

Ms Low Yen Ling

Mayor of South West District

Distinguished Guests

Ladies and Gentlemen

Residents from South West Constituencies

A very good morning to one and all.

### **The Achievements of South West CDC**

2 I am indeed very happy to be here this morning for the ECo Day Out 2017 @ South West. Let me first congratulate South West CDC for having won the Clean and Green Environment Best Community Achievement Award for the 12<sup>th</sup> time. Let us give Mayor Low, the Community Development Council (CDC) and all the volunteers a big round of applause. South West CDC has worked very hard, keeping up with the tradition of doing a wonderful job at promoting environmental consciousness amongst our residents. Many residents will be asking during this period, “when is the ECo Day Out?”, because they have a whole load of recyclables to contribute.

3 ECo Day Out has evolved to become a carnival. It is no longer just a trash for recycling programme, but includes exhibitions to raise environmental awareness and awards. The district has managed to garner over 660,000 kilograms of recyclables, which is equivalent to saving 16,000 trees. A wonderful job indeed.

4 South West CDC has implemented and initiated different creative and innovative programmes over the years, led by the CDC councilors from the environment committee. These programmes are targeted at different segments of the population, such as Green Schools @ South West, Power Savers-for-Charity @ South West, in order to encourage others to adopt eco-friendly habits.

### **Support of South West CDC to the Sustainable Singapore Movement**

5 These programmes are in line with the Sustainable Singapore Blueprint (SSB), a plan which lays out our vision on how we can develop and ensure that we have a liveable and sustainable Singapore. As part of this plan, we had launched a Sustainable Singapore movement in July 2016.

6 We have five mascots under the Sustainable Singapore movement. Two of the mascots, Caring Cora representing an Active and Gracious Community, and Smart Eddie representing eco-smart and endearing towns are here with us today.

7 South West CDC has done a lot to champion the SSB, in line with the Sustainable Singapore Movement. Just last year alone, South West CDC had over 91 ground-up initiatives, engaged 500,000 residents and having galvanised over 36,000 volunteers. This is not an easy feat, and the district has done a wonderful job. I am heartened that we have got such great champions for the environment.

### **Launch of Power Saver-for-Charity Plus @ South West**

8 South West CDC is launching the Power Saver-for-Charity Plus @ South West programme, having already implemented the Power Saver-for-Charity @ South West last year with very encouraging results. Under this programme, South West CDC hopes that South West residents can pledge to become eco-friendly and environmentally conscious citizens, by taking small steps in their everyday life.

9 An example is in reducing electricity consumption and energy usage through reducing air conditioning temperatures to 25 degrees Celsius, or 24 degrees Celsius for those who need more time to adapt. It is quite an irony that in cold climates such as Japan and Korea, the temperature set is typically 26 degree Celsius even though people in these countries are used to sub-zero temperatures, while in Singapore, temperatures are low to the point that we have to wear a jacket when we go indoors. Is this not a waste of resources?

10 I therefore encourage residents to adjust the temperatures, switch off the electrical appliances at their mains when they are not in use, use energy efficient lights, and minimise waste.

11 There is a very good recycling habit in South West. The next step for us now, even as we continue to promote recycling, is to encourage the other 'Rs' – reduce and reuse, so as to minimise waste. Though I know of families who pool together their waste to exchange their trash for groceries, we want to minimize waste generated.

12 Everybody can play a part. Small little changes in our lives, with everyone doing them, will lead to major changes to mitigate the impact of climate change.

13 From a programme involving 17 blocks last year, Power Saver-for-Charity Plus @ South West is going to be implemented throughout the district, with roving exhibitions to promote and schools and community events to garner environmental pledges. I encourage all residents to pledge to make changes in their lives, to help us conserve resources and save energy even after the event.

#### **Caring for the Environment and the Community**

14 The other benefit of Power Saver-for-Charity Plus @ South West is the charity angle. By working with Singapore Power to raise a target of \$100,000 for the more vulnerable segments of the community in the district, this two-in-one event allows us to care for the environment while caring for the vulnerable and needy.

15 This initiative is really what SG Cares is about. When we care for the environment, it is really about caring for each and every individual. By protecting and conserving the environment, we are creating a better environment for ourselves and the future generations while saving costs at the same time from the reduction in energy and water consumption.

16 Saving the environment is not a remote ideology. It involves doing practical things to mitigate climate change. South West CDC and Singapore Power have given you an opportunity, particularly during this festive period, to do good for fellow Singaporeans. This is really wonderful and I hope that all of you will make a pledge to make a difference to our environment and the lives of others.

Let me wish all of you a very happy, blessed and healthy new year. Thank you.

**SPEECH BY MINISTER OF THE ENVIRONMENT AND WATER  
RESOURCES MASAGOS ZULKIFLI  
AT THE OFFICIAL OPENING OF BEWG-UESH NEWATER PLANT  
AT CHANGI, 18 JAN 2017**

Excellencies, Distinguished Guests,

Ladies and Gentlemen

**Introduction**

1 It gives me great pleasure to join you this afternoon for the official opening of the BEWG-UESH NEWater Plant. The second plant to be built in Changi, this is Singapore's fifth NEWater plant and one of our largest NEWater facilities.

**Success of NEWater**

2 Water is a scarce resource in Singapore, and has always been an existential issue for us. According to the World Resources Institute, Singapore is one of the world's most water-stressed countries, as we are densely populated and have limited freshwater sources. NEWater's introduction in 2003 was a major breakthrough that enabled us to strengthen our water security. This achievement was not by chance, but through the sheer determination of our leaders and PUB's commitment to research and innovation. We had experimented with used water recycling as early as the 1970s, but it was only three decades later that our efforts finally paid off, when membrane technology's cost and performance had improved sufficiently for used water to be reclaimed at a reasonable price. Today, NEWater is one of the key pillars of Singapore's water supply strategy.

3 The share of NEWater in our water supply has grown steadily over the years. From an initial demand of only 4 million imperial gallons per day (mgd) in 2003, more than 80 mgd of NEWater is now supplied to over 630 companies for industrial use. NEWater is also used to top up our reservoirs during dry weather periods. Being independent of weather, NEWater helps to mitigate the impact of climate change, bolstering the resilience of our water supply.

## **Embracing Partnerships**

4 Close partnerships with the private sector have played an important role in allowing Singapore to harness deep expertise, innovation, and cutting-edge water technologies. To encourage collaboration and co-creation, the National Research Foundation has allocated \$670 million from 2006 to 2020 to foster leading-edge water technologies and grow the research community in Singapore. Today, we have 180 local and international water companies and more than 20 research & development centres in Singapore.

5 We have also leveraged the combined expertise and resources of the public and private sectors to deliver water solutions in a cost-effective manner, through Public-Private-Partnerships (or PPP) like this one. This BEWG-UESH NEWater Plant is the first PPP water project in Singapore secured by a consortium of Chinese and Singapore companies. I am pleased that BEWG has also set up an international HQ in Singapore, with global investment plans estimated at up to S\$2 billion. This decision affirms Singapore's position as a Global Hydrohub and a window to the global water industry.

## **Investments in infrastructure and Costs**

6 Even as we celebrate this launch, we need to remain mindful that Singapore continues to face challenges in water supply. NEWater is one of our four taps. Our largest tap, imported water, as well as water from local catchments are weather-dependent. The Linggiu Reservoir which regulates the flow of water in the Johor River from which we draw water for import, fell from 80% in early 2015 to a historic low of 20% in October 2016, before making a slow recovery to 27% currently. PUB has been releasing more water from Linggiu Reservoir to sustain the abstractions by water treatment plants of both Johor and Singapore. This drain on Linggiu Reservoir is made worse by dry weather, which appears to have become more frequent and prolonged in recent years. If the level of Linggiu Reservoir continues to fall, the water supply for both Johor and Singapore would be affected.

7 To meet the increasing demand for water, and strengthen our resilience against weather uncertainties, PUB has made major investments in water infrastructure over the years and will continue to do so. This NEWater plant is one example. With the completion of this plant, NEWater can now meet 40% of

Singapore's water demand. At the same time, we are also investing in 3 more desalination plants, which will be completed by 2020. Last month, we selected Keppel Infrastructure Holdings as the preferred bidder for the DBOO tender for the Marina East Desalination Plant. We will also be calling the Request-For-Proposal for the Jurong Island Desalination Plant soon.

8 However, additional infrastructure comes at a cost, especially with increasing reliance on non-traditional and more expensive sources. Rising costs of asset maintenance and replacement, as well as of resources like energy, chemicals, materials and manpower, have exerted upward pressure on the cost of water. With greater urbanization, the laying and replacing of pipelines in our network to convey water would also require the use of more expensive methods such as pipe-jacking and tunnelling. While PUB has managed its costs over the years through improvements in productivity and technology, much of the incremental improvements have already been reaped. What remains are longer term breakthrough technologies which may take many more years to be proven and become deployable, similar to how the technology breakthrough that brought us NEWater supply reliably took many years to fully develop. The prospects are promising, but we will need time to scale and test these laboratory discoveries.

## **Ensuring Sustainability**

9 To ensure that water supply remains financially sustainable, the Government reviews the water price regularly. We seek to ensure that every part of our water system is well maintained and replaced where necessary, and new infrastructure is developed to meet demand and strengthen resilience against weather or unforeseen circumstances. Our price has always reflected the cost of water so that consumers appreciate the scarcity value of water. In my encounter with water ministers from countries where water is not priced properly, they lament that water is often wasted, there is no fund to fix leakages and new plants are not built for decades. We will make adjustments in water charges when necessary.

10 At the same time, we also need to continue our efforts to manage the demand for water. We must press on with water conservation and efficiency, both in our daily personal usage and in the non-domestic sector. Every drop of

water conserved means less resources and costs needed to invest in additional supply.

### **Launch of Plant**

11 In conclusion, I would like to thank the key partners here – Beijing Enterprises Water Group Limited and UES Holdings Pte Ltd, PUB, our National Water Agency, consultants and contractors – for making this launch possible.

Today is another important page in our water story. It is now my pleasure to declare the BEWG-UESH NEWater Plant open!

12 Thank you.

Mr Grant Kelley

CEO of City Developments Limited

Mr Tim Hill

Research Director of Eco-Business

Distinguished guests

Ladies and gentlemen

A very good afternoon to all of you. Today, I am honoured to be part of a very meaningful initiative which not only benefits the environment, but also, gives back to the society. This brings new found respect to the term “Zero Waste Hero”, which very aptly is also the call-to-action tagline for EcoBank 2017.

### **Towards a Zero Waste Nation in Singapore**

In Singapore, the term “Zero Waste” is something that is slowly, but surely, starting to gain traction. It is partners like you, who help encourage individuals and organisations to be more conscious of their consumption. It is important for us to move away from the “buy and throw away” culture and give pre-loved items a second lease of life. I myself am very used to this, because I used to pass down my clothes to my brothers, and I myself used to wear hand-me-downs from my father’s boss. In fact, you would not even realise these were pre-loved items because they were so well taken care of so that someone else would be able to use them later.

As a “Clean and Green” city, it has always been the Government’s priority to ensure that demand for waste management in Singapore is adequately met. However, being a land scarce city, we face unique challenges in waste management, and we simply cannot afford to take for granted our one and only landfill, in Pulau Semakau. In fact, in 2015, Singapore generated about 7.6 million tonnes of waste, which is a 50 per cent increase from the amount generated back in 2005. Statistics speak the truth, and if we continue to generate waste as we have done so in the past decade, Semakau Landfill will run out of space by 2035.

If we all work together to create a sense of ownership towards the environment, and together reduce, reuse and recycle, we can greatly reduce the amount of food and material waste generated in Singapore. Collectively, we must move *Towards a Zero Waste Nation*. This is also one of the five themes of the Sustainable Singapore Blueprint (SSB), which outlines our national vision for a liveable and endearing home, a vibrant and sustainable city and an active and gracious community.

Under the SSB, we have set ourselves ambitious targets of an overall recycling rate of 70 per cent and domestic recycling rate of 30 per cent by 2030. Much needs to be done, particularly to raise the domestic recycling rate which stood at 19 per cent in 2015. As the majority of households live in high-rise apartments served by rubbish chutes, it becomes very convenient for residents to dispose of their refuse, into this magic hole in the wall, without separating recyclables from general waste. If more recyclables can be separated from waste at source and reused or sent for recycling, we can conserve resources and reduce the need to build more disposal facilities. In addition to the blue recycling bins at every HDB block and landed premises, the Government has been working to make recycling more convenient by enhancing the infrastructure of residential developments. In fact, since 2014, all new HDB flats launched come with centralised dual chutes for general waste and recyclables to encourage greater recycling amongst the community.

I am glad that the results have been encouraging as studies at one of the estates in Punggol have shown that the recycling rate in those blocks is 2.6 times higher than that of blocks without dual chutes. With such initiatives, I look forward to achieving our national recycling target by 2030.

### **Sustainable Singapore Movement**

Apart from Government-led initiatives, I hope to seek support from the people, public and private sectors to translate the SSB into actions. In 2016, my Ministry launched the Sustainable Singapore Movement, which aims to rally like-minded individuals and organisations, like yourselves, to take action towards environmental stewardship by leading ground-up projects which involve the community and move towards a truly sustainable Singapore. Along with this movement, we also launched a symbol and a visual identity for sustainability, as well as five lovely mascots. In fact, you might have caught a glimpse of Eco Eva today, she personally believes that we all can do our part and move *Towards a Zero Waste Nation*.

I am pleased to know that the EcoBank is one such ground-up initiative which is in support of the Sustainable Singapore Movement. You too can be a part of this movement by simply adopting greener practices, such as encouraging your organisation to go paperless, segregating recyclables from waste and

participating in recycling drives, or purchasing upcycled or recycled items. The items on sale at the EcoBank Bazaar is a good start!

### **The EcoBank Initiative**

The EcoBank, which is on its second run this year, is a joint initiative by City Developments Limited (CDL) and Eco-Business.com, both organisations are no strangers to the environmental scene. CDL has long been at the forefront of environmental sustainability. They have been ardent environmental advocates, promoting the adoption of sustainability practices and forging partnerships to create game-changing innovations. In the same stride, Eco-Business has leveraged on its networks spanning far and wide to bring to light issues on the environment and sustainable development at the click of a mouse. I am heartened by how these like-minded organisations have collaborated to advocate waste minimisation and responsible consumption, to raise funds for children charities.

I have been told that this year the EcoBank collected a whopping 10.8 tonnes of pre-loved items as compared to some 6 tonnes collected last year. These items include clothes, toys, books, electronics and household appliances, all of which are given not only a second lease of life, but a second purpose to educate consumers on responsible consumption, reusing and recycling.

In addition, the EcoBank also helps to raise awareness and highlight the importance of helping communities in need. All funds raised from the 3-day bazaar will go towards supporting children charities under the Children's Charities Association. So I hope that you reach out to your friends and families to come down to City Square Mall this weekend and not only play an active role in contributing towards less waste going into our landfill, but also help EcoBank achieve their fund raising targets for the beneficiaries. Last year the EcoBank raised SGD\$47,776, let's see how we can outdo this amount this year. That is my challenge to you!

### **Conclusion**

EcoBank is an excellent zero waste initiative, and I encourage more organisations to think out of the box, and do the same.

The concept of sustainability and environmental conservation becomes much more impactful when everyone plays a part and takes ownership, be it the Government, businesses, civil societies, and individuals like you and me. I would like to express my appreciation to CDL and Eco-Business for organising such a wonderful two-in-one initiative, and to the community for donating your pre-loved items with an open heart, and for such a good cause.

If the concept of “Zero Waste” is one that is new to you, I encourage you to start with the guilt-free shopping at the EcoBank Bazaar. In fact, go a step further and encourage this reusing and recycling culture in your own homes. Start with small acts like segregating your waste from recyclables, and being a responsible consumer. Collectively by conserving resources, we will extend the lifespan of our only landfill, for our future generations to enjoy. No action is too small, and together we can contribute towards a sustainable Singapore.

Thank you very much and I wish everyone a fruitful journey towards a zero waste lifestyle!

Madam Speaker, I beg to move, "That the Bill be read a Second time."

2 The Energy Conservation (Amendment) Bill, or EC Bill in short, seeks to introduce a new set of initiatives to improve industrial energy efficiency, enhance our greenhouse gas reporting requirements and revise the Carbon Emissions-based Vehicle Scheme.

### **International Energy Outlook**

3 Madam Speaker and members of the House, the Paris Agreement came into force last year, less than a year after it was concluded. This was a significant milestone in our global fight against climate change, and for all who seek a sustainable future for our children. To date, 134 countries accounting for over 80% of the world's total greenhouse gas emissions have ratified the Agreement.

4 When you strip away its legalities, the heart of this pact is really about energy use and conservation. The International Energy Agency's World Energy Outlook 2016 projected in its "main scenario" that global energy demand would rise by 30% from now to 2040, with accompanying increases in greenhouse gas emissions. Reducing energy use is thus key to address global warming.

5 Faced with an increasingly carbon-constrained future, countries and businesses have no choice but to transform the way we produce and use energy. At the same time, this has given rise to new opportunities to grow a greener and more sustainable economy. For example, China is embracing renewables in a big way, while India plans to have nearly 60% of its electricity capacity come from non-fossil fuels by 2027. Leading companies have also come on board. Google has committed to power 100% of its operations with renewables. I visited Shell's "Make the Future" exhibition last month which showcased innovative ideas to harness energy without emitting more carbon. One such example was a wind turbine that could capture wind energy produced by cars travelling along a highway.

6 While innovative technologies can supplement our energy needs, Singapore will still have to depend on imported energy, primarily natural gas (which is cleaner than coal and oil), to meet the bulk of our demand. Our energy demand is projected to increase at a compounded annual growth rate of between 1.2% to 1.8% over the next decade. Given our limited land space, we are disadvantaged in our ability to use alternative energy. Nonetheless, we are committed to do our part to protect the environment, and have pledged to improve our emissions intensity by 36% from 2005 levels in 2030, and to peak around the same time under the Paris Agreement.

### **Singapore's Response to Climate Change**

7 The Climate Action Plan, which was launched last year, lays out four key strategies to fulfil this commitment, namely:

- i. improving energy and carbon efficiency,
- ii. reducing emissions from power generation,
- iii. developing and deploying low-carbon technology, and
- iv. encouraging collective climate action.

8 In Singapore, the industry sector is the largest energy user, consuming about two-thirds of our total energy consumption, and contributing about 60% of our carbon emissions in 2014. Improving energy efficiency, or EE for short, in the industrial sector, is thus key to achieving our climate change goals.

9 In 2012, we introduced the Energy Conservation Act, or ECA for short. Our main objective was to put in place the building blocks to help the industry develop its capabilities in EE. Under the ECA, 180 energy-intensive companies, accounting for the lion's share of industrial energy use, are required to implement basic energy management practices such as regular monitoring of energy use, and to appoint qualified energy managers to oversee EE improvement.

10 I am happy to report that the preliminary results are encouraging. ECA companies have reported an overall EE improvement rate of 0.4% and 0.6% in 2014 and 2015 respectively. This upward trend is in the

right direction. However, in order to meet our climate pledge, we need to double or triple the current improvement rates, and achieve 1 to 2% annually, similar to that attained by leading jurisdictions such as Belgium and the Netherlands. It is timely to bring our efforts to the next level.

11 The EC Bill that my Ministry is proposing, aims to introduce three sets of enhancements to the original ECA. The first, and where the bulk of enhancements are, is on measures to improve our industrial EE. The second set seeks to improve greenhouse gas emissions reporting, and the third deals with the new Vehicular Emissions Scheme. I will elaborate more.

### **EC Bill Enhancements: Improving Industrial Energy Efficiency**

#### *Ensuring Good EE Practices in ECA Companies*

12 We will introduce three enhancements to strengthen EE practices among ECA companies. They are: one, the adoption of structured Energy Management Systems; two, to conduct regular energy efficiency opportunities assessments; and three, to conduct design reviews. Let me elaborate further.

13 Our analysis of ECA data in 2014 and 2015 showed several areas for improvement. In particular, we found that many companies did not adopt a structured framework to manage their energy use and guide their EE efforts. In addition, EE ambition amongst companies continued to be low.

14 The proposed amendments to the EC Bill will thus require ECA companies to adopt a structured Energy Management System, or EnMS for short. EnMS institutes a “plan, do, check, act” framework for companies to constantly re-examine and improve their EE efforts. Senior management will be responsible for setting energy policy and targets, evaluating them and developing action plans. Studies have shown that having a structured EnMS can help companies achieve energy savings of at least 10% to 15% in the first few years. Countries like Japan and those in the EU have already incorporated this practice in their regulations. With this amendment, companies will be required to put in place an EnMS by 2021 or 2022, depending on the size of their facility’s energy consumption.

15 ECA companies will also be required to conduct regular energy efficiency opportunities assessments, or EEOAs for short. Also known as energy audits, EEOAs involve systematic assessments of energy consumption, and the identification and quantification of potential improvement opportunities. Large companies in the EU, South Korea and India are already required to conduct such assessments regularly. Under the enhanced ECA, companies will be required to submit their first EEOA by 2021.

16 Many companies have given feedback that the lifespan of industrial equipment can be very long – 30 years or more. Thus, it is challenging to introduce new technologies mid-way as it disrupts their operations. Instead, it is better to identify and incorporate EE opportunities at the start of the project. With this in mind, from 2018, we will require new industrial facilities and major expansion projects to undergo design reviews to incorporate EE measures.

17 The three key enhancements that I have just detailed are intended to help ingrain good EE practices in companies.

### **Minimum Energy Performance Standards for Industrial Equipment and Systems**

18 Thus far, ECA data also showed that many companies have focused on harvesting “low-hanging fruits”, or EE measures that have short pay-back periods but provide only low energy savings. Undertaking EE improvements for larger systems such as boilers, chillers and compressed air systems would significantly enhance the savings reaped. The data also showed much room for improvement in the EE of common industrial equipment like motors.

19 Hence, the Bill will aim to increase the adoption of more energy efficient commonly-used industrial equipment and systems. An existing measure under the ECA is the Minimum Energy Performance Standards, or MEPS for short. MEPS currently covers household appliances and has been successful in raising the energy efficiency of these household products. We will revise and extend MEPS to industrial

equipment and systems, starting with motors in 2018. We expect MEPS for motors to translate to some 0.4 MT in carbon abatement by 2030.

20 Madam Speaker, as a result of these enhancements, we will be raising penalties for several non-compliances to reflect the higher value of industrial goods, and to bring them in line with other legislation. However, I would also point out that the overall benefits of the ECA measures to companies are by far more attractive, including helping them to achieve long-term cost savings and increased competitiveness.

#### **EC Bill Enhancements: Improving our Greenhouse Gas Emissions Reporting Requirements**

21 The second set of enhancements that will be made to the ECA concern the reporting of greenhouse gas emissions. These enhancements aim to strengthen the Quality Assurance and Quality Control processes within our Measurement and Reporting (M&R) requirements, to provide a robust foundation for the future carbon pricing regime.

22 Large industrial emitters will be required to submit a monitoring plan, and an enhanced greenhouse gas emissions report based on the approved monitoring plan. Companies will also have to compute their emissions data according to standard methodologies determined by the NEA. These will bring our M&R standards in line with international best practices and ensure accurate and robust accounting of their emissions. This will also help companies to better understand and manage their emissions.

#### **EC Bill Enhancements: Revisions to the Carbon Emissions-based Vehicle Scheme**

23 The third set of revisions to the ECA concerns the Vehicular Emissions Scheme, or the VES for short. As I have announced during the recent COS debate, the VES will replace the current Carbon Emissions-based Vehicle Scheme, or the CEVS. Under the CEVS, only carbon dioxide is taken into consideration in determining the emissions level of a vehicle. The VES which replaces it will now consider other harmful pollutant emissions in addition to carbon dioxide. Any label on any motor vehicle model displayed for sale and related promotional materials and advertisements must now include information on the vehicular emissions of the motor vehicle including information on the fuel economy of the motor vehicle. The EC Bill proposes to amend the ECA to extend the labelling and information disclosure requirements related to the VES and to make the relevant amendments to the Road Traffic Act to give effect to the new scheme.

#### **Conclusion**

24 Madam Speaker, and members of the House, let me conclude. The proposed enhancements to the ECA are forward-looking, and aim to guide how we view and conserve precious energy resources. The ECA provides a framework to shape positive choices in the industry, transport and household sectors, to achieve a carbon-efficient and sustainable future. It will also catalyse demand for energy efficiency and clean energy services, which could become the seeds of future growth. I encourage all stakeholders to work with us on efforts to conserve energy, as we seek a sustainable future together.

25 Madam Speaker, I beg to move.

Dato' Sri Dr. Haji Wan Junaidi bin Tuanku Jaafar, Minister of Natural Resources and Environment, Malaysia

Prof Simon Tay, Chairman, Singapore Institute of International Affairs

Distinguished guests

Ladies and gentlemen

It is my pleasure to be here at the 4<sup>th</sup> Singapore Dialogue on Sustainable World Resources.

2. Last year, I spoke about the benefits that a sustainable agroforestry sector can bring to the region, and the roles that the government, civil society and the financial community play in encouraging the sustainable development of the sector. I am happy to see the progress made by the various stakeholders over the past year.

3. Sustainable development is often defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. Extreme advocates of sustainability may come across as arguing against all forms of development – for example that every inch of forest must be saved in the same state as today. This extreme position is difficult to defend because it ignores the real and legitimate needs of the present generation. The palm oil sector, for example, brings important economic benefits to the region. Palm oil contributes an estimated 2-2.5% to the Gross National Product in Indonesia, and is the fourth largest contributor to Gross National Income in Malaysia. It also supports the transition of many communities out of poverty and significantly improves the lives of smallholder farmers. With demand for palm oil projected to grow by another 50% by 2020, there is tremendous potential for growth.

4. And yet, we are all acutely aware of the social and environmental costs that an expanding agro-forestry sector has brought. Social conflict between indigenous communities and corporates is common, due to discrepancies in land allocation. New areas for cultivation of palm oil often come at the expense of the rainforest, and all the resources it contains.

5. It is therefore critical that we continue to strike the right balance by actively shaping the agro-forestry sector into a more sustainable one. Let me elaborate on how various stakeholders can collectively work together to achieve sustainable supply chains for the agroforestry sector.

**6. First, a credible, strong and vibrant civil society serves as a catalyst for change, to broaden and deepen environmental consciousness among**

**the population.** There have been promising domestic developments and ground-up efforts by civil society over the past year. Let me name a few.

7. WWF Singapore and founding members Unilever, Danone, Ayam Brand, IKEA and Wildlife Reserves Singapore, have established the Singapore Alliance for Sustainable Palm Oil (SASPO) in June last year. The Alliance sends an unequivocal signal to consumers that many major businesses are committed to the production, usage and trade of certified sustainable palm oil. I hope their numbers will grow quickly. These companies and organisations lend credibility to the alliance for sustainability. This is both because they walk the talk, but more importantly, they have a deep knowledge of sustainability issues in the real world and how to steer and shape them. Since the establishment of the Alliance, more Singapore based companies have been engaged on their sourcing and policies on palm oil. I encourage companies to make the transition to sustainable palm oil by joining like-minded companies to source responsibly through SASPO.

8. The Singapore Environment Council (SEC) had in January this year announced a new and more holistic green label category for pulp and paper products which encompasses peatland management and fire prevention standards as part of its criteria. The new category maintains one of the most stringent environmental performance standards globally, and requires companies to have their entire supply chain audited against these criteria. The Government will support companies in this effort by only procuring printing paper with this label in future.

9. The SEC also launched a new certification category for palm oil-based products last year. When it has taken off, the new category for palm oil products under the Singapore Green Labelling Scheme (SGLS) will lead to greater transparency in the palm oil supply chain and provide consumers greater assurance of sustainable sourcing.

10. Through its #GoHazeFree campaign, the People's Movement to Stop Haze (PM. Haze) has been encouraging households and industry to switch to haze-free palm oil as part of its outreach programme. PM.Haze has also produced a "Haze-Free Cooking Oil" Guide.

11. The government strongly supports these ground-up initiatives that will allow for more informed purchasing decisions and influence consumers towards more environmentally sustainable attitudes and behaviours. But I hope that our NGOs will also deepen their expertise in the area they are championing. This is the best way the government and the civil society can work together so that as the government legislates for sustainability, NGOs have the credibility to help shape our society that supports sustainability.

12. **Second, sustainability should no longer be an afterthought for companies, as it can directly impact the bottom line.** With increasing global

awareness of the impact of unsustainable farming practices, a lack of oversight over supply chains can result in serious reputational and financial risks for companies.

13. Hence, forward-looking companies are already taking steps to realize sustainability targets in their supply chain. Unilever is one such example. In 2015, Unilever only had 19% of its palm oil physically certified, but it has committed to increasing this figure to 100% by 2019. Others such as Mars, Mondelez, Nestle, Cargill and Olam have also taken steps in the same directions. They are sending a strong and right signal to the industry.

14. However, having a strong public showing of a company's sustainable commitment is not sufficient. In a landscape where the traceability of agroforestry commodities is often elusive, this has to be matched by the concrete actions a company takes to scrutinize its upstream suppliers. Recently, a report by the Rainforest Action Network uncovered illegal clearing activities at a UNESCO world heritage rainforest site in Sumatra. This prompted Nestle to raise concerns over unsustainably-produced palm oil that it could have acquired from its upstream supplier. Nestle's upstream supplier subsequently responded by putting on hold purchases from the alleged producer of unsustainable palm oil.

15. This episode shows that companies cannot let their guard down when it comes to upholding sustainability standards. It is only with continued vigilance – constantly making suppliers accountable, weeding out bad players, and so on – that we can move towards a truly sustainable and reputable agroforestry sector.

**16. Third, governments in the region have moved individually and collectively to act on forest and land fires.**

17. Our region has set its sights on achieving a haze-free ASEAN by 2020. Last year, ASEAN Member States developed and adopted a Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control.

18. Each ASEAN Member State is doing its part to turn this vision into reality. Indonesia has taken positive actions to contain the number of hotspots over the past year. In 2016, there were just over a hundred hotspots as compared to many thousands in 2015. After Riau and Jambi began experiencing land and forest fires from mid-Jan 2017 as a result of drier weather conditions, Indonesia acted expeditiously by declaring a state of emergency in Riau on 24 Jan 2017. This allowed for the timely deployment of resources and tighter coordination between the central and provincial authorities in containing the fires.

19. More importantly, there are longer-term measures being put in place to address forest and land fires at source. Just last year, the Indonesian Government announced a five-year moratorium on new licenses to establish palm oil concessions. The moratorium will halt the draining and clearing of new

carbon-rich peatland. This decision extends to concession land previously licensed to plantation companies as well. The Executive Director of the United Nations Environment Programme Mr Erik Solheim recently praised this move by President Jokowi, calling it a positive and historic decision, both for Indonesia and for global efforts to tackle climate change[1].

20. While the central government actively tackles the haze problem, provincial governments also play a critical role. Under the leadership of Governor Alex Noerdin, the South Sumatra province is taking on an exemplary role by embarking on a Green Growth Development plan. As you have heard, the plan adopts a multi-stakeholder approach towards the sustainable management of forested lands. In June last year, more than 2,700 independent smallholders covering 5,500 ha in South Sumatra received the Roundtable on Sustainable Palm Oil (RSPO) certification. This is currently the world's largest individual group of independent smallholders to be RSPO-certified[2]. I was not in the room but was told that Governor Alex Noerdin made a pledge today that this year, there will be no haze coming from the South Sumatra region. Thank you Governor.

21. Since its establishment in 2016, Indonesia's Peatland Restoration Agency (BRG) has also gone from strength to strength in its peatland mapping exercise despite the challenges it had faced with plantation companies. It has also achieved successes in working together with NGOs and local communities on peatland restoration projects. For instance, BRG recently signed a Memorandum of Understanding with the Alliance of the Indigenous Peoples of the Archipelago to drive peatland restoration efforts and empower indigenous communities economically. BRG's efforts bode well for the sustainable growth and development of the agriforestry sector.

**22. Fourth, nascent sustainable financing efforts are gradually gaining a foothold in our domestic financial sector.**

23. Following the launch of the Association of Banks of Singapore's (ABS) Responsible Financing Guidelines in 2015, ABS member banks are now expected to factor into their lending and investment policies sustainability issues such as greenhouse gas emissions, deforestation, resource efficiency, labour standards, and corporate integrity. The local banks have since established internal taskforces on environment, social and governance issues, to help integrate the ABS Guidelines into their lending and business practices. Banks have also implemented environmental risk weightings as part of their loan assessment criteria. Loan decisions relating to companies which are assessed to have high environmental risks will be escalated to the banks' senior management. More recently, the ABS has also introduced specific guidelines for banks on dealing with haze-related risks, such as no open burning on plantations and building capacity on fire prevention with local communities.

24. Investment firms have also moved to anchor sustainability in their investment processes. Temasek recently established a new sustainability and stewardship group to lead the company's future initiatives around the themes of sustainability and stewardship. This is an important move that demonstrates the growing role that investment firms can play to drive sustainability, and bring about green transformation in the financial sector. I hope it will inspire and spur other financial institutions to do the same.

25. As the region develops, private sector financing will play an increasingly important role in infrastructure and project finance. If private capital can be directed to projects that take environmental factors into account, projects that engage in unsustainable business practices will be starved of credit. This will help to gradually shift the business landscape towards more sustainable practices. As a leading capital market in the Asia-Pacific, Singapore is well-poised to play an influential role in making this happen.

## **Conclusion**

26. Each and every one of us has a part to play in realizing a sustainable agroforestry sector in the region. Governments need the political will to act quickly to curb forest and land fires, and will have to take on a larger custodial role in safeguarding the rainforest and high carbon-stock areas. Civil society will need to continue fostering the environmental consciousness of the people, while keeping businesses on their toes as it pushes for greater transparency. Major buyers should insist on purchasing from producers who subscribe to higher and more sustainable standards. Finally, enlightened buyers who make the right choice can help to create added incentives by encouraging producers to move towards sustainable practices. Let us have everyone on board this journey towards a more sustainable and responsible agroforestry sector as there is no other way.

27. Thank you, and I wish you a lively, constructive discussion ahead.

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[1] <http://www.straitstimes.com/asia/indonesia-expands-protection-for-peatland>

[2] [www.thestar.com.my/business/business-news/2016/08/23/single-largest-independent-smallholder-group-gets-rspo-certification/](http://www.thestar.com.my/business/business-news/2016/08/23/single-largest-independent-smallholder-group-gets-rspo-certification/)

1 Good morning everyone.

2 It is heartening to see so many of you joining us today for the 'Do the Mozzie Wipeout' Campaign Launch 2017. I launched this campaign at Tampines last year as well. I remembered telling residents then that we had to take action, as dengue cases were projected to hit a record high of 30,000 cases. Fortunately, we ended 2016 with about 13,000 cases – which was half the initial estimation. That was made possible not just by a stroke of luck, but because of the strong community action nationwide. Intensive source reduction efforts by all stakeholders following the zika outbreak in August also helped curbed the transmission of dengue and zika. I applaud the effort of everyone who took action. Your efforts have paid off. In fact, I am glad to note that the number of weekly dengue cases have been low since the end of last year.

### **Current Dengue and Zika Situation**

3 The current number of dengue cases may be relatively low, but we cannot afford to be complacent. We are now approaching the traditional peak dengue season, which runs typically from June to October. Already, NEA's surveillance has shown that the *Aedes aegypti* mosquito population in our community remains high. This is the mosquito which spreads dengue and zika. You may have heard in the news that since the start of 2017, there have been 5 zika clusters. We need to stay vigilant and ensure that we do not breed mosquitoes in our homes. The NEA on its part, has also been keeping up with inspection and outreach efforts. It has conducted about 290,000 inspections island-wide in the first three months of 2017.

### **Wolbachia**

4 Even as NEA continues with these efforts, we also continuously explore new methods to further tackle the mosquito problem. I hope you have heard of Project *Wolbachia* – Singapore. It is a project by the NEA which looks at releasing male *Wolbachia*-carrying mosquitoes into our urban environment. When these male mosquitoes mate with the urban female mosquitoes, their eggs do not hatch and there will be no offspring. These male mosquitoes *do not* bite. The eventual goal of this technology is to complement source reduction efforts in suppressing the *Aedes aegypti* mosquito population in Singapore.

5 As part of Project *Wolbachia* – Singapore, the NEA last year launched a small-scale field study at three selected sites, including one in Tampines. The aim of the study is to find out more about the behaviour of male *Wolbachia*-carrying mosquitoes in our urban environment. Residents I spoke to have been very supportive of the study and I appreciate their cooperation. NEA is currently in its final stages of the field study and I am happy to share that the study has thus far provided valuable information on the behaviour of the mosquitoes. NEA is now conducting further analysis of the data collected from the study and is planning for an upcoming suppression trial. The aim of the suppression trial is to test the effectiveness of using male *Wolbachia*-carrying mosquitoes to reduce the number of *Aedes aegypti* mosquitoes in Singapore, and possibly prevent the spread of dengue and zika. I hope residents can lend us their support in the suppression trial as well.

6 That said, the *Wolbachia* technology is not a silver bullet. Indeed, it will take some years before we can deploy it in scale and effectively. It is therefore important that all of us must continue with our efforts to prevent mosquito breeding. This is the impetus for the 'Do the Mozzie Wipeout' campaign we are launching today. Through the campaign, we hope to galvanise everyone to stay vigilant and practise the 5-step Mozzie Wipeout. These are five simple steps all of us can take to ensure we don't breed mosquitoes in our homes. Local grassroots advisers, leaders and Dengue Prevention Volunteers will also be going around estates to share with residents the common mosquito breeding habitats and dengue prevention tips.

7 While NEA and the volunteers keep up their efforts, they would not be able to reach out to every single resident. We need the support of everyone to take action, and practise the 5-step Mozzie Wipeout regularly as a way of life. Collectively, we can keep dengue and zika under control, and protect not just ourselves, but also our family and friends, from getting infected.

Thank you.

His Excellency Kenji Shinoda, Ambassador of Japan to Singapore

Mr Masao Yamada, President, Dowa Holdings Co. Ltd

Distinguished guests,

Ladies and gentlemen,

1. A very good morning to everyone. I am pleased to be here today to witness the official opening of the Vertical Incineration Facility by Technochem Environmental Complex.

2. Cities face many environmental challenges, particularly where intensive industrial activities take place. These include air pollution from emissions, contamination of water supplies and generation of toxic waste. It is thus not a surprise that many cities, including those in Asia, are recognising the need for proper and effective management of hazardous waste. These concerns apply to Singapore as well, where we have long recognised the need for environmentally sustainable development.

3. Singapore faces unique challenges in hazardous waste management given the scarcity of land and the density of development. The amount of hazardous waste generated in Singapore has also been increasing. In the last five years, the industrial chemical waste generated had increased by about half from almost 300,000 tonnes to almost 500,000 tonnes. The amount of biohazardous waste collected and disposed of had increased by an even larger percentage, from about 24,000 cubic meters to about 40,000 cubic metres in the same period. Effective management of hazardous waste is therefore critical as such waste has the potential to endanger life and pollute the environment if it is not managed properly and effectively. With the completion of this latest facility, Technochem will double its incineration capacity for hazardous waste, and also become Singapore's fifth biohazardous waste disposal.

4. The vertical incinerator is also the first-of-its-kind in Singapore. By building upwards, the vertical incinerator is one and a half times more land productive than traditional incineration technology. This vertical incinerator is thus a fine example of how we can harness technology to implement innovative waste management solutions in land-scarce Singapore.

5. Hazardous waste treatment services remain a critical enabler for Singapore's sizable manufacturing sector, which includes the specialty chemicals and electronics industries. Our hazardous waste treatment capabilities in Singapore must develop in tandem with these industries. The Government will continue to partner hazardous waste management companies such as Technochem to become more technology- and skills-focused.

6. In closing, please join me in congratulating Technochem on this significant occasion of the opening of its newest facility.

7. Thank you, and I wish you all a good day ahead.

Mr Kazuhisa Goto, Managing Director, Ricoh Asia Pacific Pte Ltd,

Ms Jessica Cheam, Managing Editor, Eco-Business,

Distinguished Guests,

Ladies and Gentlemen,

A very good morning to everyone. It is my pleasure to address you today at the Eco Action Day Circular Economy Roundtable.

I am heartened by the efforts of our partners in organising events to celebrate World Environment Day which falls on 5<sup>th</sup> June every year. On this note, let me congratulate Ricoh Asia Pacific for its 11<sup>th</sup> successful run of the Eco Action Day campaign. Being a prominent business-led environmental campaign, the Eco Action Day has seen strong support from individuals, organisations and schools which have pledged positive actions for the future of the environment. This reinforces our Sustainable Singapore Movement, to galvanise the People, Public and Private sectors to build a sustainable Singapore together, by ensuring that sustainability becomes a way of life. I was browsing through the website and am pleased that this year, the campaign has garnered over 1,100 pledges, which is almost double the amount as compared to last year<sup>[1]</sup>! It is a reflection of the growing awareness of the need to take action to ensure sustainable development.

### **Challenges in Singapore**

Singapore faces a unique challenge of resource scarcity and we should be mindful to preserve what we have, to ensure a sustainable economy. That being said, most conventional businesses continue to practise the “take-make-waste” model which is prevalent today. This has contributed to the 7.81 million tonnes of rubbish generated in 2016, which is a 50 per cent increase from the amount generated back in 2005. If we continue producing waste at this rate, by 2030 this is projected to rise to 12.3 million tonnes.

It is paramount that we address this concern, together as a nation. A key way to tackle this challenge is to actively practise the 3Rs of Reduce, Reuse and Recycle, by optimising our resources, and even tapping on waste as a resource.

It is timely that this year’s Eco Action Day focusses on the circular economy, which advocates moving from a system of waste generation to one of endless resourcefulness by recycling finite resources while returning biological nutrients to the environment for renewal. A McKinsey study in 2012 estimated that by implementing a circular economy globally, we could potentially divert up to 340 million tonnes of waste from landfills annually, which is 2.5 times the total municipal waste generated in the United States annually. In Singapore, this would mean reducing reliance on landfill space and incineration plant capacity, as well as minimising carbon emissions from waste management.

The circular economy could also provide economic growth opportunities and create new innovative jobs in the green sector, such as in industrial remanufacturing, secondary resource extraction, and service jobs in repair and refurbishment of consumer products. For example, the National Industrial Symbiosis Programme in the United Kingdom, which matches waste generated by industries with businesses willing to recycle and reuse the waste, is credited with creating over 10,000 jobs in the UK economy since the year 2000. Along the same line of thinking, moving towards a circular economy makes good economic sense for Singapore, and will help position Singapore as a leading green economy. At the same time, it also complements the Governments efforts in moving towards a zero waste nation and a more sustainable Singapore.

### **The Circular Economy Challenge**

This brings me to some very interesting ideas that came about from the Circular Economy Challenge, another component of the Eco Action Day campaign. I’m sure everyone here would agree that when it comes to types of cuisine available in Singapore, we are often spoilt for choice. This is probably one of the reasons why, food waste forms about 10 per cent of the total waste generated in Singapore, with only 14 per cent of this being recycled. Later today we will get to hear from team *Mao Shan Wang* on their innovative

suggestion to reduce waste by setting up a durian husk collection system and upcycling it into biodegradable packaging.

Another proposal from team *Project Coop-erative* aims to develop a new revenue channel by re-purposing egg-shell waste into biodegradable plastic to package unsold eggs. Some of the ideas derived from the Circular Economy Challenge could have the potential to become viable business options which will enable our food industry to transition to a more sustainable one as opposed to the traditional linear supply-chain system.

### **Government's Efforts in Moving towards a Zero Waste Nation**

Transitioning to a circular economy requires a significant shift in behavior and mindset of both consumers and businesses, to diverge from the traditional linear model of consumer consumption. In response to this, the Government is helping to facilitate this transition. For instance, the Singapore Packaging Agreement, established in 2007 with 179 organisations on board, has resulted in a cumulative reduction of 32,000 tonnes of packaging waste and savings of more than \$75 million in material cost between 2007 and 2016.

We also aim to empower individuals to do their part to contribute to the vision of moving towards a zero waste nation. From 2014, all new HDB developments would be fitted with dual chutes for refuse and recyclables, making it easier for residents to make recycling a way of life. In fact, a study done in one of the estates in Punggol showed that the recycling rate in blocks with the dual chute was 2.6 times higher than that of blocks without. And from 1 April 2018, buildings above four storeys in all new non-landed private residential developments will need to be equipped with dual chutes. With such behavioural nudges in place, I look forward to achieving our national recycling target of 70 per cent by 2030.

### **Circular Economy Practices**

While the Government plays an important role in creating the right market conditions for a sustainable economy, businesses need to play their part as well, by minimising waste generated in their operations and processes, and recovering or recycling waste and by-products. I would like to highlight some of the efforts companies have adopted locally, in line with the circular economy model. Ricoh's construction of the Comet Circle™, back in 1994, provides support to the realisation of a sustainable society, one that looks beyond simply producing and marketing products but also takes into consideration the idea of reducing the environmental impact throughout the entire product life cycle. They oversee the recycling process at every stage and monitor the recycling rate of its machines, toner bottles and toner cartridges within their sales companies, to ensure that the use of virgin resources are kept to a minimum.

Another example of a ground-up initiative to combat Singapore's buy-and-throw-away culture, would be the Repair Kopitiam initiative launched by a social enterprise, Sustainable Living Lab, back in November 2014. Held on the last Sunday of each month, trained volunteers or 'Repair Coaches' host community meet-ups to help residents with repair of all kinds of faulty products ranging from electronic and household items to even fabric. Its efforts in encouraging members of the community to have a deeper appreciation of the materials used in consumer goods is what gives Repair Kopitiam the social edge in helping Singapore to develop a successful circular economy.

For the circular economy concept to pick up momentum in Singapore, we will not only need to change mindsets, but also invest in new business models and technologies in the way we live and consume goods and services. An interesting example that I came across is the collaboration between Adidas<sup>[2]</sup> and Parley by the Ocean, to transform the plastic that contributes to the marine pollution problem into high performance sportswear. The UltraBOOST range of running shoes are made from recycled plastic recovered from coastal clean-up operations in the Maldives. Each pair of shoes reuses an equivalent of 11 plastic bottles, with the design of the shoe itself inspired by ocean waves, reflecting both the companies' commitment towards ending the cycle of pollution in oceans and phasing out the use of virgin plastic in Adidas products. This is an example of how global brands are starting to engage in resource productivity, for the betterment of, not only the environment, but also the global economy.

### **Conclusion**

The different examples that I highlighted, as well as the different ideas that came about from the Circular Economy Challenge, show positive signs of change for our economy. The circular economy concept is restorative and is a solution that offers a means of uncoupling growth from resource constraints, and one that businesses should seriously consider. After hearing these inspiring and innovative examples, I hope to have your support as we continue on our Sustainable Singapore Movement together and adopt a more sustainable and resource efficient way forward.

I look forward to having fruitful discussions with you later, on the opportunities, challenges and possibilities that await in the shift towards circular economy in Singapore. I am confident that we can pave a way towards a zero waste and sustainable Singapore, without the expense of our economy.

With that, I wish you all a happy World Environment Day in advance! Thank you.

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[1] In 2016 there were 623 pledges for Eco Action Day from organisations, schools and individuals.

[2] <http://m.adidas.com/us/parley>

Distinguished Guests,

Ladies and Gentlemen,

### **Introduction**

1 Good evening. It gives me great pleasure to join you all here this evening to commemorate the 10<sup>th</sup> Anniversary of the Singapore Packaging Agreement (or SPA in short). Today, the 5<sup>th</sup> of June, is also World Environment Day – a day designated by the United Nations General Assembly to promote worldwide environmental awareness and empower all of us to do something positive for the environment.

2 Therefore, it is especially meaningful that, today, we are also celebrating a significant milestone of the SPA, a waste reduction initiative which was launched on this very same day 10 years ago. On 5th June 2007, 32 organisations came together to sign the SPA and made the commitment to reduce packaging waste, which makes up about one-third, by weight, of domestic waste disposed of. Since then, the SPA has been contributing to our vision of moving towards a Zero Waste Nation under the Sustainable Singapore Blueprint 2015 (or SSB) by encouraging businesses to reduce their consumption of packaging resources, as well as reuse and recycle packaging waste. You probably would have noticed that Eco Eva, one of the five mascots under the Sustainable Singapore Movement, representing the SSB pillar of “Towards a Zero Waste Nation”, is with us today. She is here in support of the SPA, and to remind us of our need to cherish our resources, consume less and adopt sustainable practices to maintain a good living environment for our future generations to enjoy. Each and every one of us has a role to play in reducing packaging waste and we can do so, for example, by supporting products with less packaging. The Logo for Products with Reduced Packaging (or LPRP in short) that will be launched this evening, will, in the near future, help consumers to identify products that have undergone packaging reduction and allow them to make more informed choices in their purchases.

3 Over the past decade, the SPA has spurred many businesses to review their packaging designs and practices in order to reduce waste and be more resource-efficient in their use of materials. The SPA has also facilitated the review process by providing signatories with the platform to share their experiences and exchange ideas. Many companies have cut their packaging usage and at the same time, reaped the benefits from improvements to their bottom lines. To date, close to 200 organisations have become signatories of the SPA and have cumulatively reduced close to 39,000 tonnes of packaging waste, which resulted cost savings of about \$93 million.

### **SPA Awards 2017 and SPA 10<sup>th</sup> Anniversary Awards**

4 This evening, we want to not only recognise the signatories for their accomplishments in packaging waste reduction over the past 12 months, but also celebrate their achievements and contributions over the last 10 years.

5 To mark the 10th Anniversary of the SPA, selected signatories will be receiving the 10th Anniversary Special Achievement Award in recognition of their consistent and outstanding performances in reducing packaging waste over the past decade, or the 10th Anniversary Outreach Award for being active champions of the SPA and its objectives.

6 In particular, I would like to highlight the three recipients of the 10th Anniversary Special Achievement Award, namely Nestlé Singapore (Pte) Ltd, Tetra Pak Jurong Pte Ltd and Sunfresh Singapore Pte Ltd. Nestlé Singapore has been undertaking new projects every year since the inception of the SPA, and has cumulatively avoided close to 3,000 tonnes of packaging waste. Nestlé has implemented wide-ranging measures spanning from making changes to their packaging designs for products under their household name MILO®, to optimising their production practices and operations so that less packaging waste is eventually disposed of.

7 Tetra Pak Jurong Pte Ltd has cumulatively reduced about 15,000 tonnes of packaging waste over the past decade through initiatives such as installing equipment within their premises to reuse their packaging waste and improving their production processes to reduce material wastage. This is a significant achievement.

8 Such efforts are not just restricted to multinational corporations; Sunfresh Singapore Pte Ltd, a local small and medium enterprise established in 1981 and one of the pioneer signatories of the SPA, stood out among the SMEs for its tenacity in looking for ways to reduce packaging waste year after year. They have

reviewed their use of packaging across the supply chain from logistics to production of finished products and made positive changes to avoid waste.

9 Sunfresh Singapore's example has proven that even smaller companies with less resources are able to contribute to packaging waste reduction and enjoy cost savings, if only they would take that first step to challenge the status quo.

10 Please join me in giving all our award recipients a round of applause. I congratulate them for their achievements.

### **Mandatory Requirements for More Sustainable Packaging Waste Management**

11 While the efforts of businesses to reduce packaging waste under the SPA programme have been laudable, the amount of packaging waste reduced still remains low compared to the total amount of packaging waste disposed of in Singapore.

12 Therefore, at last year's awards ceremony, I mentioned that mandatory requirements would be introduced for packaging waste management. We plan to start, by 2021, with mandatory reporting of packaging information and packaging waste reduction plans by businesses that place packaging on the consumer market. The objectives are to allow businesses to gain greater awareness of the amount of packaging they are placing on the market and provide the impetus for them to develop ways to reduce the environmental impact of their packaging.

13 NEA will be holding a series of stakeholder engagement sessions in the second half of this year to flesh out the detailed implementation framework for the mandatory reporting requirement. I strongly encourage your participation in this round of consultations as your inputs will be very important and valuable in determining how the reporting requirements will be implemented, and which companies will be affected. With these new mandatory measures, we hope to work towards more sustainable packaging waste management and move closer to the SSB visions of "A Leading Green Economy" and moving "Towards a Zero Waste Nation".

### **Conclusion**

14 Finally, I would like to take this opportunity to thank the SPA Governing Board for co-organising this event together with NEA, and for their continued and strong support of the SPA over the past 10 years. The SPA would not have come so far, and achieve as much as it did, without their leadership and active role in the programme.

15 Have an enjoyable dinner and I wish you all a pleasant evening. Thank you.

Mr Niam Chiang Ming, Chairman, Energy Studies Institute, National University of Singapore

Professor Ricardo Raineri Bernain, President, International Association of Energy Economics

Mr. Keisuke Sadamori, Director, Energy Markets and Security, International Energy Agency

Distinguished guests

Ladies and gentlemen

1 It is my pleasure to be here at the 2017 Conference of the International Association of Energy Economics hosted by the NUS Energy Studies Institute. I am happy to note that this is the 40<sup>th</sup> year of the Conference, a strong testament to its role as an important platform for top representatives from academic, corporate and public institutions to discuss critical issues affecting global energy markets. I was told that this is the first time that it is hosted in Singapore, and I am pleased to extend a warm welcome to all delegates, and to our foreign delegates, welcome to Singapore.

2 2017 also marks the 10<sup>th</sup> anniversary of the founding of the NUS Energy Studies Institute (ESI). It is a key partner of the Government and is also recognised internationally as an important partner in conducting multidisciplinary research on global energy issues, as well as promoting discussion on their national, regional and international implications. The Institute is also a strong supporter in facilitating the global exchange of ideas on energy, which is the reason why we are all here today.

### **Global Energy Trends and Climate Change**

3 Our world is at an inflexion point – whether it is politics at the international level, or in markets and societies whereby we are seeing the emergence of new consumer trends and patterns; and innovative and disruptive technologies changing the norms that we are all used to. The energy market is no different. In the next two decades, global energy demand is expected to increase significantly. The International Energy Agency's World Energy Outlook 2016 projected in its "main scenario" that global energy demand would rise by 30% from now to 2040.

4 In particular, we are experiencing major shifts in the global supply and demand of energy. Oil and gas markets continue to be sluggish, keeping energy prices lower for longer than expected. Geographically, emerging economies are

progressively taking up a larger share of global energy demand – but it is also heartening to see many of them are trying to do so via renewable energy. Renewable energy is currently the world’s fastest-growing source of energy and is projected to nearly double in generation capacity by 2040<sup>[1]</sup>, driven by a strong push in emerging economies such as China and India. For example, India has plans to produce 60% of its electricity from non-fossil fuels by 2027. It is thus timely for this year’s IAEE conference to facilitate a discussion on energy demand in emerging economies.

5 Our discussions on the global energy outlook cannot be divorced from developments on the environmental front – the two are tightly intertwined. Last year, 2016, was a historic year in the fight against global climate change. Countries came together in separate forums and negotiated agreements to put forward their best efforts on reducing greenhouse gas emissions and managing climate change impacts. The Paris Agreement on Climate Change came into force last year, less than a year after it was concluded. This was a monumental milestone as the Agreement is the most ambitious global climate agreement ever negotiated. More recently, even though the Trump Administration has decided to pull out of the Agreement, other major players such as China and the European Union have pledged their continued support for it. This shows the very challenging dynamic put forth by climate change – but also underscores the importance of working together as an international community to address it.

6 Singapore only contributes 0.11 per cent of global emissions, but we believe it is important to play our part as a responsible member of the international community. As part of the Paris Agreement, we formalised our pledge to reduce our emissions intensity by 36% from 2005 levels by 2030, and to stabilise greenhouse gas emissions with the aim of peaking around the same time. This is an ambitious goal, and one that we are committed to uphold. Moving forward, our challenge then is one of how to continue to grow and prosper in an increasingly carbon-constrained world.

### **Singapore’s Energy Development and Environmental Sustainability**

7 Let me elaborate further. Singapore is a small, open economy with no indigenous energy resources. We rely heavily on imported fuels – natural gas fuels about 95% of our electricity generation and is an important industrial feedstock – which means that we are heavily exposed to the volatility of energy markets. Our energy demand is projected to increase at a compounded annual growth rate of between 1.2% to 1.8% over the next decade, in line with projected increases in overall population and economic growth. However, we are alternative energy disadvantaged – we lack the land and climate conditions necessary for the large-scale deployment of renewable energy. Solar energy is

assessed to be the most feasible for Singapore given our location but large-scale deployment of solar is not without its challenges. We have to face these energy and resource constraints more acutely in a world that will become more carbon-constrained.

8 On a positive note, we were fortunate to have pursued economic growth in tandem with preserving our environment since the early years of our independence in the 1960s. We strove to create a vibrant and liveable city underpinned by our belief that economic growth and environmental sustainability can and should be pursued together, rather than be seen as trade-offs. This is because there are externalities arising from both these objectives which are mutually reinforcing and would strengthen Singapore's value as a whole.

9 Given this, we are embracing this new environmental challenge and have embarked on a path to reduce our carbon emissions and energy consumed in tandem with each dollar of growth that we achieve. For example, we are actively building up a clean energy ecosystem to seize new opportunities particularly in the solar energy sector. Since 2007, we have grown our clean energy industry ten-fold<sup>[2]</sup>. Singapore's green economy generated around 60,000 jobs and contributed around \$6.2 billion to our GDP in 2011. We will continue to help the clean energy sector grow, which can translate to more jobs and enterprise, and also promote economic growth.

### **Climate Action Plan**

10 We released our Climate Action Plan in 2016 which details the measures that we will be taking both on the mitigation and adaptation fronts. We are adopting a multi-pronged approach, involving the key sectors, stakeholders and partners. I will elaborate more.

11 Our industry sector is the largest consumer of energy, and emitter of greenhouse gases in Singapore – consuming about two-thirds of our total energy consumption, and contributing about 60% of our carbon emissions in 2014. Improving our industrial energy efficiency is thus a key strategy for us to meet our Paris pledge. Earlier this year, we enhanced the Energy Conservation Act – a key piece of energy conservation legislation – to spur efforts to improve energy efficiency in the industry sector. We introduced new requirements for companies to conduct regular energy audits and put in place energy management systems. We will also phase out inefficient motors from our market starting next year.

12 We also made a decisive move recently to factor the impact of greenhouse gas emissions through a carbon tax to be implemented from 2019. Through enhancements to the Energy Conservation Act and the implementation of a carbon tax, we hope to encourage the industry to reduce their carbon emissions and improve their energy efficiency when and where it makes the most business sense.

13 As a densely populated city, the building sector is another energy-intensive sector that we are working closely with to manage energy consumption. The Green Mark scheme, administered by the Building and Construction Authority, has been assisting the sector in the shift towards more environmentally sustainable buildings. I am happy to note that nearly one-third of all buildings in Singapore are Green Mark certified as of January 2017, and we are on track to achieve our target of having 80% of all buildings in Singapore green by 2030.

14 In the transport sector, we are actively encouraging commuters to shift to more sustainable modes of travel such as public transport and improving the energy efficiency of current modes of transport. We also intend to deploy Electric Vehicles in every housing estate by 2020, as part of our “car-lite” vision as a sustainable and liveable city.

15 I earlier mentioned our vibrant local clean energy sector. We are targeting to increase the contribution of solar energy – the most viable renewable energy available to us – to 1GWp (Gigawatt peak) beyond 2020. At peak periods, this will represent about 15% of our electrical power demand. Some of the initiatives on this front include our piloting of a floating solar PV installation in Tengah Reservoir, an energy storage system test-bed, and the Renewable Energy Integration Demonstrator micro-grid test-bed on Pulau Semakau. We hope that such projects can be the seeds for scaling-up of innovative clean technologies in Singapore, as well as other markets in the region.

16 A few weeks ago, the Government also published its inaugural Public Sector Sustainability Plan. This is a joint effort by 16 ministries and 64 statutory boards to be more sustainable. Some of the energy-related initiatives in the plan include reducing the public sector’s electricity consumption as a whole by 15% from 2013 levels by 2020, and adopting more solar energy on our premises. We hope that this will spur the wider community to adopt more sustainable practices.

17 However, the best laid policies would not work without the support of businesses, individuals and associations – in fact, everyone needs to play a part in creating a Sustainable Singapore. The heart of each energy-related policy ultimately drills down to encouraging businesses and the individual to go green. For it is only when we have a green mindset that Singapore can become a hub

for the cutting-edge business of sustainable development, and Singaporeans can in turn explore new opportunities in this exciting and meaningful sector. I urge you to play a part in the Sustainable Singapore Movement which was launched last year through your actions and decisions in your daily lives.

## **Conclusion**

18 I know that many new studies and findings will be shared at this conference, and I hope that many of them will find their way into policy decisions in your countries and provide lessons for others. I hope that new partnerships will be formed and collaborations strengthened as we work towards a low carbon economy, while keeping to our environmental sustainability and economic competitiveness objectives.

19 I would like to wish you all a successful conference. Thank you.

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[1] The International Energy Agency forecasted global renewables energy consumption to reach 131 quadrillion Btu, up from ~70 quadrillion Btu in 2016.

[2] Singapore's clean energy industry has grown from about 10 companies in 2007 to around 100 companies in 2016.

Distinguished guests,

Ladies and gentlemen,

It gives me great pleasure to join you today for the groundbreaking of our fourth desalination plant here at Marina East.

### **Keppel Marina East Desalination Plant**

2 The Keppel Marina East Desalination Plant is expected to commence operations in 2020 and will add another 30 million gallons per day (mgd) to our water supply. This is about enough to fill 55 Olympic-sized swimming pools per day. As far as we know, this plant will be the first of its kind in the world. Being a large-scale dual mode plant, it will either treat freshwater from Marina Reservoir or desalinate seawater, depending on wet or dry weather conditions. As such, this plant will be yet another step forward in enhancing the drought resilience and sustainability of our water supply.

3 Beyond this, there will be public green spaces incorporated on the rooftop of the Keppel Marina East Desalination Plant. This illustrates how we can achieve multiple uses of land, which includes the creation of new spaces for the community to enjoy.

### **Building water supply resilience**

4 Desalinated water forms one of the four National Taps of Singapore's water supply, in addition to water from local catchments, imported water and NEWater. As a weather-resilient source, it plays an especially crucial role in ensuring a diversified and sustainable supply of water for everyone.

5 We are thankful that we have had reasonably good rainfall these last few months. However, we need to plan ahead as we are increasingly facing greater weather uncertainties. We must not forget that we had just left behind 3 continuous years of dry weather and such long dry spells are projected to be more frequent in the future. We must therefore ensure that we have enough NEWater and desalination plants ready to cater for any eventualities.

6. Indeed, water has always been an existential issue for us. Climate change impact will exacerbate our water issues if we are not prepared. According to the World Resources Institute, Singapore is one of the world's most water-stressed countries, as our local freshwater sources are far from sufficient to meet the needs of our population and economy. Despite our water scarcity, Singaporeans are able to enjoy a reliable supply of water today. This is a result of our relentless pursuit to secure a high-quality and reliable supply of water for our nation.

7 While we pursue greater resilience in our water supply, we also need to expand our water supply sources to keep pace with the growth of our nation's economy; it is prudent that we build ahead to cater to future demand. Our water supply strategy must take into account climate change as well as the need to allow the economy to grow. These are objectives that require complex solutions that incorporate technology, land use, capable human resources and sound operations. I am glad that we have always taken our water challenge seriously while always trying to keep costs manageable and water affordable.

8 With the launch of the fifth NEWater plant at Changi earlier this year, NEWater can meet up to 40% of Singapore's current water demand. As for desalination, our two existing plants at Tuas can meet up to 25% of our water demand now, and the third desalination plant at Tuas will be completed this year. Besides this Marina East desalination plant that begins construction today, our fifth desalination plant located on Jurong Island is also targeted for completion in 2020. We need to continue right-pricing this precious resource so that users can appreciate its scarcity value and the cost of supplying water. It is one key component to enable continual investments and proper maintenance of our water infrastructure. We have avoided the problems many countries face with water supply because we always take a balanced approach towards investment, conservation and pricing.

9 Looking forward, our water demand is expected to more than double by 2060. We will need to continue ramping up our capacities of NEWater and desalination so that they can meet up to 55% and 30% of our water demand respectively by then. And as we expand our water supply, we also need to continue our efforts to manage the demand for water. We must press on with water conservation and efficiency, both in

our daily individual usage and in the non-domestic sector. Every drop of water conserved means that less resources and costs are needed to invest in additional supply.

### **Investments in infrastructure and R&D**

10 Water infrastructure projects, such as this plant, are testaments to PUB's efforts to reduce our vulnerability to climate change and enhance reliability through research and development efforts. Such technological improvements take us many years to prove and to become operationally deployable. Just like the breakthrough in membrane technology that brought us NEWater, the realisation of the dual mode desalination concept that we will see implemented in this desalination plant did not come easy. The reliability of this concept was proven through a 1-mgd demonstration plant at Pasir Ris, which PUB had operated since 2007. Today, after years of testing, this technology is ready to be applied on a large-scale at this 30-mgd plant.

11 These technological improvements come at a large expense. Other than construction costs to build these new plants, operation costs are also significant. For example, desalination costs more than treating freshwater from a reservoir as it is much more energy-intensive. PUB's R&D efforts have been vital in keeping these costs as low as possible, allowing water to remain affordable.

12 Moving ahead, we must continue to innovate and look into ways to reduce the energy consumption of the desalination process to ensure energy sustainability as well as to moderate production costs. To this end, PUB has been exploring, through R&D, the use of electrochemical energy, waste heat and even biomimicry in the desalination process. Though further technological improvements may take many more years to become operational, we must remain committed to our continuous efforts in R&D, so as to keep cost pressures in check as we have done in the past.

### **Embracing Partnerships**

13 The public sector alone cannot chart our water journey. Close partnership with the private sector has enabled Singapore to explore, pilot and implement new technologies. This has improved our ability to overcome challenges in addressing our water scarcity. We have leveraged the combined expertise and resources of the public and private sectors to deliver water solutions in a cost-effective manner, through Public-Private-Partnerships (or PPP) like this one. Such an approach also encourages greater innovation and competition in the private sector, enhances production efficiency and helps keep water as affordable as possible. Through such partnerships for our water infrastructure, companies in the private sector also gain a track record here and can go on to contribute their water expertise on the global stage.

### **Conclusion**

14 This desalination plant at Marina East is PUB's second PPP with Keppel, after the Keppel Seghers Ulu Pandan NEWater Plant. I would like to congratulate Keppel Infrastructure Holdings Pte Ltd (Keppel Infrastructure) on the groundbreaking of Singapore's fourth desalination plant at Marina East. We look forward to the opening of the plant, which will contribute to a new page in Singapore's water story. Thank you.

Mr Chaly Mah, Member of the NUS Board of Trustees

Distinguished Guests

Graduates

Ladies and Gentlemen

1. A very good afternoon to you. It is my pleasure to share this happy occasion with you, your family and friends and deliver this year's commencement speech to the graduating class of 2017.

2. As you start a new phase in life, you may be anxious of what lies ahead for you. Most of you would be embarking on your first job, some in the pursuit of further studies, and yet, others may be entrepreneurial and start your own enterprise. There is no one-size-fits-all template to adopt, as we have different ambitions, strengths, likes and dislikes. But one thing is clear, you will experience change as you begin the next chapter in your life. The Greek philosopher *Heraclitus*, who observed that "The only thing that is constant is change", lived 2,500 years ago. And his observation still holds true.

3. I started my career in SingTel and stayed there for 18 years. Given how fast people move from job to job today, I know some of you may wonder why nobody else wanted to hire me. However, I did move from job to job but within SingTel. This opportunity was available because it was such a large and diverse telecommunications services company. Indeed, I started from planning and implementation of various telecom systems which gave me a solid engineering experience, to marketing these services, and to being part of managing overseas acquisitions.

4. Looking back, a solid engineering training had enabled me to have an enriching career in an industry that was evolving rapidly due to technologies. My career had spanned from a time when digital technology virtually did not exist, to one when telephony dominated and digital services were carried over telephone lines and finally to one when telephone services were carried over digital lines. Soon, nobody will know what a land line telephone looks like.

5. Indeed, digitalisation has given birth to a new lifestyle that smart cities are envisaged to improve upon. I remember during the 50<sup>th</sup> anniversary celebration of the Institution of Engineers Singapore in 2016, Prime Minister Lee said that Engineering will continue to be key to Singapore's future, as our country works towards becoming a smart nation, and overcoming her lack of resources.

6. In recent times, you would have read more about Artificial Intelligence or AI, Digital Disruptions, as well as the perceived threats to jobs in many sectors. Already our younger generation have been told to brace for jobs that do not yet exist. Rather than worry about job losses and the advent of robots, your generation can lead our country to embrace technology advancement to give us new and better ways to transform and innovate, create solutions for cities, communities and citizens. For example, intelligent robots can help fill the labour gap and improve productivity, and supercomputers powered with AI have demonstrated the ability to diagnose difficult medical cases. As technologies continue to evolve, industries will progress and new careers will be created, such as in cyber-physical security, and additive manufacturing such as 3-D printing. Progressive companies seize the opportunity to invest in promising emerging technology, innovate and create new products and services.

7. Therefore, your training in engineering will be most useful. As an engineer, in a discipline which is at the forefront of the technology evolution, you have the best vantage point to appreciate technology trends, and to imagine and build the future of Singapore.

8. As businesses learn to be responsive to what new technologies can do for them, we as individuals must do likewise. Do not be fearful because as engineers, of all people, you are well-equipped to adapt. Your university education has provided you with the disciplinary knowledge, and exposed you to a breadth of information in multiple domains needed to navigate the complex world in which we operate. These skills will enable you to add value to your company or organisation, as it responds to multifaceted challenges and opportunities brought about by changes and advances in technology.

9. There are countless examples of how engineers have contributed to the development of Singapore. Allow me to cite a few that are related to the environment, in line with my current portfolio. During Singapore's early years, engineers played a crucial role to ensure the country developed sustainably. They overcame the challenges of poor living conditions and widespread pollution, turning Singapore into a liveable and sustainable city that other countries look up to.

10. Engineers have also contributed much to the area of water sustainability. Today, Singapore has a robust and diversified water supply with the four National Taps of local catchment water, imported water, NEWater and desalinated water, to ensure that we and our future generations will always have a high-quality and sustainable supply of water. We must and will continue to invest in water infrastructure projects and R&D, in order to meet future water demand and to strengthen our resilience of our water supply against climate change.

11. From past to present, engineering has constantly overcome challenges, provided solutions to problems, turned imagination into reality, and transformed lives. The engineer's role in the future will be no different, regardless of trends and how society develops.

12. The degree scroll that you will be receiving today, signifies the start, and not the end of your adult learning journey. In your work, take a step back occasionally to appreciate the bigger picture. Read widely, talk to people beyond your field, and delve deeper into topics that drive our economy. This is what lifelong learning is all about - the acquisition of new knowledge and skills, not merely to weather the onslaught of changes in the workplace, but to position yourself to innovate and improve lives.

13. And as you progress in life, seize the opportunities to broaden and deepen your knowledge base and skill-set. NUS, for example, offers courses for lifelong learning, and in the years to come, the suite of courses will expand significantly to cover diverse topics that will add value to your career and personal development. Do also leverage the opportunities and incentives that the Government has put in place, under the SkillsFuture initiative, to develop deep and varied expertise. Finally, let me also remind those of us who have benefitted from a sterling education system, to give back to society in ways we can. It's the best expression of our gratitude to our deserving pioneers, because they too gave the best of their lives so that we can prosper, rich or poor, regardless of race, language or religion.

14. In closing, I encourage you to adopt an agile mind-set in everything that you do. Embark on a lifetime of learning, and you will be well-prepared to meet the challenges that lie ahead. More importantly, always aspire to lead change through innovation. Singapore aspires to be a modern city that is cleaner, safer and more connected, and where our citizens are empowered to lead meaningful and fulfilling lives, create economic opportunities and forge a closer community within and beyond our shores. The value of Engineering lies in the creation of this future.

15. Let me once again congratulate all graduates on your fine achievements. I wish you all the best in your exciting career and learning journey ahead.

16. Thank you.

Distinguished Guests,  
Ladies and Gentlemen,

Good morning and welcome to the Singapore International Water Week Spotlight 2017. It gives me great pleasure to join water leaders from all over the world to further our discussion on pertinent water challenges. These challenges, like the need to meet the water demands of an increasingly thirsty world, or weather variability due to climate change, or financing and revitalising ageing infrastructure, are common to us all. All of us - governments, utilities, industry, and research institutions, grapple with them as we seek to ensure an adequate and reliable supply of water. Hence, I believe that the theme for this year, "Forging Alliances Amongst Water Utility Leaders" will resonate with many of us.

2. Singapore, which has been hosting SIWW and its related events since 2008, is an appropriate venue to talk about water challenges. While we are a fairly young, prosperous nation, Singapore is in many ways a bellwether to the rest of the world with regards to water. In the 2015 World Resources Institute study of water stressed countries, Singapore was ranked first among countries with the greatest risk of water stress in 2040. Dealing with water issues, therefore, is hardwired into our DNA.

### **Good Water Quality Cannot be Taken for Granted**

3. A vital part of any utility's water supply management programme is ensuring water quality. Singaporeans, like many of their counterparts worldwide, tend to take for granted that clean, wholesome, drinkable water will flow when we turn on the taps. However, the public may not be aware that ensuring this outcome does not come easy. For example, to turn our urban stormwater into drinkable water requires more advanced treatment than what is conventionally employed elsewhere. Currently, PUB's treatment processes use membranes to remove bacteria and other contaminating particles too small to be seen with the naked eye. In time to come, ozone, to disinfect and remove taste and odour; and activated carbon, to further remove any unknown contaminants, will become part of the standard treatment for water collected in our local reservoirs.

4. However, even after water has been treated, the work does not stop there. PUB has in place one of the most comprehensive source-to-tap water quality monitoring programmes in the world. PUB monitors and tests all the various types of water that it manages for over 300 different water quality parameters, far exceeding the requirements stipulated under any international drinking water regulation, including WHO's drinking water guidelines. In total, over 400,000 tests are run annually on tap water, desalinated water, NEWater, and their sources – rainwater, seawater, reservoir water, and treated used water (or what others refer to as secondary effluent or treated sewage).

5. In addition, Singapore has deployed about 300 pressure and water quality sensors, as well as a system of fish activity monitoring stations around the island for real-time, 24 hours a day, 7 days a week situational monitoring of Singapore's 5,400 kilometre-long water supply network while other sensors monitor our

reservoirs and about 8,000 kilometres of rivers and drains. Singapore also has sensors to monitor its sewers as well. A system of over 40 Volatile Organic Carbon (or VOC) sensors are placed in key nodes of our used water network to detect illegal discharges with more planned for the future. Therefore, from the moment that water falls from the sky and hits either the land or a reservoir in Singapore, it is tracked by PUB until it ultimately ends up going back up to the sky or out to the sea. And I say this with only the slightest of exaggeration.

6. All these treatment, sensors and testing are not without cost, but the confidence it inspires in the public and the assurance it gives to the regulators are quite literally priceless. Yet in this area, we, as are all water utilities around the world, will be judged by our failures, not our successes. Unlike other goods, you cannot issue a product recall for water and a failure to ensure good water quality can be deadly. We have seen from other countries how things can go wrong very quickly, often with just one misstep in the long complex chain of supplying water. Once public confidence in their local water supply is lost, it is difficult to regain trust and affected communities take years to recover. That is why we have chosen to make “Guaranteeing Quality in Every Drop” one of the topics of discussion at this Spotlight event. At the session tomorrow morning, Michigan State University’s Homer Nowlin Chair in Water Research and Expert in Water Quality, Professor Joan Rose will share lessons from the Flint Water Crisis. Mr Bernard Sheridan from Sydney Water will talk about the Sydney Water Crisis, and Mr Jonathan Clement, CEO of PWN Technologies, will share insights into how PWN overcame water quality challenges through technology.

### **Other Topics for SIWW Spotlight 2017**

7. Closely tied to water quality in the public’s mind is the issue of water recycling and reuse. More countries are increasingly adopting the view that the old concept of a ‘single pass’ use of water is no longer viable as water resources become more scarce. Instead, the paradigm is shifting towards acknowledging that water may be used and reused, over and over, almost infinitely. PUB’s Chief Engineering and Technology Officer, Mr Harry Seah, will share on NEWater, Singapore’s brand of high-grade recycled water and one of our Four National Taps that has been in use for more than 15 years. Other speakers include Mr Michael Wehner from Orange County Water District, another global pioneer in producing potable-quality water from treated used water, and the model which Singapore’s NEWater programme took inspiration from. We are also very proud to have a presentation from Mr Pierre van Rensburg, Strategic Executive of the City of Windhoek, Namibia, the pioneer potable reuse programme in the world. Today, after more than a decade of reusing water on a municipal scale, we are keen to share our experiences and to learn from one another. This is why PUB and the World Health Organisation (WHO) will be launching a document on “Potable Reuse: Guidance for producing safe drinking-water”, which provides information for utilities and regulators on the planning, design and operation of potable reuse schemes.

8. The afternoon session today will cover one of the universal challenges faced by all utilities, that of non-revenue water. PUB believes that the effective management of non-revenue water requires a combination of community engagement, sustainable financing, internal reform and technology. This last item, we feel, is often overlooked. As a result, Singapore is investing heavily in technologies to detect and even predict *where* and *when* pipe leaks occur and stop them before significant loss occurs. We have distinguished speakers His Excellency Ek Sonn Chan and Mr Nobuyuki Kawagoe to share how Phnom Penh and Tokyo have improved network efficiency in their respective cities.

9. Actions in one area of the water cycle will impact another area. Water leaders thus need to manage the water cycle as an entire loop from the moment rain falls on the surface to water catchment to water treatment, supply and distribution, and finally to wastewater collection and treatment. PUB embodies the concept of managing water as one. Today, whether it be rain water, reservoir water, desalinated water, NEWater, used water or tap water, PUB has officers that are responsible for the management of this resource. Increasingly, we see other forward-thinking cities around the world reorganising their water management programmes around a single agency. We will shortly be hearing about two transformative water management projects from Mr Ma Weizhong, Director of Water Resources, Shanghai Water Authority and His Excellency Ali Al Hazmi, Governor, Saline Water Conversion Corporation (SWCC).

### **Right-Pricing Water**

10. Since this country's inception, Singapore has been confronted with a fundamental paradox – namely that water infrastructure cannot be constructed without economic development and resources, but at the same time, a city's economic growth cannot take off without a source of clean and safe water. In achieving its present success, Singapore has had to put in place sound policies and good governance, an integrated approach in urban planning and water resource management, as well as investments in water infrastructure and water R&D.

11. Fundamental to this is the need to remain financially sustainable to enable continual investments in water infrastructure and its proper maintenance. At the same time, we believe in the importance of right-pricing water, so that users appreciate the scarcity value and the true cost of the water they are using. Starting this month – and for the first time in 17 years – residents living in Singapore and businesses operating on our island would have to pay more for water. In fact, some of you here in the audience would have already received your first utility bill with the new charges. I will not ask you how you feel about your water bill, after all a price increase in *anything*, much less something as essential as water, is never welcome. However, the price revision is necessary. If we do not continually shore up our water system, to keep its foundations strong, it will surely come under strain. As many of you know, a small leak, if left

unattended, will grow. All these are done so as to ensure that Singaporeans continue to enjoy a high quality and reliable water supply.

### **Singapore as the global platform to bring utilities together**

12. As you can see, there is much to talk about and even more to be done. The Singapore water industry is a vibrant one, with more than 180 local and international companies and over 20 public and private research centres spanning the entire water value-chain. As a global hydrohub, we want to be a key node to bring the global water industry together to co-create innovative water solutions and build capabilities to solve urban water challenges. To further this aspiration, PUB will be signing MOUs with the Saline Water Conversion Corporation (SWCC) and Water Corp Australia to increase bilateral technology and capability exchanges.

13. It is a rare opportunity for us all to be gathered in one place, so let us take full advantage of this platform to connect and collaborate with one another. In this vein, I am pleased to welcome Kurita, who is launching their first R&D centre in Asia outside of Japan today, to join Singapore's growing water cluster. This R&D Centre will strengthen Singapore's position as a Global Hydrohub and support the development of novel technologies in desalination and water reuse. I wish them all the best and look forward to their contribution of innovative solutions to our local water scene. We hope to see more of such collaborations.

14. This Spotlight 2017 programme is brief by design, but it should not mark the end of our exchanges. We also have the Singapore International Water Week, or SIWW in short, which is our biennial flagship water event that brings more than 20,000 urban, water and environment leaders and experts to Singapore. The discussions and outcomes over the next two days will be continued at SIWW scheduled in the week spanning 8 to 12 July next year. I urge you all to note these dates down in your calendars and hope to host all of you in Singapore again next year.

### **Conclusion**

15. Lastly, I wish everyone a fruitful forum and a delightful stay in Singapore.

Dr Yeoh Lean Weng, Deputy President of The Institution of Engineers, Singapore

Distinguished Speakers, Guests

Ladies and Gentlemen

1 A good evening to everyone. I would like to thank the organisers for inviting me to today's event. I understand that this is the third year that the Institution of Engineers, Singapore (IES) has organised the World Engineers Summit. By presenting this year's conference together with the International Conference on Applied Energy and the Applied Energy Innovation Institute, this summit serves as a crucible for the wealth of knowledge arising from research by engineers. I am heartened to see so many local and overseas engineers and energy professionals gathered here in Singapore to discuss engineering solutions for a low carbon future and sustainable development.

### **Impact of Climate Change in the World and on Singapore**

2 Much has been said and discussed about climate change. In fact, the challenges of operating in a carbon-constrained future will only continue to increase. With projected rises in world temperatures and sea levels, the world might be facing irreversible consequences that undermine sustainability in water, ecosystems, food, coastal zones and public health. Recently, the Arctic Monitoring and Assessment Programme found that the Arctic region has been warming twice as fast as the rest of the world, and the Arctic Ocean could be largely free of ice in the summer as early as twenty years from now, jeopardising biodiversity and ecosystems. Another study that was just published (in Nature Climate Change in June) warned that up to three-quarters of the world's population could face at least 20 days per year of deadly extreme heat by 2100, if greenhouse emissions continue to rise at current rates. Even with aggressive emissions reductions, rising temperatures and humidity levels will combine to increase the intensity and frequency of such deadly heat waves.

3 The world has made some significant progress in this regard – last year, 2016, was a historic year in the fight against global climate change. 151 countries, accounting for more than 80% of the world's total greenhouse gas emissions, ratified the Paris Agreement, pledging their conviction to the importance of transiting to a low-carbon world. Despite the US's recent announcement of its withdrawal from the Paris Agreement, we saw leaders from the other G20 countries affirming their commitments at the recent G20 summit in Germany. We now need to take action decisively as an international community.

4 As a low-lying and densely populated island state, Singapore, like many other countries in the world, is vulnerable to the impacts of climate change.

Based on the Second National Climate Change Study conducted by the Centre for Climate Research Singapore (CCRS) and the UK Met Office Hadley Centre, it is projected that the daily mean temperatures in Singapore would rise by between 1.4 – 4.6 degrees celcius by the end of the century. The contrast between the wet and dry months in Singapore would also likely become more pronounced. The intensity and frequency of heavy rainfall events in Singapore are also expected to increase while sea levels are projected to rise up to 1 metre by the year 2100.

5 Given this, we made an ambitious pledge at Paris to reduce our emissions intensity by 36% from 2005 levels by 2030, and to stabilise greenhouse gas emissions with the aim of peaking around the same time. It is useful to note that, at the same time, our energy demand is projected to increase at a compounded annual growth rate of between 1.2% to 1.8% over the next decade.

6 Thus, amidst a landscape of rising energy demand, our continued need to maintain energy security as well as to meet our environmental aims, Singapore must be alert to seize fresh opportunities, and be nimble in finding new and innovative ways to sustain our growth in an increasingly carbon-constrained future.

7 You may be aware of our recent decision to implement a carbon tax from 2019. The intent is to encourage the industry to improve their energy efficiency and thus reduce their carbon emissions, when and where it makes the most business sense. However, the carbon tax is not the panacea to reducing our greenhouse gases, and this is where we hope that “thinking out of the box” innovation and the problem-solving strengths of the engineering community will come in useful and contribute to Singapore’s future growth.

### **IES Prestigious Engineering Achievement Awards 2017**

8 With this, I am very heartened to see outstanding examples of engineering solutions and projects that can help pave our way in this challenge amongst tonight’s Prestigious Engineering Achievement Awards presented by IES. For example, the Building and Construction Authority (BCA) has won the award for developing the BCA SkyLab, the world’s first high-rise rotatable laboratory for the tropics. Besides being a living lab for easy retrofitting and testing of various building technologies, it can also rotate up to 360 degrees for the study of energy and indoor environmental performance at different orientations. Launched in July 2016, the SkyLab is a fulcrum point for research, product development and training in the area of building energy efficiency, and will play an important role in the environmental sustainability drive.

9 Another good example is the project on Mitigation of Pollution at Kandy Lake and Mid-Canal in Sri Lanka designed by the Nanyang Environment and Water Research Institute and NTU. These engineers have designed an innovative passive lake water treatment and protection system that provides improved living environment and wastewater management and enhances the capacity of about 400,000 people living and working in Kandy City. In addition, it has arguably paved the way to further infrastructure development in Kandy City and beyond.

### **Importance of Engineers' Role in Building a Sustainable, Energy-Efficient Singapore**

10 These projects are but some examples of how engineering can provide innovative solutions in our journey of sustainability. Engineers are in fact already driving many innovations in sustainability-related technologies in Singapore. I share two examples. Singapore's first hydrogen fuel cell plant that started in 2014 in the JTC CleanTech Park was made cost-feasible through the work of research engineers from homegrown firm Real Time Engineering and Temasek Polytechnic. The plant uses a unique catalyst to extract hydrogen from water, which has considerably decreased the cost of obtaining and using hydrogen as a fuel. Researchers over at NTU are working on a prototype of "flexible solar panels" – made from a new material called perovskite, which can be used on building facades and windows instead of only rooftops as it is translucent, while potentially being cheaper to produce than conventional silicon panels. This material could revolutionise the surface coverage of solar panels in Singapore and vastly increase the potential of solar energy adoption in Singapore.

11 The role that engineers play in establishing new frontiers in urban energy systems and sustainability will only continue to grow. Singapore released our Climate Action Plan in 2016 which details the measures that we will be taking both on the mitigation and adaptation fronts. We intend to grow our clean energy sector and increase our adoption of solar energy – the most viable renewable energy available to us – through initiatives such as the piloting of a floating solar PV installation in Tengeh Reservoir and an energy storage system test-bed. In the transport sector, we intend to deploy Electric Vehicles in every housing estate by 2020, as part of our "car-lite" vision. These initiatives will require creative engineering solutions that are customised to Singapore's constraints while remaining cost-effective.

12 In particular, I think that there is room for greater innovation and creativity in our industrial energy efficiency sphere. Our industry sector is the largest consumer of energy, and emitter of greenhouse gases in Singapore – consuming about two-thirds of our total energy consumption, and contributing about 60% of our carbon emissions in 2014. Improving our industrial energy efficiency is therefore a key strategy for us to meet our Paris pledge. My ministry hence recently enhanced the Energy Conservation Act to spur efforts to improve energy

efficiency in the industry sector. New requirements were introduced for companies to conduct regular energy audits and put in place energy management systems. We will also phase out inefficient motors from our market starting next year. Our current energy efficiency improvement rates are only 0.4 and 0.6% in 2014 and 2015 respectively; we clearly can do more in our goal of achieving 1 – 2% annual energy efficiency improvement rates seen in other developed countries like Belgium – with engineers like yourselves.

13 We have seen some early innovations. With support from the Grant for Energy Efficient Technologies by EDB and NEA, Glaxo Wellcome Manufacturing (GSK) installed a waste heat recovery system to recover waste heat from incineration processes and generate steam, which was sufficient to cover the plant's steam demand as well as power a separate chiller for the plant's cooling needs. Such a system that creates resources out of "waste" allowed GSK to achieve energy savings of up to about 100 terajoules (TJ)!

14 For a country that is ranked as one of the most water challenged nations in the world, Singapore, paradoxically, is recognised internationally as a Global Hydrohub with over 180 local and international water companies spanning throughout the entire water value chain, and more than 20 public and private R&D centres. We are a platform for the global water community to come together to exchange best practices, tap on expert knowledge, and collaborate on solutions to solve shared global challenges. For example, the engineers at PUB and GE Water Process & Technologies have been working on an exciting new reverse electrodialysis seawater desalination technology. As we all know, seawater desalination is very energy intensive. The pilot results of GE Water's project shows potential for near 100% system recovery on top of a 14% reduction in energy consumption. PUB's ultimate aim is to bring desalination energy consumption down even further from around the current 3.5 kilo-Watt-hour-per-cubic-meter to less than 1.5 kilo-Watt-hour-per-cubic-meter through R&D projects like the use of electrochemical technology to desalinate seawater. Other exciting R&D is based on biomimicry or mimicking the biological processes by which mangrove plants and euryhaline fish extract seawater using negligible amounts of energy. I encourage all from the engineering community to similarly consider and innovate urban sustainability solutions in all sectors of our economy that can contribute to the realisation of our vision of a livable, sustainable Singapore.

## **Conclusion**

15 I believe that the discussions in the conference over these three days will build critical connections that can foster collaboration among engineers, policy makers and business leaders and give rise to valuable solutions that will make real differences in our sustainability aspirations.

16 I would also like to take the opportunity here to again congratulate the winners of the awards that we will be presenting tonight. You are prime examples of how, through innovative engineering solutions, we can shape this sustainable city we call home for our future generations.

17 I wish you an enjoyable evening. Thank you.

DPM Teo Chee Hean

Deputy Prime Minister & Coordinating Minister for National Security

Fellow Advisers of Grassroots Organisations

Mr Desmond Tan

Chief Executive Director of the People's Association (PA)

Encik Omar Ismail, PBM

Chairman of MESRA

Panel of Advisers, members of MESRA and the Malay Activity Executive Committees (MAECs)

Ladies and gentlemen

## **Introduction**

1. Thank you everyone for being here today. Echoing what DPM Teo has just shared, 40 years is a significant milestone for the People's Association Malay Activity Executive Committees, MAECs for short and its Council, MESRA; and this celebration is worthy of our time to look at what we've achieved and what we should do for the future.

## **40 years of Malays in Grassroots Work**

2. Indeed, over the past 40 years, MESRA and the MAECs have contributed much to the development of the Malay community and Singapore. From their inception in 1977, the MAECs were tasked to organise and promote Malay cultural activities, and therefore, served as a platform for outreach to the community through celebration of Malay festivities and organising cultural events. They have played a key role in strengthening social cohesion in the early nation-building years – firstly bringing together the community, and in the process integrating with other races every time they congregate in the Community Clubs and Resident Committees.

3. For example, MAECs would gather residents of all races for Hari Raya get-togethers and would share our culture of ketupat-making, and these continue today. Indeed, if the mosques have developed to guide

Muslims to be moderate, the MAECs have developed our community's sense of Singapore's special version of Malay culture melding with our multiracial setting. Over the years, the range of programmes have expanded to remain relevant to the evolving needs of the Malay community.

4. This year, sadly, we lost one of Singapore's founding fathers, former Minister of Social Affairs, Encik Othman Wok who played a pivotal role in rallying all Singaporeans – Malays and others, to work together to build a multi-racial and multi-religious Singapore. As Prime Minister Mr Lee Hsien Loong stated in his eulogy for Encik Othman, “... *one golden thread that ran through his long life was his commitment to the ideal of a multi-racial and multi-religious Singapore.*” This multi-racial and multi-religious context remains relevant and this same ideal underpins the work of the MAECs. Through the MAECs, generations of Malay grassroots leaders have emulated Encik Othman Wok and have come forward to serve and rally our community: work with everyone to build a harmonious multi-racial society even as we cherish and preserve our Malay culture and identity. I want to acknowledge the contributions of the leaders and activists, past and present, who have served with dedication through the decades. Let me also thank Dr Yaacob for helming MESRA all these years and passing it on to us a well-oiled organisation set to achieve even greater heights.

## **Para hadirin sekalian**

### **Cabaran yang dihadapi masyarakat Melayu/Islam**

5. Masyarakat kita hari ini menghadapi tiga cabaran utama. Pertama, fahaman agama yang ekstrim yang boleh membawa kepada penganasan. Kedua, pengaruh tersebut berupaya melemahkan budaya Melayu kita, dan ketiga, perubahan pesat ekonomi global dan pencetus gangguan teknologi.

6. Sejak beberapa bulan lalu, dunia digemparkan dengan berita golongan pelampau Islam melaksanakan serangan ganas ke atas London, Manchester dan Kabul. Ia adalah tindak tanduk para radikal yang terpengaruh dengan pegangan agama Islam yang ekstrim, yang disebar oleh kumpulan seperti Al-Qaeda dan ISIS. Singapura tidak terlindung dari ancaman penganasan dan radikalisme seperti itu.

Realiti tersebut timbul baru-baru ini dengan penahanan seorang pekerja pusat jagaan kanak-kanak dan anggota polis tambahan. Kumpulan-kumpulan pelampau jelas menasaskan golongan yang mudah terpengaruh dan berpotensi untuk melakukan aksi merbahaya dan kerosakan besar.

7. Imej agama Islam yang selama ini telah berjaya mendekatkan hati manusia untuk menyelaminya kini tercemar. Sebaliknya orang Islam mula menjadi sasaran serang balas di negara Barat akibat daripada keganasan yang dilakukan saudara Islam senegara mereka. Di Singapura juga, kita telah berjaya menahan mereka yang mempunyai niat ganas. Yang menjadi tanda tanya ialah apakah reaksi masyarakat bukan Islam, jika keganasan benar-benar berlaku hingga mencederakan atau mengorbankan orang yang disayangi mereka. Pihak berkuasa akan berusaha gigih untuk mengelakkan ia dari berlaku. Masyarakat Islam pula harus mengambil segenap langkah supaya Islam yang diajar dan dipraktikkan di negara kita tetap moderat dan mendokong kehidupan makmur berbilang kaum dan agama. Inilah yang diusahakan MUIS kebelakangan ini. Masyarakat kita digalakkan supaya orang yang tersayang pun akan dirujuk kepada pihak yang berwenang jika mereka jelas terpengaruh dengan ajaran tegar supaya dielakkan daripada terjerumus menjadi radikal dan ganas. Itulah bukti yang akan memberi keyakinan kepada masyarakat Singapura; hingga, sekiranya berlaku keganasan oleh individu yang radikal, kepercayaan masyarakat Singapura akan tetap kekal teguh kerana usaha masyarakat kita selama ini.

8. Ajaran Islam yang bersifat tegar dan eksklusif sebenarnya pengaruh yang asing di Nusantara dan tidak pernah terlihat di rantau ini hinggalah baru-baru ini. Dalam membentuk pemahaman Islam tegar yang diutarakan sebagai pembaharuan, golongan pelampau tahu mereka perlu menggoyahkan keyakinan kita terhadap pengamalan agama dan budaya kita, sebelum dapat menggantikannya dengan fahaman mereka. Banyak sekali amalan budaya kita dibidas seperti acara persandingan dilabel sebagai pengaruh Hindu dan amalan kenduri arwah sebagai amalan yang dilarang agama. Hinggalah orang menganggap jubah orang Arab lebih tinggi martabatnya dari baju Melayu kita. Jika dahulu kehidupan moden mengancam kehidupan budaya tradisional Melayu, kini pengaruh agama tegar pula cuba menggantikannya dengan budaya Timur Tengah yang dianggap Islami.

9. Pengaruh dan ajaran tersebut muncul di sini sejak timbulnya konflik besar pada 1979 di Timur Tengah antara negara adikuasa Saudi dan Iran, dan juga antara fahaman agama masing-masing. Masing-masing saling mencari dan membeli pengaruh di merata dunia. Dengan dunia semakin tanpa sempadan dan Internet membolehkan sesiapa saja untuk berhubungan sesama manusia, golongan muda kita boleh tertarik untuk mempelajari amalan agama dan budaya negara-negara asing ini, umpamanya setelah mengikuti pengajian di luar negeri, membaca artikel dari Internet atau berkomunikasi dengan pihak luar. Kita sudah mula melihat bagaimana elemen-elemen luar ini dapat melentur dan mengubah kepercayaan agama kita, dan perubahan inilah yang harus kita awasi dan waspada. Ini kerana sikap menolak fahaman agama Islam setempat yang toleran dan mendokong hidup berharmoni dan penghakisan budaya yang selama ini mencorak dan mencantikkan agama kita, bakal digantikan dengan sifat eksklusif dan ta'asub.

10. Ia juga menolak kewujudan persekitaran berbilang budaya dan agama, lalu membangkitkan rasa benci pada kaum dan agama lain. Akhirnya mengharamkan hidup rukun senegara dengan sistem yang berprinsip sekular. Itulah penyebab utama rakyat sanggup memerangi negara sendiri dan berjuang bagi sebidang tanah yang jauh dari mereka yang diisytihar Wilayah berkhalifah di Syria dan Iraq. Seperti apa yang disampaikan oleh Mufti Dr Fatris Bakaram semasa khutbah Aidilfitri yang lalu, di mana Islam mengajar insan bahawa kecintaan seseorang kepada agamanya tidak bercanggah dengan cintanya kepada negara, bangsa dan budayanya. Mufti juga mengingatkan kita bahawa seseorang itu boleh hidup sebagai Muslim yang baik Islamnya di mana sahaja beliau berada, dan menyumbang kepada kesejahteraan masyarakat setempat. Mufti turut menarik perhatian bahawa menjadi satu masalah sekiranya seseorang itu menyangka sesuatu adat yang asing itu lebih Islamik daripada apa yang kita ada di sini. Para ulamak kita berkongsi pendapat bahawa agama Islam harus diamalkan dalam konteks setempat, sejajar dengan perkembangan masyarakat dan persekitarannya.

11. Oleh itu saya gembira melihat ramai keluarga terus hidup berbudaya Melayu, dan mengenakan pakaian Baju Melayu ketika menyambut Hari Raya baru-baru ini. Masyarakat kita juga masih bangga menggunakan Bahasa Melayu ketika berbicara. Media Melayu kita – Berita Harian, Suria dan Warna terus berkembang. Ini jelas menunjukkan bahawa kita masih berupaya mengekalkan Bahasa dan

budaya kita. Cinta kita pada bahasa dan budaya kita boleh menjadi benteng kuat yang dapat mencegah penyusupan fahaman agama Islam berbudaya asing, yang konteks masyarakat asalnya mempunyai sejarah, bahasa dan budaya yang tidak sama konteksnya bagi orang Melayu Nusantara.

12. Cabaran ketiga pula, ialah menghadapi ekonomi dunia yang sedang berubah dengan hebat dan pesat hingga menjadi satu gangguan. Kita melihat bagaimana teknologi dan kecerdasan buatan (artificial intelligence) mengancam pekerjaan biasa. Ini adalah cabaran yang dihadapi bukan saja di sini malah secara global. Saya prihatin khususnya bagi golongan profesional, pengurus, eksekutif dan teknisyen (PMET) masyarakat kita, terutama yang di peringkat pendapatan pertengahan bawahan. Untuk bertahan di dalam ekonomi yang berubah-ubah ini, dua kunci utama harus kita miliki: pertama adalah melalui peningkatan kemahiran dan pendidikan sepanjang hayat. Terdapat sektor-sektor baru yang kekurangan tenaga mahir, yang dapat menawarkan peluang pekerjaan baik bagi masyarakat Melayu/Islam kita. Kedua, kita tidak boleh hilang haluan kerana terpengaruh dengan ajaran yang tujuannya mempersiapkan kita untuk mengambil bahagian dalam konflik di Timur Tengah. Malah, jika masyarakat di sini condong pada ajaran tersebut seperti di Chechnya dan Xinjiang, ia bukan sahaja menyebabkan kita ketinggalan, kita akan disibukkan dengan sikap mencari kedamaian dan hilang kemakmuran.

13. Dalam menghadapi semua cabaran-cabaran tersebut, MESRA memainkan peranan penting supaya masyarakat kita di arus nasional dengan menitik-beratkan kehidupan berharmoni dengan semua kaum. Ini akan saling melengkapi usaha MUIS dalam memberi hala tuju kehidupan beragama, dan Mendaki sebagai memangkinkan masyarakat Melayu untuk mampu bersaing di persada dunia. MUIS, MENDAKI, MESRA – 3M tunjang masyarakat kita, memperkukuhkan satu sama lain.

14. Justeru itu, MESRA harus memainkan peranan proaktif dalam memimpin masyarakat kita berintegrasi dan mendekati semua kaum supaya kita memahami dan mesra dengan budaya dan kehidupan satu sama lain. Sedang kita pihak minoriti terus berusaha berintegrasi, pemerintah juga selaras berusaha supaya yang majoriti menerima kaum minoriti dalam segala aspek sebagai sebahagian daripada cara hidup 'masyarakat inklusif'.

15. Seperti sebuah perkampungan, masyarakat kita harus ada di ruangan bersama, di mana semua masyarakat dengan latar belakang berbeza berpeluang untuk berinteraksi dan mengenali satu sama lain – untuk memupuk semangat kesepaduan yang utuh di kalangan masyarakat di Singapura. Apakah itu semasa bekerja atau bersantai di kawasan kejiranan kita – kita harus usahakan dan memudahkannya. Jika dibiarkan, kita lebih condong berkelompok hanya dengan kaum kita sendiri, kerana kita seagama. MESRA mempunyai peranan besar dalam mengorak strategi menyatukan masyarakat kita untuk bersama dalam perkampungan ini demi kemakmuran semua.

16. Jelas, pihak MAEC perlu bergerak secara berbeza berbanding ketika ia baru ditubuhkan semasa era pos-merdeka. Fokus MESRA dan MAEC kini harus berkembang – dari hanya menganjurkan acara kebudayaan kepada juga menjalin hubungan yang mendalam dengan masyarakat kita. Kita perlu menyusun langkah mendekati pihak-pihak berkepentingan dalam masyarakat Melayu/Islam dan memberi fokus kepada golongan muda, para ulamak kita hingga golongan pakar dan karyawan dari pelbagai latar dan bidang. Usaha mendekati masyarakat kita secara berkesan adalah penting sebelum kita boleh membawa mereka berhubung baik dengan masyarakat am di Singapura. Panel penasihat MESRA; Puan Halimah, Dr Maliki, Dr Faishal, Encik Amrin dan Encik Zaqq sedang bekerja sama dengan semua anggota MESRA untuk menyusun langkah mendekati masyarakat dengan lebih erat. Perinciannya akan kami kongsi dalam bulan-bulan mendatang.

17. Kini saya ingin menyentuh tentang warisan kita. Baru-baru ini di Parlimen, DPM Teo bercakap tentang masyarakat Singapura yang inginkan sesuatu ikatan yang menghubungkan sejarah silam kita. Taman Warisan, yang dahulunya Istana Kampung Glam, merupakan salah satu contoh ikatan tersebut. Juga kawasan seperti Kampong Glam dan Geylang, di mana generasi lama kita tinggal dan membesar di sana, terpahat banyak memori lama mengenai semangat kekampungan yang pernah wujud dahulu. Pada 2018, kita bakal mempunyai sebuah mercu tanda yang boleh kita banggakan di tengah-tengah pembangunan bandar yang pesat, dengan terbinanya nanti Wisma Geylang Serai.

18. Wisma Geylang Serai merupakan sebuah bangunan serba baru yang boleh dibanggakan masyarakat kita, yang bakal menonjolkan betapa kayanya warisan, budaya dan identiti Melayu kita. Saya gembira semua ciri-ciri tersebut dapat dilihat dan dipamerkan melalui seni reka

bentuk bangunan tersebut. Saya bangga dan berbesar hati untuk mengumumkan bahawa Persatuan Rakyat (PA) telah memberi kepercayaan kepada MESRA untuk menerajui usaha merancang dan menguruskan program acara di Wisma Geylang Serai sepanjang tahun. Dr Maliki akan mengetuai inisiatif ini.

19. Di bawah naungan ini, kami juga akan bekerjasama dengan Majlis Seni Kebangsaan, Lembaga Warisan Negara, dan Kelab Masyarakat Geylang Serai untuk menganjurkan acara-acara budaya Melayu, serta kursus-kursus dan program yang memberi fokus kepada mendekati masyarakat. Visi kami – untuk menonjolkan Wisma Geylang Serai sebagai sebuah ruang warisan yang boleh dibanggakan masyarakat Melayu. Salah satu acara tahunan yang bakal dianjurkan MESRA adalah Bazar Hari Raya @WGS, mulai tahun depan. Harapan kami agar Wisma Geylang Serai menjadi pusat tumpuan bagi pelbagai aktiviti mendekati masyarakat.

#### **Para hadirin sekalian**

20. Kita bangga dengan pencapaian MAEC dan MESRA selama 40 tahun ini. Apa yang penting kini adalah langkah selanjutnya dalam menghadapi cabaran-cabaran masyarakat kita dan negara kita bersama. Saya telah melakar beberapa keprihatinan bersama dan strategi penting yang akan dilaksanakan MESRA dan MAEC, dan saya harap semua pihak - PA, pemimpin akar umbi dan relawan - dapat bekerjasama dengan kami untuk menjayakannya. Terima kasih.

Distinguished guests,

Ladies and gentlemen,

Good morning and welcome to our first ever Partners for the Environment Day.

2. I hope you enjoyed the video as much as I did. I thought that although it is a short video, it captures the kind of things that we should worry about for the future of our planet. Even as we strive for economic progress and urban renewal, and in Singapore, we always have to keep renewing ourselves, we have to consider a bright future for ourselves and also our children; we must always remember how our actions impact on the environment. Slightly over a year ago, I launched the Sustainable Singapore Movement or SSM. We hope to galvanise Singaporeans to take ownership of the environment and to ensure that we do it in our daily lives, whether we're working, playing or just relaxing, and that we do our best to create a cleaner, greener and ultimately a sustainable Singapore.

3. Within a short span of time, the Sustainable Singapore mascots have become recognisable because we have gotten them invited to many events to promote awareness of the sustainability movement. Train commuters enjoyed the "Sustainable Singapore" themed trains on the Downtown Line and Northeast Line, when they made their appearance in November last year. They are all loveable mascots and have starred in many videos launched online and collected many "likes". The five of them, Caring Cora, Zippy Maree, Smiley Ray, Smart Eddie, and Eco Eva – after this there will be a quiz where you can remember all five – they are very enthusiastic Ambassadors for Sustainability and eager to show up at your events, including having breakfast with all of you this morning!

4. It is timely to move beyond general public awareness to a deeper engagement with organisations and individuals like yourselves. We have to explore how to take the movement further, to entrench the value and meaning of the sustainability messages into the lives of all Singaporeans. Our theme today is "Sustainable Singapore Movement". As important partners for the environments, let us all reflect on what we can do to imbue the spirit of care and consideration for the environment in our people. Little drops of water make the mighty ocean. We can all make a difference by consciously making the right choices and taking the right action each time and every time. Even better, we can teach and inspire others to do the same.

### **Our Environmental and Water Challenges**

5. We live in a complex and challenging world today. One of these challenges is the impact of climate change, which is not a far-fetched possibility but really, a current reality. Countries all over the world are experiencing more frequent and

extreme weather patterns, resulting in floods, droughts and rising sea levels affecting millions everywhere. With a notable exception, 19 of the G-20 countries reaffirmed their commitment to the Paris Climate Agreement at the Hamburg summit last month. Even though Singapore contributes only 0.11% of global carbon emissions, we, too, remain committed to our pledge to reduce our emissions intensity by 36% from 2005 levels by 2030 and to stabilise emissions with the aim of peaking around the same time.

6. Singapore is a densely-populated area, we only have 700 sq km. We have to balance our land uses between many different needs. This includes prudent waste management and recycling and reusing resources whenever possible. With limited natural resources, population and economic growth will also place greater pressures on the management of energy and water resources.

7. To this end, the Sustainable Singapore Blueprint was developed as a response to these challenges, after extensive consultation with many different stakeholders. The Blueprint articulates the national vision, plans and targets for our long-term sustainable development towards a *Liveable and Endearing Home, a Vibrant and Sustainable City and an Active and Gracious Community*. It sets out a balanced growth approach towards growing the economy and protecting the environment. The Blueprint represents a national front, with inputs from consultations with industries, businesses, NGOs and community groups, as well as contributions by many public agencies. The Sustainable Singapore Movement seeks to breathe life into words on paper, by encouraging everyone to think of how we can actively contribute to help our country to achieve the targets and goals we have set for ourselves.

### **Partners for the Environment**

8. I am sure you will agree with me that sustainability becomes more meaningful and effective when everyone takes ownership and ropes in the community around them to do likewise. In fact, many of you already lead by example.

9. The public sector being the largest employer in Singapore and a significant consumer of resources, developed the Public Sector Sustainability Plan 2017-2020, which was launched by DPM Teo in June this year. Among the targets set in the plan are a reduction in electricity and water consumption by 15% and 5% by 2020. I am glad that the public sector is on track to achieve them.

10. City Developments Limited (CDL) and the Sustainable Energy Association of Singapore (SEAS) opened the Singapore Sustainability Academy, a training and networking facility on sustainability in June. This is a significant ground-up initiative between a private developer and a non-profit organisation to bring the Sustainable Singapore Movement to a wider audience. I applaud them for their

vision and look forward to much more such collaborative undertakings from other parties.

11. Organisations have also stepped forward to empower the community to take action for the environment. A recent example is OCBC Bank, which launched the #OCBCCares Fund for the Environment. It is a private sector-led Fund to support ground-up projects that can impact the environment and the community. The Fund will pay out a total of \$100,000 annually. At the launch, Mr Sivasothi, who has been a strong environmental advocate for a very long time, and chairs the project evaluation committee for this Fund, said, and I quote, *“by encouraging the community in Singapore to take ownership of environmental conservation efforts, OCBC Bank is creating a movement that can over time generate long-term benefits for the larger good of society.”*

12. Even our corporations that are sponsoring marathons and friendly runs have creatively introduced sustainability messages into their events. For example, when NTUC Income organised the Eco Run, participants were challenged to be zero-waste runners. Out of 10,000 runners, 1,500 of them took up the challenge. Runners appreciate the importance of clean and green spaces to enjoy their runs, so maybe this is a good audience to target! Let us hope sustainability features become a regular part of such events.

13. Within the community, Southwest CDC is an active partner and a strong advocate for the Sustainable Singapore Movement. Its annual flagship event, ECo Day Out @ South West, celebrates environmental efforts in the South West District and encourages resource conservation among the residents. At the tertiary level, Earthlink, NTU's environmental club, organises an annual carnival Greenfest to promote environmental awareness among the NTU community. This year, Earthlink also launched a mobile application to help NTU students and staff to reduce their energy consumption using the sociological concept of nudging and a gamification-based approach. The app, named PowerZee, was developed by the Energy Research Institute @ NTU and industry partner ENGIE Lab Singapore. SMS Dr Amy Khor, who was the GOH at the event, had challenged NTU to achieve 30,000 downloads for PowerZee. I hope NTU is on track in taking up the challenge. Maybe we can have a report at the end of this seminar.

14. Beyond organisations, active individuals can also be excellent Sustainability Ambassadors. Ms Nor Lastrina Binte Hamid is one such passionate youth with an aspiration and commitment for the environment. Lastrina represented the youth and spoke on climate issues at the 2015 United Nation's Climate Change Conference (COP 21) in Paris. She co-founded the Singapore Youth for Climate Action (SYCA), a platform to connect interested youths and to groom leaders to take action against climate change through climate action projects. In 2016, Lastrina also co-founded #LepakInSG, which provides a one-stop calendar listing all environmental events in Singapore, and

organises networking sessions to bring together like-minded individuals to discuss sustainability-related issues.

15. These are many stories of our partners' active engagement in the Sustainable Singapore Movement. Time does not permit me to mention everyone by name, but I want to thank you for your passion and commitment to the environment cause. It is wonderful to see cross-sector collaborations between the private sector, NGOs, educational institutions and public agencies, all working towards a common vision.

### **Continuing the Journey to Sustainability**

16. There are so many opportunities for us to make a difference. We can start with our organisations or our offices, by setting targets to reduce our energy and water consumption. Certifications such as BCA's Green Mark and SEC's Eco-Office provide a useful framework to develop environmental management systems and help organisations improve through benchmarking and tracking of their targets. Collaborations, particularly across sectors, also allow organisations to pool resources and tap on diverse skills and talents to co-create solutions that would be difficult to achieve alone. During the breakout session later, I encourage you to be creative and find innovative ways to partner one another to design and develop impactful programmes for your industry and for the community.

17. I believe that with a collective will and a concerted effort, it is possible to change mindsets and behaviour so that both in the corporate world and in our personal lives, sustainability becomes the default choice. We know in our head that our action today will determine the future that we live in, and our collective action will have a positive impact on our environment tomorrow. But what we know in our head must translate to conscious decision-making and tangible action. The true test of a Sustainable Singapore will be whether we will do the right thing for the environment, even when no one is looking and there is no regulation. How can we achieve this? Let me challenge you to think out of the box and come up with innovative ideas to turn this into reality. What can all of us do to build sustainability into our Singaporean DNA?

### **Conclusion**

18. In closing, let me bring us back to our purpose for being here today. As members of the Sustainable Singapore Movement who have been actively working to build a sustainable future for Singapore, you will have the opportunity today to come together to share experiences and explore how to spread this Movement to everyone in Singapore. How do we teach, engage, inspire fellow Singaporeans to take this journey with us and how do we support them along the way? I wish you a fruitful discussion and I am sure that there will be many ideas and collaboration opportunities arising from the discussions. Thank you.



Distinguished Guests

Scholarship Recipients

Parents

A very good afternoon to all of you today. I am glad to join you on this joyous occasion, as we welcome our award recipients into our warm and loving MEWR family. They call this MEWR family, I call this an awesome family, as it means air, water and environment.

2. As we mark this occasion, I hope that all of you will remember to thank your families, everyone who has supported you in your journey, in your process of becoming successful in your career and guided you thus far. This is important, because similarly, without the foresight and careful planning by our pioneers, everyone who had made us successful, is worth our thanks. Therefore it is important to do well, and remember the work of our pioneers who cleaned up our rivers and streets and turned our water system into something we can drink.

3. But, this does not mean that our job is done. In fact, we are faced with complex challenges more than ever. Singapore is a low-lying island-state, we are particularly vulnerable to the effects of climate change. Those joining the MEWR family better believe this, because this is not just a story, it is science. The expected rise in sea levels poses the most immediate threat to Singapore. It means that come end of century, the forecast could be anything between 1-1.5m rise from what we normally see today. Most of our nation lies only 15m above the mean sea level. Temperatures will rise, and we can expect more frequent events of extreme weather. There will be less rain, and when the rain comes, it will fall furiously fast and we also will have prolonged dry spells and drought, that can affect the reliability of our scarce water supply. Sudden episodes of intense rainfall means that we will have lots of water we cannot keep, which flood our city.

4. As a small island, we have many challenges like these, and as we urbanise, it will become more difficult, and we have to balance our land uses carefully between different needs, such as defence, industry, housing, transport, and recreation, and water even. There is limited space to manage our growing amount of waste, and our only landfill at Semakau will run out of space by 2035 if we continue generating waste at the same rate.

5. What I have just shared are some of the challenges that we in MEWR family have to address. To respond to these environmental and water challenges, the government developed the Sustainable Singapore Blueprint, which outlines our shared vision, including other concerned ministries, about making sure Singapore is a sustainable country. To achieve this, every officer in MEWR family

has an important role to play in contributing meaningfully to the environment and water challenges.

6. Since 2008, 145 students, including yourselves, have been awarded the National Environment and Water Scholarship. Many of them have completed their studies and are now working amongst us. One of the engineers at PUB, Ming Hwang, is involved in the development of the third desalination plant in Tuas, and the expansion of the Kranji NEWater Factory. These are part of our investment in water infrastructure to cope with growing demand and to build up water resilience against the impact of climate change.

7. Another alumnus, Xin Min, has returned to join us since July 2015, after completing her degree in Environmental Engineering. She is working in the Waste Resource and Management department in NEA. Waste management and recycling are crucial in Singapore, as we move towards becoming a Zero Waste Nation.

8. Like the officers that I mentioned, you too will have the opportunity to be involved in interesting projects, some still being planned and have not been announced yet. Your roles will have an impact on Singaporeans. In the environment and water sector, things are always changing, and issues can arise suddenly. This means that we will always have to think on our feet, leverage on new technologies and explore innovative solutions to these challenges. As you embark on this next phase of life, it is pivotal that you understand the role you have to play as a NEW scholar. Take in as much knowledge as possible from your universities, the places you visit, and the people you meet. I look forward to the exciting ideas that you will bring back with you.

9. I hope you will always remember that, in the public service, it is our duty to serve our Singaporeans. Hence it is important to serve with a heart. When you return from your studies to join the MEWR Family, no matter which department you are placed in, it is necessary to stay connected to the ground, be empathetic and listen to the concerns and needs of the public, even as you carry out your duties diligently and objectively. It is challenging, but at the end of the day, you will find what we do in MEWR family a rewarding and enriching experience.

10. So, I wish you success in your journey ahead. When you come back, it will be a different Singapore, with interesting things to work with and I look forward to you joining us in a few years' time, working alongside all of us and contributing to the MEWR family.

11. Thank you, and congratulations to all of you.

Professor Hsiao-Chi Chen, President of the East Asian Association of Environmental and Resource Economics, National Taipei University

Professor Orapan Nabangchang, Program Chair of the East Asian Association of Environmental and Resource Economics, Thailand Sukhothai Thammatirat Open University

Professor Euston Quah, Local Organising Committee Chair of the East Asian Association of Environmental and Resource Economics, Singapore Nanyang Technological University

Distinguished guests

Ladies and gentlemen

## **INTRODUCTION**

It is my pleasure to be here at the 7<sup>th</sup> Congress of the East Asian Association of Environmental and Resource Economics today. I understand that this is the first time that it is hosted in Singapore, and I am pleased to welcome all our foreign participants to Singapore.

## **SINGAPORE'S ENVIRONMENTAL JOURNEY**

2 Let me begin by sharing how Singapore has transformed itself from third world to first in a short span of about fifty years. Over this period of time, our nation has enjoyed growth in many areas, thanks to the hard work of our people.

3 One key aspect of our growth that we are very proud of is that we have achieved our economic development without sacrificing our environment. After gaining independence in 1965, we were hard-pressed to grow our economy and create jobs for our people. However, Singapore firmly believed that our environment issues have to be given priority alongside economic considerations.

4 To this end, we established various government institutions, such as the Public Works Department, the Environmental Public Health Division and the Anti-Pollution Unit during our founding years to look into providing environmental infrastructures and regulations. Some of these institutions were amalgamated to form the Ministry of Environment in 1972. In fact, we were one of the first few countries in the world at that time to have a dedicated Ministry that addresses environmental issues.

5 There are two key anchors to Singapore's sustainable development approach. Firstly, taking a pragmatic view towards governance and a long term

view in implementation. Our focus is on outcomes, not ideology. If we believe that a policy would work, we will stand by our position even if they might not play well to popular opinion. NEWater, one of our four National Taps is a good example. NEWater, for those who might not be aware, is purified wastewater (or used water as we prefer to call it). When it was first launched, there was a well known risk of the public not accepting it due to its origins. In reality, after processing the used water through multiple treatment barriers, the output, NEWater, is so pure that it barely contains any minerals and may be used as a high grade water in wafer fab manufacture! Because of our belief in the quality of NEWater and its importance to helping Singapore achieve water security, we took great pains to educate the public that NEWater is safe and a sustainable source of water for cities like Singapore. Today, recycled water is readily accepted as an integral part of our water portfolio.

6 Second, partnerships have helped us to build our capacity and capabilities beyond what the government can do alone. Citizens, industry, academia and civil society have partnered us in order to monitor and tackle climate change as well as other environmental challenges. For example, as of May 2017, a total of 246 companies have joined the Energy Efficiency National Partnership (EENP) as partners. Ricoh Asia Pacific Pte Ltd. is another partner which has been strongly supportive of sustainability efforts. Their Eco Action Day held earlier this year saw over 1,100 individuals, organisations and schools pledging positive actions for the future of the environment. Indeed, we believe that strong local and global partnerships will lead Singapore into the future.

7 Let me now touch on some of our key environmental challenges – how we have dealt with them, and the way moving forward.

## **KEY ENVIRONMENTAL CHALLENGES**

### *On Water*

8 When we first gained independence in 1965 – with an almost complete absence of natural resources – we were acutely aware of the importance of long-term planning and forward-looking policies. We knew that first impressions counted and when visitors and foreign investors came to Singapore, a large part of their impression of our nation would be determined by the appearance of our infrastructure. Thus we ensured that two big priorities would be to build a world class airport and a city centre district that was clean.

9 As part of the cleaning up effort, our Singapore River, which flows along the heart of the Central Business District, was judged to be in need of an extreme makeover with squatters, hawkers and manufacturing industries crowding the banks of the river, leading to severe pollution. A large-scale clean-up costing S\$300 million was mounted by the Government over ten years from 1977, with enhancements in subsequent years, forming the vibrant waterway that we know

today. In 2008 we built the Marina Barrage across the mouth of the Marina Channel to create Singapore's 15<sup>th</sup> reservoir, right in the heart of the city. Not only is this used to create a new supply of freshwater, the Marina Barrage brings about other benefits such as controlling floods and as a lifestyle attraction with canoes and dragon boats a common sight across the Marina Reservoir.

10 Singapore viewed water resource management as essential to Singapore's development, and had poured in much research and emphasis on it. This meant that we had to make sure the entire urban catchment – including land and waterways – were clean enough so that the water collected could ultimately be made potable. In this respect, Singapore was one of the pioneering countries to carry out city-scale urban stormwater harvesting. I've already alluded to NEWater and local stormwater harvesting as key parts of our four National Taps. Singapore also has imported water from Malaysia and desalinated water to supply our remaining two taps. Over the last 50 years, we have built a robust, diversified and sustainable water supply that ensures a sufficient supply of water for everyone on the island.

11 One of my Ministry's key roles is to ensure resilience in our water supply going forward. To that end, PUB, the National Water Authority, has in place a Water Master Plan – a strategic blueprint for our water until 2060 – which is regularly reviewed. The plan provides for the development of NEWater and desalination plants to meet up to 85% of our future projected water demand by 2060, as well as new pipelines for drinking water and used water. We are making good progress on the plans with several projects that are critical to water supply resiliency being rolled out within the next decade.

### On Air Pollution

12 Air pollution is another critical environmental problem that we pay close attention to. In Singapore, industries and vehicles are the two key sources of air pollution. To address air pollution from industries, we strive to make environmental considerations part of the upstream planning process. For example, land-use planning takes into consideration possible pollution and nuisance impact, which must be mitigated in the development. We also work closely with economic agencies to ensure that the pollution impact of new industries, as well as the health and safety hazards, can be managed before allowing them to operate in Singapore. These industries are then sited in designated industrial estates with adequate buffer from residential estates. In addition, they have to incorporate pollution control measures to comply with NEA's air emissions standards and regulations.

13 Aside from industrial emissions, we also look closely at vehicular emissions as part of our approach. Measures include updating emission standards for new vehicles and introducing schemes to turn over older, more polluting vehicles. These measures have made a difference, with studies showing that the amount of pollutants emitted by vehicles have fallen by between

20% to 35% over the last decade. Nonetheless, we still have some way to go toward our targets, and are pressing on with our efforts in this area.

### On Waste Management

14 Another key focus area for us is waste management. During the early years, our pioneers overcame the problems of dirty streets, poor sanitation and polluted waterways, transforming the country into a liveable city with a level of cleanliness that countries around the world look up to.

15 Singapore has put in place an effective and efficient waste management system to safeguard our health and protect our environment - most of the waste we generate is incinerated, with the resulting ash as well as non-incinerable waste sent to the offshore Semakau Landfill.

16 But we continue to face challenges. In the face of an increasing population and economic activity, the amount of waste that we generate is increasing. Semakau, our only landfill, is expected to run out of space by 2035. And because land in Singapore is limited, we can't keep building landfills or incineration plants.

17 Achieving our vision of becoming a Zero Waste Nation requires a significant shift in mindset and behaviour of every single individual and organisation. To facilitate this positive change, the government has adopted a holistic strategy to tackle different waste streams. For instance, the Singapore Packaging Agreement was established in 2007 to reduce packaging waste. To date, almost 200 organisations have come on board, and we have witnessed a cumulative reduction of 39,000 tonnes of packaging waste and savings of more than \$93 million in material cost.

18 We are also working closely with stakeholders to manage electrical and electronic waste, or e-waste in short. We are currently consulting industry stakeholders on an enhanced national e-waste management system – which would cover both the collection and disposal of e-waste – and will also be seeking the public's views on the proposed system soon.

19 We also aim to encourage individuals to actively Reduce, Reuse and Recycle. Since 2014, all new HDB developments have been fitted with dual chutes for refuse and recyclables, making it easier for residents to make recycling a way of life. And from 1 April 2018, buildings above four storeys in all new non-landed private residential developments will need to be equipped with dual chutes. We hope that by making recycling more convenient, we would be able to achieve our national domestic recycling target of 30 per cent by 2030.

## **SUSTAINABLE SINGAPORE BLUEPRINT – A WHOLE-OF-GOVERNMENT RESPONSE TO ENVIRONMENTAL CHALLENGES**

20 Our journey of sustainable development is a continuous one, and one which we will pass on from generation to generation. To direct our efforts into the future, we developed the Sustainable Singapore Blueprint or SSB for short. The SSB outlines our national vision and plans for the next phase of development until 2030, through three themes: “A Liveable and Endearing Home”, “A Vibrant and Sustainable City” and “An Active and Gracious Community” to create a more liveable and sustainable home for Singaporeans. The SSB represents our belief that we can balance our approach towards both growing our economy and protecting our environment. Under these themes, we further developed five key focus areas: “eco-smart” endearing towns, a car-lite Singapore, a leading green economy, working towards becoming a Zero Waste Nation, as well as active and gracious community, so as to engage the Singapore community to contribute to this vision.

21 I believe that everyone has a role to play in combatting environmental challenges, as well as helping to create an even more sustainable and liveable Singapore. To facilitate this, we launched the Sustainable Singapore Movement (SSM) – a national movement launched in July 2016 that is part of the SSB to make sustainability a way of life. Through the movement, we hope to galvanise ordinary Singaporeans and organisations to cherish our resources, consume less and practice sustainability habits, so that we can create a sustainable and liveable home for ourselves and future generations. On this note, I am heartened that more companies are increasingly doing more to promote sustainability. Earlier this week, more than 350 partners from the public, private, academic and NGO sectors came together to discuss opportunities for cross-sector collaborations, and I am glad that there were some interesting ideas that could be developed further.

## **CONCLUSION**

22 Similarly, I understand that many academic and policy ideas relating to the economics and management of the environment in Asia would be discussed at the conference today. I am hopeful that through cross-sharing of experiences from your respective backgrounds, there can be new ideas that would contribute towards a more sustainable environment. I wish you a lively and fruitful discussion. Thank you.

Mr Ang Wee Gee, Chief Executive Officer, Keppel Land

Mr Tan Swee Yiow, Chief Executive Officer, Keppel REIT Management and President of Singapore Green Building Council

Ms Flora Goh, Managing Director of United International Pictures Singapore

Ladies and gentlemen,

1. I am honoured to join you this evening, to be a part of a very meaningful initiative aimed at addressing and educating a global audience on the impacts of climate change.
2. We live in a fast changing world, with industrialisation happening at an unprecedented pace. One consequence of our rapid development, is the reality of climate change and global warming. Countries all over the world are experiencing more frequent and extreme weather patterns, resulting in floods, droughts and rising sea levels affecting millions everywhere.
3. Climate change has now become the biggest environmental problem mankind has ever seen. However, we are taking steps in a positive direction. A key milestone was the signing of the Paris Agreement on climate change in December 2015 and its coming into force in November 2016. More recently, 19 of the G-20 countries have also reaffirmed their commitment to the Paris Climate Agreement at the Hamburg summit last month.
4. Singapore, a low-lying, island city-state, is vulnerable to the effects of climate change. Last year was the warmest year on record for Singapore. New records for the warmest January, April and August were also set in 2016. Even though Singapore contributes only 0.11% of global carbon emissions, we recognise that we have a key role to play in combating climate change, and to remain committed to our pledge to reduce our emissions intensity by 36% from 2005 levels by 2030 and to stabilise emissions with the aim of peaking around the same time.
5. But what does this mean for us and how can we do our part for climate change? Quite simply, all of us – in Singapore and across the world – must act now, and act responsibly. Countries must work together to reduce our greenhouse gas emissions. We must take immediate steps to preserve our environment for our future generations.
6. To this end, the Government launched the Sustainable Singapore Blueprint 2015 and the Climate Action Plan, to serve as roadmaps towards sustainable development and carbon mitigation. Improving energy efficiency is Singapore's key strategy to reduce greenhouse gas emissions. Plans have been made to improve energy efficiency across all industry sectors.
7. Realising that the fight for environmental consciousness and climate resilience is a continuous one which involves many stakeholders, we launched the Sustainable Singapore Movement in 2016 to galvanise Singaporeans and residents to adopt greener practices for a more sustainable and carbon-efficient Singapore. Simple things we could do include taking public transport, using efficient appliances and reducing energy and water consumption.
8. Indeed, I am heartened that this event, which is in support of the Sustainable Singapore Movement, has brought like-minded partners together for the common cause of environmental sustainability and raising awareness on the impacts of climate change. It is most assuring to see the private sector taking the lead in such sustainability efforts. I would like to commend Keppel Land and Keppel REIT for raising the awareness of climate change to the community and doing their part to promote sustainability within their internal operations. I hope more organisations and individuals will do likewise.
9. More than a decade ago the award-winning *An Inconvenient Truth* brought climate change into the heat of popular culture. This is the power of education. Through this documentary, people were able to grasp the reality of the unprecedented effects of climate change and its implications for the future. Tonight we are here to witness the much awaited sequel showcasing Al Gore's tireless global campaign and training an army of climate champions in influencing international climate policy.

10. As we enjoy the documentary in the comfort of this theatre, I hope you put on your sustainability lens and imagine how you, and your communities, can be part of the solution towards climate change. Our goal towards a more carbon-efficient and climate-resilient Singapore can only be achieved when everyone takes personal responsibility towards mitigating the effects of climate change and protecting our environment. With that, I wish everyone an enjoyable and thought-provoking evening!

Thank you!

Mr Petteri Taalas, Secretary-General of the World Meteorological Organization

Distinguished Guests, Ladies and Gentlemen

## **INTRODUCTION**

1. First of all, let me extend a very warm welcome to our overseas guests who have travelled from afar to be with us today.

2. I am delighted to join you today for the opening of the World Meteorological Organization's (WMO) Regional Office for Asia and the South-West Pacific in Singapore. This office will serve as the nerve centre for the WMO's programmes in the region. It will be hosted by the Meteorological Service Singapore (MSS) and co-located here at the Centre for Climate Research Singapore (CCRS).

3. The establishment of this Regional Office is a very significant milestone for Singapore and the region. Allow me to elaborate.

## **SINGAPORE AND THE WORLD METEOROLOGICAL ORGANISATION (WMO)**

4. Since its inception in 1950, WMO has been the United Nation's authoritative voice on the behaviour of the Earth's atmosphere – the atmosphere's interaction with the oceans, the climate that this produces and the resulting distribution of water resources. Weather, climate and water go beyond national boundaries and this is why, the WMO plays a pivotal role in galvanising the global community to come together to cooperate in these areas.

5. In particular, the WMO is instrumental in facilitating real-time, free and unrestricted exchange of weather, climate and hydrological data among National Meteorological and Hydrological Services (or NMHSs in short) and its regional networks around the world. The framework for this international exchange of data was initiated in the late 19<sup>th</sup> century, and gradually led to the establishment of WMO's World Weather Watch in 1963 – in a sense, WMO has been way ahead of the 'Big Data' revolution that we see happening now! This free sharing of data has enabled the provision of early warnings and forecasts which have helped to prevent and mitigate disasters, save lives and reduce damage to societies, economies and the environment through early planning and better risk management.

6. Singapore's relationship with WMO dates back to 1966, when we first joined the organisation as a Member. We are honoured and delighted that WMO has decided to set up this Regional Office here in Singapore. We believe that this will further enhance collaboration and create synergies among the various NMHS in this region. In addition, this will facilitate the cross-pollination of new and innovative ideas with scientists here at CCRS as well as with the larger research and scientific community in Singapore and the region. This is important as I am told that producing weather forecasts with high precision and accuracy is particularly challenging for this part of the world. As there has been little research dedicated to this area, CCRS is trying to address this scientific gap and we want to work closely with the WMO on this. We recognise the importance of WMO's work, and will support and contribute to this Regional Office's capacity-building initiatives through the MSS.

## **EMERGING TRENDS IN THE ASIA PACIFIC DEMAND ADVANCED, CUTTING-EDGE METEOROLOGICAL SERVICES**

### ***Symbiotic Relationship between Air Transport and Aeronautical Meteorological Services***

7. We are faced with three emerging challenges in our region today. First, no region in the world is spared from the growing threats of weather and climate extremes induced by climate change. The last decade alone has seen the Asia Pacific region experience major natural disasters that resulted in significant fatalities and financial losses – a recent one being Cyclone Mora that cut a path of destruction across Sri Lanka, Bangladesh and Myanmar. Studies have shown that the Southeast Asian region is highly vulnerable to rising sea levels, heavy floods and droughts. For the aviation sector, in particular, fluctuating climate extremes overlaid with already dynamic tropical weather patterns in our region can potentially be hazardous to flights and air travel if we are not prepared.

8. At the same time, we are seeing significant growth in air traffic in the region. The International Air Transport Association (IATA) has forecasted that global air passenger demand would double over the next 20 years – from 3.8 billion in 2016 to 7.2 billion passengers in 2035. This is primarily fuelled by the strong demand in Asia Pacific which is projected to have a growth rate of more than 6% per annum. In Singapore, we are expanding our airport in preparation for this – when Changi Airport's Terminal 5 is ready in the 2020s, Singapore is expected to handle up to 700,000 flights annually – double the number of flights handled today.

9. This brings me to the third challenge. Given strong air passenger demand globally, it is imperative to transform the air traffic management system. The International Civil Aviation Organization (ICAO) envisions a globally interoperable and harmonised air traffic management system that will enable smooth, safe and seamless flights.

10. These three challenges – climate change, strong steady growth in global air traffic, and the transformation of air traffic management system, significantly changes the operating paradigm for our national meteorological services. Maintaining status quo is not an option. Meteorological information must be of even higher standards, precision and accuracy, particularly in the face of climate variability and climate change. WMO has made aeronautical meteorological services one of their key strategic priorities. So has Singapore.

### ***Strengthening our Capabilities and Expertise in Aeronautical Meteorological Services***

11. A key role of MSS is to provide accurate and reliable forecasts and warnings of hazardous weather conditions for Singapore's Flight Information Region (FIR) – these are paramount for aviation safety and efficiency. MSS also leads several regional initiatives. For instance, in South East Asia, MSS leads the coordination arrangements with the Meteorological Watch Offices of Malaysia and Indonesia to harmonise the issuance of advisories of significant meteorological conditions that can affect the safety of flights traversing different FIRs. This regional initiative, which started out as a WMO project, is the first to become operationalised in Asia and the Southwest Pacific region. Internationally, MSS is also the inter-regional gateway for the exchange of meteorological data between the Asia Pacific and Europe.

12. Against the backdrop of the 'triple challenges' confronting us, we have been investing heavily in cutting-edge research and building up our expertise to improve the precision of our weather predictions. For example, CCRS has embarked on a multi-year research programme to develop an advanced modelling system that will simulate the convective-scale thunderstorms over our tropical region. Such thunderstorms can be particularly disruptive to flights and can potentially be hazardous. When completed, the research from the programme will improve the short-term prediction of thunderstorms.

### ***Working with the Region to Build Capacity and Expertise***

13. Besides aviation, MSS also plays a key role in the monitoring and assessment of transboundary hazards in the region. MSS is also host to the ASEAN Specialised Meteorological Centre or ASMC in short. Founded in 1993, the ASMC's objective is to enhance regional capacity and strengthen support in the provision of meteorological services. Through the ASMC, MSS is spearheading a regional programme to promote research and application of Sub-Seasonal to Seasonal (S2S) predictions for the tropics, with a focus on high impact events such as heavy floods and droughts. This programme is undertaken in close collaboration with the WMO S2S Prediction Project. The capability to predict the weather at longer lead times of a few weeks and months will help in the planning of water resources, agriculture and disaster management over a longer time horizon.

14. One of the key roles of ASMC is to monitor and issue alerts for land and forest fires and the occurrence of transboundary haze in the ASEAN region. During the traditional dry season, the Southeast Asian region is susceptible to transboundary smoke haze from peatland fires and the burning of agricultural waste. These haze events have caused adverse health and economic impact on countries in the region. Research and development into a dispersion modelling system that the ASMC uses is on-going. The aim is to improve the prediction of transboundary smoke occurrence and its impact in the ASEAN region so that stakeholders can take early mitigation actions.

15. So, these are some of the exciting and impactful projects that MSS, CCRS and ASMC are undertaking. We welcome collaborations with the Regional Office to further strengthen regional cooperation and coordination in the area of meteorology.

## **CONCLUSION**

16. Ladies and gentlemen, we are heartened by WMO's vote of confidence in Singapore by choosing to relocate the Regional Office for Asia and the South-West Pacific here. I would like to thank the WMO Secretary General, Mr Petteri Taalas and his staff for their support and hard work in making the establishment of this office a reality. Also, I would like to extend a warm welcome to Dr. Park, who will be based in Singapore as the Director of this Regional Office.

Mr Albert Teo, President, Singapore Hotel Association

Distinguished Guests,

Ladies and Gentlemen

A very good afternoon to all. I am happy to be here today for the 5<sup>th</sup> Singapore Green Hotel Award Ceremony 2017.

2 In 2009, I was invited to the launch of this event to present the award to 15 hotel recipients. Today, I am pleased to note that double the number of hotels i.e. 30 hotels will be receiving the award in recognition of their good work in environmental sustainability. This increase in the number of recipients is indeed encouraging as it demonstrates a growing awareness and focus on sustainability within the hotel sector.

### **The Economic Case for Going Green**

3 Going green makes economic sense for all businesses as it helps to cut down operating cost, such as through more efficient usage of energy as well as the minimisation of waste. In addition, hotels with green practices have a distinctive advantage as they appeal to an increasing number of eco-conscious consumers. For instance, Travel search engine Kayak, which has an “eco-friendly” filter for hotels, found that there has been a 30 per cent growth in Singapore-based searches for such hotels, compared to last year. With the shift towards eco-friendly preferences, it is important for hotels to continually explore opportunities to offer an enhanced green experience for this growing market segment.

4 Rolling out green initiatives such as providing the option for guests to reuse their towels and linen will also help hotels in the allocation of scarce manpower. Placing recycling bins in guestrooms is yet another simple green practice that can go a long way. Through such efforts, less waste is disposed of, thereby helping, among others, to prolong the lifespan of our Semakau Landfill, which is absolutely crucial for land-scarce Singapore. Hotels also play an important role in Singapore’s overall effort to reduce the amount of food waste generated. By reducing food waste, hotels will be able to save on the manpower and costs associated with waste collection. There will also be less need for cleaning and management of pests which are attracted to discarded food. Therefore, I encourage hotels to explore measures to reduce or recycle food waste. For example, Marina Bay Sands emphasises on minimising the overproduction of food across its dining options and donates excess food to a food distribution organisation. For food that cannot be redistributed, the hotel has

installed five on-site food waste digesters to convert the food waste into non-potable water.

## **Public Sector Taking the Lead in Promoting Sustainability**

5 These efforts go a long way towards achieving the goals set out in the Sustainable Singapore Blueprint, to make our economy greener and also growing a green economy. In this context, all of us have a part to play in contributing to our National Movement towards a Sustainable Singapore. We hope to encourage both individuals and organisations through this movement to adopt sustainable practices and reduce consumption, so that we can create a sustainable and liveable home not just for ourselves, but also for the next generation. The Government is committed at the highest levels to green our public sector. In June this year, DPM Teo Chee Hean launched the inaugural Public Sector Sustainability Plan (PSSP) 2017 – 2020. It sets out targets to save energy and water, as well as to green our buildings. It also provides other sustainability measures that the public sector will implement.

6 One such measure is for the public sector to hold functions and events in BCA Green Mark certified hotels and convention centres. This demonstrates the public sector's support for the efforts of our hotels to adopt sustainable practices. I understand that the number of BCA Green Mark certified hotels has risen substantially over the years, and government agencies can now choose from more than 90 such hotels.

## **Efficient Use of Energy and Water Help Conserve Precious Resources**

7 Swissôtel Merchant Court is an example of a Green Mark Platinum Certified hotel. The hotel has a chiller plant system which consumes of 0.6kW of energy per tonne of cooling, which is 20-25% better than the typical average design. The hotel also uses lifts with variable voltage, variable frequency motor drive and sleep mode features. Other energy efficient features adopted by the hotel include variable speed drives for air handling units, motion sensors for lighting and carbon dioxide sensors to regulate fresh air.

8 For hotels that are researching to embark on various green initiatives, I would like to draw your attention to the existing guidelines and best practices that have been put together by our lead agencies and the relevant industries. The list includes the Code of Practice for Indoor Air Quality for Air-conditioned Buildings (SS554), the Sustainability Guidelines for the Singapore MICE Industry, the SHA-NEA 3R Guidebook for Hotels as well as the Singapore Standard on Water Efficiency Management System (SS577).

9 On this note, I would like to briefly highlight some sustainable practices for water in relation to hotels. For hotels, the areas of high water usage are the cooling towers and guestrooms. In addition to using water-efficient fittings and monitoring water usage by installing private water meters on major water usage areas, it is important for hotels to develop a water efficiency management plan to identify water-saving measures for implementation and further improve their water efficiency. This is all the more important as demand for water continues to increase in tandem with economic growth.

10 Since 2015, 67 hotels have been submitting their **Water Efficiency Management Plans (WEMPs)** to PUB, Singapore's National Water Agency, on an annual basis. Based on the data collected, PUB will be developing benchmarks and best practice guidelines to improve water efficiency in buildings including hotels.

11 Besides reducing water consumption, I would also like to urge more hotels to consider using alternative water sources such as NEWater, rain water, condensate water as well as recycling water. For example, I am glad to hear that Shangri-La's Rasa Sentosa Resort and Spa collects and uses condensate water from their Air Handling Units to supplement their cooling tower makeup water and harvests rainwater for landscaping. In addition, the hotel, which is certified as a "Water Efficient Building", also monitors its key water usage areas on a daily basis using a remote metering system.

12 To ensure the continuity and sustained impact of green initiatives, staff, guests, and vendors must be engaged and informed of the environmental initiatives that the hotel is championing. More importantly, they need to know how they can proactively contribute towards the goal of sustainability. Let me share a few notable initiatives rolled out by hotels to promote a culture of sustainability:

13 At Marina Bay Sands, over 20 departments have set energy and water conservation targets. Waste diversion rate is also included as a key performance indicator for Heads of Department.

14 Several hotels have also implemented incentive or recognition schemes to encourage employees and guests to take positive actions to support environmental sustainability. For instance, at The Fullerton Hotel and The Fullerton Bay Hotel, a \$50 F&B voucher is awarded to any staff for coming up with practical green ideas. Furthermore, the hotels go the extra mile by placing a "Thank You" card inside the guestroom to appreciate guests' suggestion or feedback on green solutions.

15 As we seek to work towards the goal of a Sustainable Singapore, I would like to urge all hotels to include going green as one of the key goals in your decision-making process – it will be a worthwhile cause for your business and our shared environment.

## **Conclusion**

16 Before I conclude, I would like to thank the Singapore Hotel Association and the supporting public agencies, namely BCA, NEA, PUB and STB for their unwavering partnership in promoting the development of a sustainable hotel industry by establishing this biennial Singapore Green Hotel Award.

17 I would like to congratulate once again the 30 hotels that will be receiving the Singapore Green Hotel Award 2017. Last but not least, I would also like to take this opportunity to strongly encourage more hotels to come on board and be part of this meaningful green journey. Thank you.

Prof Tan Chorh Chuan

President of NUS

Prof Yong Kwet Yew

Chair of NUS Sustainability Steering Committee

Distinguished Guests

Ladies and Gentlemen

It is my pleasure to join you today at the inaugural sustainABLE NUS Showcase.

2. I was in NUS on 12<sup>th</sup> July this year to address the graduates at the NUS Engineering Commencement Ceremony. Then, I spoke about how an education in engineering has contributed to Singapore's sustainable development, particularly on water sustainability.

3. Let me expand upon this point and share broadly about how technology, education, infrastructure and an engaged community will continue to be key enablers for sustainability and how universities like NUS can play a key role in achieving our vision of a Sustainable Singapore.

#### **Climate Change and the Sustainable Singapore Blueprint**

4. We are all aware that the reality of climate change and its associated impacts are increasingly being felt all around the world. As a low-lying island-state, Singapore is particularly vulnerable to the effects of climate change. Additionally, with a densely populated area and limited natural resources, there are great pressures on the management of energy, water resources, and waste.

5. The Sustainable Singapore Blueprint 2015 was developed in part as a response to these environmental challenges. The Blueprint articulates the national vision, plans and targets for our long-term sustainable development, and sets out a balanced growth approach towards growing the economy and at the same time protecting the environment.

#### **Enablers for Sustainability**

6. To realise our vision, we need innovative **technological** solutions that are scalable. The NUS plays an important role in furthering our understanding of how we can leverage on technology to be more sustainable. For example, the joint NUS-PUB study on the use of smart shower devices demonstrated the potential to reduce water usage for households significantly and achieve our national water conservation targets for the household sector. Approximately 29% of a household monthly water consumption are for showering. In this study, a smart shower meter, the Amphiro A1, is installed in the shower to provide real-time feedback on how much water is consumed. Complemented with a realistic target for individuals, the conservation of water can be boosted by about 5 litres per shower. As a result of these findings, PUB will be installing smart shower devices in 10,000 new homes over the next few years. You will be able to learn more about this initiative, as well as NUS' other initiatives at this inaugural Showcase.

7. Secondly, **education** is another enabler for a Sustainable Singapore. In addition to engineering expertise, we also need graduates who are well versed across many disciplines to confront the increasing complexity of environmental problems. Disciplines like law, public policy, governance and management, public health, urban planning, and business management, just to name a few, are all areas which our environment increasingly share a close relationship with. I am glad to learn that NUS has always been cognisant of such trends and have been offering modules across faculties to give students a more holistic understanding of the multi-faceted environmental challenges so that our youth will be able to respond with innovative solutions in their respective fields.

8. In particular, the Bachelor of Environmental Studies at the Faculty of Science, Master of Environmental Management at the School of Design and Environment, and Yale-NUS College's Environmental Studies major are all specialised degree programs to prepare graduates for a future where sustainability will be at the core of our economy, our society, and even everyday life.

9. **Infrastructure** is another important enabler. The building and real estate sector is responsible for about a quarter of Singapore's electricity consumption. I am heartened by NUS' emphasis in master planning with their Sustainability Strategic Plan that has 2020 targets for energy, water, recycling, the construction of energy-efficient buildings, and green spaces within these buildings. I look forward to the completion of the Net-Zero Energy Building at the School of Design and Environment, which will be NUS' first purpose-built building to achieve net-zero energy consumption through a combination of green building technologies.

10. Beyond technological, education and infrastructural enablers, **engagement** lies at the core of our journey to realise a Sustainable Singapore. I launched the Sustainable Singapore Movement in July 2016 to galvanise the 3P or people, public and private sectors to take concrete actions in sustainability. And early this month, my Ministry organised the inaugural Partners for the Environment event that saw more than 350 3P partners gathering together to co-create ideas on sustainability.

11. I am heartened by the interests shown by NUS students to advance the Sustainable Singapore Movement, or SSM. In fact, I was told that in 2009, the NUS Students Against Violation of the Earth, or NUS SAVE, worked with various NUS offices and the student population to roll out a plastic bag tax within campus – a first in Singapore then – to advocate less use of plastic bags. The project has been so successful and readily accepted by the NUS population that NUS SAVE went on to introduce rebate schemes such as Project Box and Project Tumbler to further discourage the use of the disposables in addition to the ongoing plastic bag tax.

12. These student leaders have also shared their community engagement experiences with other tertiary institutions' environmental clubs through informal networks such as the Joint University Environment Conference. In the process, they have contributed to the growing youth environmental movement in Singapore. In recognition of their endeavors, NUS SAVE was conferred the Ten Accomplished Youth Organisations in ASEAN Award by the ASEAN Secretariat and the Ministry of Education, Youth and Sports of Cambodia in 2016.

## Conclusion

13. Ladies and gentlemen, I hope that all NUS students and staff will spend some time exploring the exhibits at the Showcase today, and think about the key sustainability challenges we are facing and innovative solutions to overcome these. We need you to be part of the change by adopting sustainable lifestyles. You can start by practising the 3Rs. You buy only what you need. You also do your part to segregate food waste from recyclables to reduce contamination and support Singapore's recycling efforts. This is a step towards Singapore's vision of a zero-waste nation.

14. But why stop there? Better still, take action and influence your family, friends and relatives to bring about a wave of change in mindset and behaviour. Do not be afraid to ask others to change their habits. Your passion and courage to take that step in spreading the sustainability message are necessary in order for us to realise a Sustainable Singapore together.

15. I was curious about why the ABLE in "sustainABLE NUS" is specifically capitalised and was happy to know that it was done in that way so that individuals can readily associate it with what "I AM ABLE....." to do, for a sustainable campus. I would therefore like to challenge our young minds to also think about the story we are shaping through our actions, and envision the kind of sustainable future you want to be living in beyond the campus. With that, I hereby declare the sustainABLE NUS Showcase open.

Thank you.

Excellencies and distinguished delegates,

## **INTRODUCTION AND SINGAPORE'S CONTEXT**

1. Protecting the environment and the health of people is a central element to the attainment of sustainable development. Statistics have long shown that proper control of pollution tends to correlate with economic growth, especially for many developing countries. Singapore thus takes pollution issues seriously. As a small island city state of 720 square kilometres and with no natural resources, the challenges of pollution are more acute for Singapore.

## **SUSTAINABLE SINGAPORE BLUEPRINT**

2. Even as Singapore develops and makes steady economic progress over the past 52 years since our independence, we have continued to place emphasis on sustainable development. As part of our efforts to sustain this, we have come up with the Sustainable Singapore Blueprint 2015, which sets out our national vision and plans on sustainable development until 2030. The Sustainable Singapore Blueprint is a living document that undergoes regular reviews to maintain its relevance.

3. In the interest of time, I will draw focus on policies related to waste and water management, which are integral to the theme of a resource efficient and pollution-free Asia Pacific.

## **WASTE MANAGEMENT**

4. To address waste upstream, Singapore works towards inculcating the 3R (Reduce, Reuse and Recycle) approach. We have launched the National Recycling Programme since 2001 to raise public awareness about recycling and to encourage individuals to recycle more. We also enforce strict anti-littering laws to keep the country clean.

5. To address waste downstream, we have an integrated waste management system to minimise waste at source and ensure proper waste recycling and disposal. All incinerable wastes, including plastics that are not recycled, are disposed of at modern waste-to-energy incineration plants equipped with advanced air pollution control systems. Non-incinerable wastes and ash from the incineration process are disposed of at leachate-free off-shore landfills.

6. Through these concerted efforts, the overall recycling rate in Singapore has increased. We have also set a target to achieve 65 per cent overall waste recycling by 2020 and 70 per cent by 2030 to help meet our goal of moving "Towards a Zero Waste Nation".

## **WATER MANAGEMENT**

7. Turning to water, being a small island state with an increasing demand for water, Singapore makes every drop of water count. We achieve this by adopting three key strategies: one, collect every drop; two, re-use water endlessly; and three, desalinate seawater.

8. Singapore works closely with the private sector to lower water consumption. This includes launching the Water Efficient Building Certification Programme in 2004 and incentivising water efficiency using the Water Efficiency Fund scheme that started in 2007. This is especially important as non-domestic use is expected to increase from 55 per cent of water demand today to 70 per cent by 2060.

9. We also have in place measures to ensure households and industries use water efficiently by getting them to adopt water-efficient fittings and appliances that can help conserve water. The recently introduced mandatory Water Efficiency Labelling Scheme helps consumers choose their products such as taps, flushing cisterns, urinals, washing machines, and other appurtenances wisely.

10. Given that reclaimed water and desalinated water are part of our sources of water, we implement stringent and comprehensive policies to control and manage wastewater. Singapore's sewerage system covers the entire country. All trade effluent discharged to the sewer must comply with our trade effluent regulations to ensure that it is suitable for water reclamation and subsequent processing into Singapore's brand of reclaimed water called NEWater. Surplus used water not recycled into NEWater is collected and treated to internationally recognised standards before discharge. Singapore also does regular water quality monitoring of our water bodies to ensure that they meet international water quality standards.

## **TRANSBOUNDARY POLLUTION**

11. Singapore does its part in reducing its resource and pollution footprints. However, localised pollution control efforts alone are not enough in achieving a pollution-free planet because pollution crosses borders through carriers, such as air and water.

12. Therefore, it is important for countries to adopt holistic strategies, including cooperating to address transboundary pollution. Every country must also do its part in the collective effort in minimising pollution from source. In addition, multilateral and regional bodies, such as UN Environment and UN ESCAP, play an important role in facilitating effective implementation through capacity building.

## **SINGAPORE COOPERATION PROGRAMME**

13. As a responsible international citizen, Singapore also shares our experience on sustainable development. Under the Singapore Cooperation Programme, we have since shared our know-how on waste and water management, and broader sustainability and environmental issues. To date, more than 100,000 officials from fellow developing countries have undergone such training.

## **CONCLUSION**

14. In conclusion, Singapore stands ready to contribute to the discussions here as well as the vision of a resource-efficient and pollution-free Asia Pacific region. Thank you.

Madam President,

Excellencies,

Distinguished delegates,

1 It is an honour to address this Conference on behalf of Singapore. Our meeting here is indeed timely and relevant, given the vital role oceans play. Oceans not only provide livelihoods for millions of people, enable maritime trade and food security, and regulate the climate; research has also shown a link between oceans and human health.

2 This nexus between the oceans and human health is multi-dimensional. The oceans are a vast supply of resources such as food, raw materials for medicines, as well as serving as a source of energy. Oceans also potentially hold the key to new drugs to treat various diseases. On the other hand, when oceans become polluted, human health can be adversely affected by contaminated seafood, toxins from algal blooms, and harmful chemical pollutants. The oceans are also increasingly being polluted by plastic waste, which can contain hazardous chemicals and bio-accumulate, posing ecological and health risks. These are serious issues that confront all of us, especially small island developing states. As such, it is vital to ensure that our oceans remain “healthy”.

### Conservation and Sustainable Use of the Oceans

3 Given the close linkages between oceans and human health, we have added reason to take concrete action to conserve and sustainably use our oceans and seas. Political resolve is key. The actions we take must also be guided by the following principles. First, our actions must be informed by a clear, evidence-based understanding of the threats facing our oceans. It is only with a clear understanding of the problems that we can come up with appropriate solutions. Second, we need to take responsibility and action at the national level. Third, besides action at the national level, there is also a need for coordination and cooperation at the regional and international level, and related to this is the importance of adhering to and effectively implementing international law.

4 On the first principle of understanding the challenges, we need to enhance marine scientific research to support policy and decision-making. We also need to promote knowledge hubs and networks to enhance the sharing of scientific data, best practices and know-how. Some research projects Singapore has undertaken include establishing a citizen science monitoring and data sharing system for marine debris and the development of a multi-organism and multi-level biomarker system for biomonitoring of marine ecosystem health.

5 Second, we need to take responsibility at the national level. Singapore has been doing our part to combat marine pollution, which is a key threat facing our oceans. Given that 80% of marine pollution stems from land-based sources, which include marine litter and microplastics, it is important to take steps to control pollution from land-based sources.

6 To ensure that Singapore does not contribute to the issue of marine litter and microplastics, we have in place stringent and comprehensive policies to control pollution and manage waste. For example, all discharge of trade effluent, oil, chemicals, sewage or other polluting substances to the watercourses are tightly controlled so that they do not cause pollution. We also enforce strict anti-littering laws, and have an integrated waste management system to minimise waste at source and ensure proper waste recycling and disposal. All incinerable wastes including plastics that are not recycled are disposed of at modern waste-to-energy incineration plants equipped with advanced air pollution control. Non-incinerable wastes and ash from the incineration process are then disposed of at leach-free off-shore landfills. In addition, Singapore's sewerage system covers 100% of the country and all surplus used water not recycled into high-grade reclaimed water is collected and treated to internationally recognised standards before discharge. Together, these measures help prevent land-based sources of pollution, including plastics, from ending up in coastal waters and the ocean. Singapore also does regular water quality monitoring of water bodies to ensure that they meet international water quality standards.

7 In line with our collaborative and inclusive approach, the Singapore Government works with the private sector and citizens on anti-littering initiatives such as cleaning up waterways and beaches. This helps raise the consciousness among people about the importance of keeping the environment, including our water bodies and seas, clean. We have also worked with industry to embark on initiatives to reduce the generation of land-based solid waste. One such initiative is the Singapore Packaging Agreement, a voluntary agreement with industry, to reduce packaging waste.

8 In addition to land-based sources, Singapore also has laws to address sea-based sources of marine pollution. Such pollution sources comprise negligent or intentional discharge from vessels and oil platforms. As one of the world's busiest ports, Singapore has taken the lead in rolling out a wide range of measures to protect our marine environment. The Maritime and Port Authority of Singapore (MPA) was one of the first maritime administrations in the world to launch a comprehensive pro-environment initiative, known as the Maritime Singapore Green Initiative (MSGI) in 2011 to reduce the environmental impact of shipping and shipping-related activities, and promote clean and green shipping in Singapore. A sum of up to S\$100 million had been pledged over 5 years to implement this initiative, which comprises three components – the Green Ship Programme, Green Port Programme and Green Technology Programme. The MSGI was further extended and enhanced in July 2016 to include two new

components – the Green Awareness Programme and the Green Energy Programme.

9 While Singapore has played our part in addressing marine pollution, none of us can solve the challenges facing our oceans alone. This brings me to my third point on regional and international cooperation. All States and relevant stakeholders must cooperate to more comprehensively tackle the problem. The United Nations, in particular, has a key role to play. We applaud the UN's efforts in galvanising action to address the challenges facing our oceans. These include the landmark Oceans Conference in June this year, which provided a platform for high-level dialogue and an exchange of ideas and solutions, including on the issue of marine pollution. It also garnered, as of 27 August, a total of 1395 voluntary commitments, and produced an ambitious and action-oriented outcome document in the form of a Call for Action. Singapore was among those which submitted a list of voluntary commitments and we remain firmly committed to deliver on them. Singapore also participates actively in regional seas initiatives such as the Partnerships in Environmental Management for the Seas of East Asia and Coordinating Body on the Seas of East Asia.

10 Among our commitments are those pertaining to providing training and capacity building opportunities for our partners. Having ourselves benefitted from technical assistance in the past, we are keenly aware of the value and importance of such programmes. We have established the Singapore Cooperation Programme (SCP) in 1992 to provide training and capacity building courses for our partners. In 2015, we launched the Sustainable Development Programme under the SCP to support the 2030 Agenda, focusing specifically on climate change adaptation strategies and water quality management. More recently, we launched a course on Sustainable Oceans and Marine Resources.

11 Last but not least, I wish to draw attention to the fundamental importance of adhering to and effectively implementing international law, as reflected in the United Nations Convention on the Law of the Sea (UNCLOS). UNCLOS sets out the legal framework within which all activities in the oceans and seas must be carried out. The issue of oceans and human health is no exception. This fundamental principle has also been explicitly recognised and will therefore serve to achieve Sustainable Development Goal 14.

12 In closing, I hope that this Conference can help galvanise greater political will and action to address the challenges facing the health and sustainability of our oceans. I am happy that this conference will be issuing the Oceans Meeting Declaration. We hope that this will signal our collective political will to take action and achieve Sustainable Development Goal 14 and its targets.

13 Thank you.

Mr Lee Fook Sun,  
Chairman, BCA,

Mr Tan Swee Yiow,  
President, Singapore Green Building Council,

Distinguished Guests,

Ladies and Gentlemen,

1 A very good morning to you all. It gives me great pleasure to join you at this event. Many of you here are decision makers in your companies and organisations, and you can play a part in greening our environment. Let me share with you what the Government has been doing, and how we can work together on our green journey.

### **Singapore's Green Building Development**

2 Since independence, we have pursued sustainable development to build a clean and green Singapore. In June this year, Deputy Prime Minister Teo Chee Hean launched the Public Sector Sustainability Plan, outlining the government's collective efforts to go green. The public sector will take the lead to contribute to the nationwide Sustainable Singapore Movement, and the goals outlined in the Sustainable Singapore Blueprint, or SSB.

3 Singapore has been demonstrating leadership in the green building movement. Under the Green Building Masterplans led by BCA, we are championing the development of green buildings through various initiatives such as the BCA Green Mark scheme, incentives and financing schemes. Since the launch of BCA Green Mark scheme in 2005, more than 3,100 buildings have been "greened", covering more than 92 million square metres of gross floor area (GFA). This is more than 34% of the entire building stock in Singapore.

4 But greening a building is only half the battle. Based on BCA's benchmarking report released annually, building users namely tenants and occupants are responsible for about half of the total electricity consumption. This means more can be done to reduce the buildings' overall carbon footprint by placing a greater focus on encouraging a building's eventual users, namely tenants and residents, to green their premises and adopt good habits to reduce their daily energy use.

### **Sustainability Benefits Businesses**

5 Globally, the signing of the Paris Agreement has unified the push for sustainable development. The drive for sustainability will not only bring about a positive impact to the environment, it can also benefit businesses. We expect to see more opportunities for business growth through the demand for green buildings. I am glad to note that more private companies, such as DBS and Credit Suisse, are making it a requirement for their offices to only take up spaces in green buildings.

6 Besides demonstrating an organisation's corporate social responsibility, the immediate benefit of green buildings and premises would be lower operating costs. Beyond that, a BCA and NUS joint study has shown that Green Mark buildings promote a healthier indoor environment, translating to higher occupant satisfaction. This could lead to higher staff productivity and a stronger bottom line for businesses.

7 The Government recognises these benefits, and is committed to greening the public sector buildings and infrastructure through the Public Sector Sustainability Plan. For example, all government agencies need to hold events and lease offices in Green Mark premises. Additionally, new government buildings with more than 5,000 m<sup>2</sup> air-conditioned floor area will need to attain the BCA Green Mark Platinum rating.

### **"Be the Change: Top Down and Ground Up"**

8 We have to realise that the Government cannot do this alone, and the support of the industry and businesses is therefore critical. I call for your strong support to put Singapore's green building plan into action through a shift in mind-set and strategic direction within your organisation. All of you are decision makers within your company. I urge you to help drive and develop a workplace culture that places greater emphasis on green and sustainable behaviour. While the top management endorsement is critical, there is also a need to actively engage your staff. Everyone has a role to play – even small operational changes

implemented by staff on the ground can make a big difference. This is aptly echoed in the theme today – Be the Change: Top Down and Ground Up.

### **Government's Support in Your Green Journey**

9 The Government is rolling out various initiatives to support organisations in going green. To help companies embark on their green journey, I am happy to announce that BCA is introducing a pilot Green Mark feasibility assessment for 50 SMEs on a first-come-first-served basis, where companies can apply for a free basic assessment to gauge how green their premises are.

10 To help defray some of the upfront costs of greening your premises, BCA has also enhanced the Green Mark Incentive Scheme for Existing Buildings and Premises. With this enhancement, the co-funding cap amount has been doubled, to a total of up to \$40,000, and will support a wider range of energy efficient systems and equipment.

11 Ultimately, staff support is essential in achieving a holistic sustainable culture within the organisation. Therefore, BCA, together with the Singapore Green Building Council (SGBC), is launching a Behavioural Change Pilot Programme to train up champions within companies to help encourage your staff. This programme aims to improve energy use through behavioural changes, where small targeted actions can lead to tangible savings for the organisation, and also help create a better environment for all of us.

12 To put it simply, these new initiatives seek to encourage the built environment industry to do more towards a Leading Green Economy, which is one of the five focus areas under the SSB. With the wide range of occupant-centric initiatives available, I am confident that you will be able to find some form of support to take the next step in your organisation's sustainability journey, and thereby help Singapore to become one of the leading cities in green innovation and deployment.

### **Conclusion**

13 Today, I am pleased to highlight some building owners and tenants, who have shown strong leadership and commitment, working together to improve the environmental sustainability of their buildings and premises.

14 On the screen, you can see over 50 tenants from the three buildings of this year's BCA Green Mark Pearl and BCA Pearl Prestige award winners. The award recognises building owners and tenants who achieve greater environmental sustainability for their building. These 50 tenants, such as Prudential, Golden Village and Din Tai Fung, have demonstrated strong commitment and attained Green Mark for their premises.

15 Let me conclude by encouraging all of you to follow their lead, as there is a need for greater support from everyone. I hope that the exchanges afterwards will provide you with valuable insights, inspire you to be part of the Sustainable Singapore Movement, and to create greener and healthier spaces for your staff and tenants. Indeed, I am very happy that this year, there has been quite a big focus on the link between green buildings and health, and that is why my colleague Prof Tan Chorh Chuan is also here to share with you this morning. I wish all of you a fruitful discussion later on. Thank you.

Distinguished Guests, Ladies and Gentlemen

## **Introduction**

Good evening. It gives me great pleasure to be part of the EcoFriend Awards Ceremony 2017, to recognise the efforts of outstanding individuals who have made significant contributions to keep Singapore clean, green and, now the key word, sustainable. It is heartening to see and personally experience the passion and dedication of these award recipients in my interaction with them just now.

2. In our drive for economic development and faced with trends of a growing affluent population and climate change, Singapore faces environmental challenges such as increasing waste generation and environmental pollution. There is a need for organisations and individuals alike to innovate and adopt sustainable practices to mitigate these challenges.
3. Efforts by the government alone is not enough. We need stakeholders from the People, Public and Private sectors, also known as 3P sectors, to work with us and play a part in actively practising and promoting environmentally friendly practices. It is also timely now to move beyond creating general awareness to actually deepening engagements and collaborations among partners to bring about stronger collective action and greater environmental ownership.
4. With that in mind, my Ministry launched the Sustainable Singapore Movement in July 2016 to rally the 3P sectors to take concrete actions in realising our vision of a Sustainable Singapore. Since then, many partners have answered the call. It is important for us to take time not just to appreciate their efforts, but also to recognise them so that they can be role models to others in our efforts to realise a Sustainable Singapore.

## **Important Role Models**

5. Today, we recognise 10 individuals who go beyond their call of duty as either a CEO, working professional, educator or student to launch environmental initiatives – not just to heighten awareness of environmental stewardship and sustainability to the wider community. These role models are change makers who started movements with the aim of changing habits and advocating for the adoption of eco-friendly lifestyles.
6. One such role model is Ms Ivy Quek Chew Buay, Principal of PCF Sparkletots Preschool @ Limbang Blk 543. Ms Quek believes that it is important to instil environmental values in children early. She spearheaded the development of a curriculum that teaches pre-schoolers the basics of 3Rs and public cleanliness through their “Project Healthy and Happy Me” weekly class programme. Another example, Ms Kia Jie Hui, co-founder of “Save That Pen”, engages students and volunteers through schools and community groups to donate used and unwanted pens, and give them a new lease of life by refilling and redistributing them to the less privileged. Ms Clarissa Song Jia Xi, who will be turning 14 next month, is our youngest student recipient to-date. As the Vice-President of Anderson Secondary School’s Green Club, she successfully led a team to convince the school’s canteen vendors to participate in her ‘Refuse Plastic’ movement, where she obtained 100% buy-in from all the canteen vendors to stop using straws and plastic disposables. The efforts of all our award winners are indeed laudable.
7. I understand that there were 329 Award nominees this year, an increase from 2016. The percentage of new nominees had also increased from 63% in 2016 to 78% in 2017. We recognise that more individuals are doing their part for the environment and influencing fellow Singaporeans to do the same. They are sterling examples of how we can play an active role in caring for our environment and spur collective action towards a Sustainable Singapore.

## **Sustaining Efforts for the Environment**

8. It is also heartening to see sustained efforts by past Ecofriend Award recipients. Mr Eugene Tay, founder of Zero Waste SG, was a 2014 EcoFriend Award recipient and has been an active advocate of environmental issues for the past 10 years. His most recent initiative is the BYO (Bring Your Own) Singapore campaign. Launched just last month, Eugene has collaborated with retailers to reach out to the

community with educational tips, resources and incentives to promote the use of reusables, thereby reducing the use of disposables.

9. NEA has invited him today, together with other partners to highlight their initiatives and provide opportunities for exchange of ideas, in the hopes of forging new partnerships.

### **Conclusion**

10. I hope that the stories of our award recipients and partners will inspire others to continue to protect our fragile environment and precious resources, as well as increase ownership and collective action in the community.

11. Together, let us continue towards a clean, green and sustainable Singapore.

12. Thank you.

Yang Amat Berhormat Datuk Seri Khaled Nordin,  
Menteri Besar of Johor

Yang Berhormat Datuk Hasni Mohammad,  
State Chairman of Public Works, Rural and  
Regional Development Executive Committee

Yang Berhormat Datuk Ayub Rahmat,  
State Chairman of Health, Environment, Education and  
Information Executive Committee

Distinguished Guests,

Ladies and Gentlemen,

1 A very good morning to everyone. I would like to thank Menteri Besar Dato' Khaled Nordin for inviting me to speak today. This Forum is a very important initiative, and is a reflection of the state water authorities' untiring efforts to improve the management and supply of water in Johor. I know that my friend and colleague Datuk Hasni is always focused on the issue of water, and I congratulate him for organising this Forum. I am happy to see that Singapore officials have strong ties with the Johor water authorities, especially BAKAJ. I am glad to be here today with a chance to share with you on the Singapore Water Story.

### **The Dutch Experience**

2 Before I start on our Water Story, I would like to share with you what I experienced when I visited the Netherlands late last year. Both the Netherlands and Singapore face acute water problems. However, unlike Singapore, the

Dutch's problem is too much water. The lowest point in all of Europe, at 7.8 metres below the sea level, lies in the town of Zuidplas, in the Netherlands. The massive flood of 1953 in which thousands perished is etched in their national memory. People all over the Netherlands are always reminded that the rivers could overflow, inundating their homes and destroying their properties, taking the lives of their loved ones.

3 As such, the Dutch have, over time, built a complex system of dykes, pumps and water storage capabilities across the country. Today, their continual investment of over 400 million euros on flood protection every year has even turned into a great advantage, attracting investments from water-intensive industries, and exporting their expertise.

### **Singapore Water Story**

4 The Singapore Water Story is the extreme reverse. We don't have enough water. We are a small island city-state with limited natural water resources, and limited land area to collect rain when it falls. When Singapore gained independence in 1965, we also faced poor water and sanitation conditions, exacerbating our water scarcity problem.

5 At the same time, our population was growing rapidly during the Baby-Boomer years. We therefore had to undertake swift industrialisation to provide jobs for the people, placing even more pressure on our water resources. Demand quickly outpaced supply. Water woes were aplenty, threatening the quality of living.

6 Notwithstanding these issues, we have strived relentlessly over the past half-decade to secure reliable and good quality water for our people today through long-term planning, sound management, innovation, and most importantly, bringing our people on board to build a national awareness, a consciousness, on Singapore's water scarcity.

7 Like the Dutch, Singapore also has a heightened national consciousness of our water problem. Not of having too much water, but of having very little water. In fact, this consciousness has been ingrained in our DNA, built up over the last 50 years through education and close partnerships with our people. This national consciousness is the key enabler in Singapore's success in water management today. In fact, I would like to call it an obsessive instinct for water conservation. When PUB, Singapore's National Water Agency, receives feedback from the public on faulty water pipes, or when Singaporeans write to me when taps are leaking in public toilets, it is a demonstration of such an obsessive instinct. This instinct has driven Singapore to innovate and continually look into better and more cost-effective technology for water management, not just water supply, and to work with our people to ensure that we continue to use our water resource as responsibly as possible, and in a financially sustainable manner.

8 Despite our current success, Singapore will always remain a water-stressed nation. Singapore was ranked first among countries with the greatest risk of high water stress in 2040, by the World Resources Institute. It is important for Singapore to continue to build on our water management strategies, guided by the nation's instincts on our water problem.

9 There are currently five strategies, or ingredients, in building our Water Story. Let me share them in detail with you now.

### **The First Ingredient – our Four National Taps strategy**

10 The first ingredient in building the Singapore Water Story lies in our Four National Taps. The Four National Taps is Singapore's long-term strategy to ensure a robust and sustainable water supply for our people and for generations to come. They are, namely, water from local catchments, imported water from Malaysia, NEWater, and desalinated water.

#### ***Water from Local Catchments***

11 To take advantage of the sole naturally occurring freshwater resource available to us: rainwater from our local catchments, Singapore created new reservoirs and we dammed up all our rivers. As our drainage and sewerage networks were kept separate, stormwater can be channeled into the reservoirs through our extensive drainage network, and subsequently treated for drinking purposes. Today, two-thirds of Singapore's land are water catchment areas, and we are one of the few countries in the world to harvest urban stormwater on a large scale for consumption.

#### ***Imported Water from Malaysia***

12 The Second Tap is imported water from Malaysia. Recognising the inadequacy of Singapore's local water supply, Singapore signed two water agreements with the State of Johor in 1961 and 1962 respectively. These two agreements ensured the long-term provision of water from Johor to Singapore till 2011 and 2061 respectively. Reflecting their importance, the two water agreements were confirmed and guaranteed by both the Governments of Singapore and Malaysia in the Separation Agreement of 1965 that established Singapore as an independent and sovereign state. The guarantee was also enacted into the Malaysian Constitution by an Act of Parliament. The Separation Agreement was registered with the United Nations.

13 When the 1961 Water Agreement expired, Singapore handed the waterworks as well as pump houses under that agreement to the Johor State Government free of charge and in good working order. Under the 1962 Water

Agreement, Singapore is granted the full and exclusive right to draw 250mgd of water from the Johor River. In return, Singapore provides Johor with treated water up to 2% of the water we import. When on occasion, Johor needs additional water and we are able to, we have provided Johor with more than this 2% out of goodwill. The Johor River is an important source of water to both Singapore and Johor. In view of the importance of the Johor River to both parties, as early as in 1990, Malaysia and Singapore signed an agreement to construct the Linggiu Reservoir to increase the yield of the Johor River. Water discharged from the Linggiu Reservoir supplements the natural flow of the Johor River during periods of dry weather in order to enable the reliable abstraction of water. However, low rainfall in recent years, coupled with the additional stress of having to meet all the abstraction needs from the Johor River, has lowered the water levels at Linggiu Reservoir.

14 Last year, in October 2016, Linggiu Reservoir stock dropped to a historic low of 20%. This is a matter of great concern for all parties. Should Linggiu Reservoir fail, it will pose major problems for the water supply of both Johor and Singapore. In this regard, I am glad that both countries are coming together to look into measures that will help to enhance the resilience of the Linggiu Reservoir and increase the yield of the Johor River.

15 While the first two Taps are critical, they are subjected to the vagaries of weather. To boost the water security and drought resilience of our water supply, we have invested in weather-resilient, weather-independent water sources such as NEWater and desalinated water.

### ***NEWater***

16 NEWater, our Third National Tap, is Singapore's own brand of ultra-clean, high grade reclaimed water. By reclaiming every drop of water so that it can be used again, we can increase the water supply substantially. For those who are engineers here, you will know, if you take 50% of the water, and put it back into the closed loop, you will double your water supply. This is one of the most sustainable ways of increasing our water supply, but it did not come easy. Back in the 1970s, while the technology of producing reclaimed water was feasible, the cost was too high. But that did not stop us. Like I mentioned earlier in my speech, our obsessive instinct drove us for two decades until the 1990s, when Reverse-osmosis membrane technology became more affordable and reliable. It was then, in 1998, that Singapore set up a team to test the membrane technology for use in water reclamation. Finally, in 2003, our first two NEWater plants successfully commenced operation – three decades of scaling up the technology – but it was worth our perseverance.

### ***Desalinated Water***

17 Let me now move on to the Fourth Tap, desalinated water. Being an island-nation surrounded by the sea, desalination is a sound option. However, just like NEWater, we had to persevere and invest heavily in Research and Development to improve on the technology. Our efforts came to fruition in the early 2000s, when desalination finally became a technically and financially viable option for Singapore – again with RO membrane as opposed to the traditional process that used more than double the energy needed for RO. Singapore’s first desalination plant commenced operation in 2005. Our efforts do not stop here, Singapore is currently proactively supporting research into more energy-efficient desalination technology, such as electro-deionisation (EDI), which would potentially further halve the energy consumption for desalination.

## **The Second Ingredient – collaborations with the private sector and our people**

### ***Public-Private Partnerships***

18 Ladies and gentlemen, after talking about the Four National Taps, let me now move on to the second ingredient, collaborations with the private sector and our people. Singapore has long recognised that the public sector alone cannot chart our water journey. Partnering with the private sector encourages greater innovation and competition, enhances production efficiency, and helps to keep water as affordable as possible. In 2005, Singapore embarked on our first Public-Private Partnership (PPP) project, the SingSpring desalination plant, which was also our first desalination plant. We have since gone on to develop one more desalination plant and three NEWater factories under the same model. The latest example is the Marina East Desalination Plant, to be built by Keppel. It is an iconic project, as it is probably the first large scale operational plant that treats both reservoir and sea water, and all of the treatment equipment will be located underground.

19 We have turned our water scarcity problem into a competitive advantage. Through such partnerships for our water infrastructure, our local water companies gain a track record in Singapore, and can go on to export and showcase their water expertise on the global stage. For example, Hyflux, having built two desalination plants in Singapore, has gone on to build one of the world’s largest seawater reverse osmosis desalination plants in Algeria. Additionally, their joint venture project in Tanzania, the Star City Township Project, also boasts of housing approximately 140,000 residents and creating 100,000 jobs, when completed.

20 To further encourage collaboration and co-creation, Singapore has set aside investments to foster leading-edge water technologies in every part of the water process ecology and grow the research community in Singapore. Today, we have 180 local and international water companies and more than 20 Research and Development centres on water in Singapore.

## ***Collaborating with our people***

21 Aside from the PPPs, we must not forget the other “P”: People. The older generation of Singaporeans will remember when Singapore had to undergo water rationing in 1963 and 1964, when a severe drought swept through Singapore then. We owe it to them, as they bore with water rationing, supported water saving campaigns, and paid the cost of cleaning up rivers and their catchment areas in Singapore’s early years. Four decades ago, the Singapore River was in need of an extreme clean-up. The Singapore River was suffocating from the pollutants flowing into it. In 1977 to 1987, there was a multi-agency effort to clean up the Singapore River. Dumping of waste and used water from industries located near the river was eliminated. Heavy industries were relocated, rubbish was removed and the riverbed was dredged. The clean-up took 10 years, but it was worth it. The Singapore River is now a vibrant waterway for all to enjoy. This was how water conservation became our DNA. It is because of our obsessive focus on water and the collective determination of the earlier generations of Singaporeans and PUB officers, that we were able to manage our water vulnerabilities. Because of their hard work, we were able to tide through the last prolonged dry weather spell from 2014 to 2016 without any water rationing.

22 However, we do not forget these precious lessons from Singapore’s early days. Today, water rationing exercises are still carried out in our schools, to remind our young that the amenities and convenience that they enjoy now must not be taken for granted.

23 Because Singaporeans appreciate the value of our water system, we launched a program in 2006 to increase the awareness to keep our water system clean and together. We call it Active, Beautiful, and Clean Waters (ABC Waters) programme. Since then, 36 ABC Waters projects have been successfully completed by PUB. The programme not only transformed our extensive network of drains, canals and reservoirs into thriving social and recreational spaces, but also brought our people closer to water, educating them on the need for everyone to protect and conserve this precious resource, and passing this important message on to our next generation.

## **The Third Ingredient – enhanced international cooperation**

24 I will now move on to the third ingredient, enhanced international cooperation. Singapore also constantly learns from and shares knowledge with the global community. This international cooperation forms the third ingredient in building our Water Story. When ideas are exchanged, innovation is the result. An example of a global platform for such an exchange of ideas is the Singapore Cooperation Programme (SCP), established back in 1992 as Singapore’s way of sharing with the international community our developmental experience,

including water issues. To date, more than 116,000 participants from more than 170 countries have attended the programmes under the SCP.

25 In addition, the Singapore Water Academy, launched in 2016, partnered with the Singapore Ministry of Foreign Affairs to conduct water-related programmes for ASEAN countries and Mexico. These programmes touch on a myriad of water issues, for example Smart Water Technologies, Water Resource Management, and Water Efficiency.

26 As a global hydrohub, we want to be a key node in bringing the global water industry together to co-create innovative water solutions and build capabilities to solve urban water challenges. We organise the Singapore International Water Week, an international platform for water leaders from all over the world to further our discussion on pertinent water challenges. In 2016, the Singapore International Water Week attracted over 21,000 participants from 125 countries.

27 Through hearing the experience of the countries that we partner with, and the innovative solutions from others, Singapore has also benefitted greatly.

#### **The Fourth Ingredient – water demand management**

28 Ladies and gentlemen, another important ingredient in good water management is managing water demand. Water demand in Singapore is projected to double by 2060. Our obsessive instinct for conserving water kicks in. In order for our precious water supply to remain sustainable, every one of us must manage water demand. This is especially relevant to the non-domestic sector in Singapore, as this sector currently makes up around 55% of the total water consumption in Singapore. Their demand is projected to grow significantly to make up 70% of our water demand by 2060. Our efforts to manage non-domestic water demand are hence critical to allow for Singapore's sustainable growth. Only by doing so, can we continue to position ourselves as an attractive hub for businesses and industries.

29 PUB works closely with industries to manage water demand in the non-domestic sector. Since 2015, it is mandatory for large water users to submit their *Water Efficiency Management Plan*, which aims to help them better understand their water consumption patterns and seek ways to improve their water efficiency. PUB is also analysing data collected under this scheme to develop sectorial benchmarks and best practices guides to share with the companies. This will facilitate knowledge transfer and enable companies to implement projects that not only increase water efficiency, but make business sense at the same time.

30 Of course, it is not just businesses and industries that need to manage their water demand, but also regular households, which make up the other 45% of our water demand today. Water is a precious resource, and Singapore encourages everyone to make water conservation our way of life. To facilitate this, Singapore started the *Mandatory Water Efficiency Labelling Scheme* in 2009, which allows households to make better-informed choices and purchase more water-efficient water fittings. This scheme has already reaped rewards in terms of water savings for Singapore. The per capita household water usage in Singapore now stands at 148 litres in 2016, and we plan to lower it to 140 litres in 2030.

### **The Fifth Ingredient – pricing**

31 Finally, at the core of all the measures above, is financial sustainability. Harking back to the Dutch experience again, the Netherlands established the world's first and only Water Bank, to finance large investments in water. This was made possible because each household contributed its share of water taxes. In fact, this Bank was instrumental in the aftermath of the 1953 floods.

32 In Singapore, water is unlike any other ordinary public commodity. It needs to be right-priced to ensure financial sustainability, so that we can continue to upgrade our water system to tackle upcoming challenges, and ensure a reliable and sustainable supply of water. We price potable water to reflect its long-run marginal cost (LRMC), which refers to the cost of producing and conveying the next drop of water. Doing so also reflects the scarcity value of water and encourages consumers to use it prudently. We hope that through right pricing, everyone will cultivate the habit of saving water as part of our DNA, whether we are a household or business. This is the way forward.

33 As important as it is to price this precious commodity right, we also have to make sure that water, a basic need, is accessible and affordable to all. To balance between the two objectives, Singapore has introduced targeted assistance to eligible households while continuing to right-price water at its LRMC. This will also ensure that everyone will be able to afford access to this basic resource, but also send the right signal price on its scarcity value.

### **Conclusion**

34 Ladies and gentlemen, you can see that from searching for the most cost-effective water technology, to right-pricing our water supply, Singapore demonstrates this national obsession for the need to conserve our most precious resource: water.

35 Though Singapore has progressed by leaps and bounds in the area of water management over the years, our Water Story is not concluded.

Singapore's Water Story is constantly evolving, continually being written and re-written by all Singaporeans, as we continue on this journey.

36 Let me conclude by thanking the organisers for allowing me to share on Singapore's Water Story, and I wish all participants a fruitful discussion in the sessions ahead at the Water Leaders Forum over the next two days. Thank you.

Excellencies

International Advisers,

Distinguished Speakers,

Ladies and Gentlemen,

1. A very good morning to everyone. I'm pleased to join you. To our foreign friends, I hope you are enjoying your stay in Singapore.

### **Global Environmental Issues**

2. Over the past few decades, we have witnessed significant advancements in environmental governance and management. But we continue to be affected by major environmental issues that compromise our well-being and affect the planet's natural resources. Addressing these issues should be a priority.

3. Two global environmental issues deserve a closer look: the increase in waste generation and rising global energy consumption.

4. Unrestrained growth in waste generation can pose a major challenge to our environment. When not collected and treated properly, the waste can lead to poor public hygiene and water source contamination. According to a National Geographic article, 70% of industrial waste generated in developing countries is dumped untreated into water bodies, causing serious pollution problems. While many countries have tried to manage their waste generation and disposal, implementing sustainable waste management practices is becoming more challenging given the rapid pace of industrialisation and population growth.

5. Global energy consumption is increasing. Most of the energy we use comes from non-renewable sources. According to World Atlas, at least a quarter of the countries in the world source more than 85% of their energy from fossil fuels. While fossil fuels are a valuable energy source, we need to mitigate the release of pollutants such as particulate matter and noxious gases when fossil fuels are burnt. The release of carbon dioxide into the atmosphere from burning fossil fuels for generating electricity is also a concern in itself, as carbon dioxide exacerbates the "greenhouse effect" and contributes to climate change.

6. Many countries and governments recognise the significance of these environmental issues. The challenge lies in balancing economic growth and ensuring sustainable development. We must safeguard our planet for the well-being of future generations.

### **The Circular Economy and Industry 4.0**

7. To ensure long-term sustainability, we must pay closer attention to several areas. One important area is to examine the production and consumption models governing our industries. Today's linear "take, use, and dispose" economic model relies on large quantities of cheap energy. But we do not have infinite resources and the environment does not have infinite capacity to absorb all the pollutive matter generated. One approach being widely discussed is the circular economy. We keep resources in use for as long as possible, extract the maximum value from them, before recovering and regenerating products and materials at the end of their service life.

8. A circular economy could reduce the amount of waste generated and disposed of through designing products from the start for remanufacturing, refurbishing, and recycling to keep components and materials in use. Industries would also prioritise energy from renewable sources, which are typically less pollutive. Resources are selected wisely when and where they are required; technologies and processes that use renewable or sustainable resources are chosen. There is also an associated push for resource efficiency to reduce energy demand.

9. The key enablers of circular economy strategies are technological advancements and breakthroughs, which are facilitated and made possible by the Industry 4.0 revolution. This is the fourth industrial revolution which sees computers and automation working together in an entirely new way.

10. There are four key features of Industry 4.0. The first is interoperability, where machines, devices, sensors and people connect and communicate with one another. The second is information transparency, where systems create a virtual copy of the physical world through sensor data. Third, there is a high degree of technical assistance, where IT systems assist humans with making decisions, solving problems, and tasks that are too difficult or unsafe for humans. The final key feature of Industry 4.0 is decentralised decision-making, where cyber-physical systems operate autonomously.

### **Industry 4.0 Application in Vector Control, Public Cleaning and Waste Management**

11. The value of Industry 4.0 is derived from the integration of automation, data analytics, manufacturing and products in a way that delivers unique competitive advantages and unlocks new business and operating models. While such integration is commonly applied in the manufacturing sector, there exists many opportunities that we can develop for the environmental sector.

12. I would like to share some examples of how Singapore leverages technological advancements in the environmental services industry.

13. The first is that of using data analytics for vector control. The National Environment Agency (NEA) worked with the Saw Swee Hock School of Public Health at the National University of Singapore to develop a dengue forecasting model for the incidence of dengue fever up to 4 months ahead of time. This model, powered by data science, generates the forecast through performing data analysis on the seasonal patterns of dengue cases over the past decade. It provides advanced warning of impending outbreaks, enabling us to be more responsive in implementing mitigation measures, such as conducting more frequent checks, intensifying the removal of breeding sites, and performing public education. With increased data integration, the forecasting model can enable the prediction and localisation of dengue outbreaks in specific areas throughout the country.

14. The next example is harnessing automation to maintain public cleanliness in Singapore. In Changi International Airport's new Terminal 4, robots are keeping the premises clean. Automated cleaning bots will be used to mop, clean and pick up small items in public areas, car parks and toilets. Cleaners will map the robot's cleaning route by operating it manually for the first time; the machine will subsequently operate the cleaning route autonomously. Overall cleaning manpower is set to be reduced by 20%. More importantly, our cleaners will be upskilled to perform higher value tasks.

15. The usage of sensors, together with the data collected, is also widely adopted in Industry 4.0. In the areas of solid waste management, sensor technology is playing an increasing role. In Singapore, all public waste collection trucks are equipped with GPS sensors which allow real-time tracking of their movements. All recycling bins provided under the public waste collection scheme are RFID tagged. Public waste collectors scan the tags upon collecting recyclable waste from these bins to register. Through the combined use of sensors and GPS devices, the interoperability of the waste collection network in Singapore has enabled improvements in productivity and work processes.

### **Industry Transformation**

16. As you can see from the above examples, Singapore is adopting Industry 4.0 technologies to enhance our environmental sustainability. As we work towards becoming a Smart Nation and Sustainable Singapore, the transformation of the environmental services industry will play a key role in mitigating environmental challenges in an increasingly urbanised landscape.

17. When governments support local industries in their adoption of technological advancement, local capabilities can grow faster. This could spur impactful innovation. Smart infrastructure, more efficient waste-to-energy systems, and technology to improve productivity are just some of the benefits Industry 4.0 can bring to the environmental services sector to support the circular economy.

18. However, governments cannot do it alone. Strong collaboration across stakeholders both domestically and internationally is critical. International collaboration can drive innovation and best-practices across borders.

19. NEA has been working with industry, unions and other stakeholders on an Environmental Services Industry Transformation Map, or ES ITM. The ES ITM will focus on growing capabilities and driving innovation, encourage wider adoption of technology to raise productivity, as well as enhance jobs and skills in the environmental services industry sectors. One of the key areas of focus in developing the ES ITM would also be to increase opportunities for local and international collaboration, and between the different stakeholders in the environment ecosystem – service buyers and service providers, technology providers, academia, research institutes, government agencies and so on.

### **Conclusion**

20. Our vision of environmental sustainability is a long term journey. To achieve our goals, we as a nation need to be conscious of the need to care for and conserve the environment, take collective action, and stay committed to the cause. No government can do it alone and regulations alone cannot build a national consciousness that embraces environmental sustainability.

21. I hope that today's Catalyst event will have a fruitful discussion on how the concepts of Industry 4.0 and the Circular Economy can help the environmental services sector scale greater heights. The conclusions will form the basis for our deliberations at CESS 2018 which will be held from 8 to 12 July 2018 at the Marina Bay Sands.

22. I look forward to seeing all of you at CESS 2018. Thank you.

Distinguished Guests

Ladies and Gentlemen

1. Good morning. I am happy to open the National Energy Efficiency Conference (NEEC) and present the Energy Efficiency National Partnership (EENP) Awards 2017. I am pleased to note that this is the 5<sup>th</sup> run of the Conference, and the turnout has been growing. The number of EENP programme partners has also reached a record 260, up from 90 when it first started. All these are positive signs that industry awareness and participation in energy efficiency issues is growing.

2. Today, we also recognise individuals and companies that have made great strides in their energy efficiency (EE) journey. NEA has introduced a new award for Outstanding Energy Services Provider of the Year. This award recognises the contributions of an often overlooked group of enablers and solution providers, whose work has helped many companies advance their EE initiatives tremendously.

### **Building an Energy Efficiency Eco-System**

3. Singapore's efforts to enhance EE are closely linked with our Paris Agreement pledge to reduce our Emissions Intensity by 36% from 2005 levels by 2030, and stabilise our greenhouse gas emissions with the aim of peaking around 2030. To achieve this, the industry sector has to improve its EE by 1-2% annually. This is only possible if we grow our economy in an energy- and carbon-efficient way. EE is also known as the "fifth fuel" – it takes almost nothing to produce, but has huge potential benefits. The theme of this year's conference - Building an Energy Efficiency Eco-System - highlights the role that different stakeholders can play to create an enabling environment for EE. I would like to make three observations on how we can promote a robust EE eco-system.

### **Adopting an Opportunity Mindset**

4. First, we need to adopt an opportunity mindset. EE actions can be simple – such as switching to more energy efficient air-conditioning and lighting. It can also involve complex projects such as re-designing manufacturing processes and utilising the latest smart technologies. There are many opportunities for companies both big and small, if we look for them. One of this year's award winners, Ardentec Singapore, is

an SME that has adopted an opportunity mindset for EE. Between 2012 and 2016, Ardentec put in place an energy management system, conducted an energy audit of its facilities and implemented several initiatives, such as retrofitting its chilled water plant and lighting systems. As a result, the company was able to save 349 MWh in energy and \$70,000 in annual costs. Ardentec has even set a commendable target of 3% year-on-year improvement for EE.

### **Top Management Support is Critical**

5. Second, EE efforts require the support of top management. A strong feedback that my Ministry received at a recent focus group discussion was that top management support for EE efforts could be further strengthened. I strongly encourage companies' senior management to value EE as a business opportunity, and support and empower all levels of your organisations to continually seek EE improvements. An effective way to involve top executives in EE programmes is to implement an energy management system. A study by the Danish Energy Agency showed that companies could reduce their energy consumption from 10% to 15% during the initial years of implementing an energy management system.

### **Mutual Learning and Support**

6. Third, we improve quickly when we learn from each other. A laudable industry-led initiative is the Food Manufacturing Energy Efficiency Committee (FMEEEC). Following a benchmark study on EE by the NEA, a group of food manufacturing companies set up the committee to promote and share best practices. The committee held its first meeting in February this year, and has committed to meet regularly in an effort to grow the industry.

### **Government Initiatives and Financial Support**

7. Five years ago, we introduced the Energy Conservation Act, or ECA for short. The insights that we gained from implementing the various EE initiatives under the ECA have allowed us to develop the next phase of our EE improvement efforts. The NEA will introduce enhancements progressively following recent amendments made to the ECA earlier this year. Let me recap the key enhancements.

8. Next year, we will introduce the Minimum Energy Performance Standards (or MEPS) for common industrial equipment and systems, starting with motors. MEPS will help to phase out inefficient motors from the market. Given that energy constitutes 95% of a motor's life cycle cost, companies can look forward to significant savings when they purchase premium efficiency motors.

9. We will also be implementing a requirement for new facilities and major expansions that are expected to consume more than 54 TJ of energy - to conduct energy efficiency assessments of their designs in 2018. This will ensure that EE opportunities are identified early, and companies can incorporate system-level synergies at the initial stage of a project. NEA has been consulting companies on this requirement and the finalised details of the new requirements will be released later this year.

10. Taking into account industry feedback, the NEA also launched the Energy Efficiency Fund (E2F) in March to support companies, especially SMEs, in their EE efforts. Under the fund, the government will provide co-funding support for resource efficient design, energy audits, and direct grants for SMEs to invest in EE equipment and technologies, such as energy efficient motor retrofits.

#### **NEEC 2017 & EENP Awards**

11. I would like to encourage all participants to take advantage of your time at this conference to share your experiences and learn from one another. You might be from different companies but you share the common goal of improving the efficiency of your operations. Your manufacturing processes, industrial systems, and management practices present invaluable opportunities for mutual learning.

12. I warmly congratulate all EENP award winners for your commitment and outstanding achievements. I hope the awards will spur you to continuously innovate and push the boundaries for energy efficiency.

13. I am happy that this year, a total of 12 companies, 1 energy manager, 2 energy services providers, 2 public sector agencies and 2 schools will be receiving awards. Best of all, the combined energy savings of all the winning projects in the Best Practices category is about 1,290 TJ. This is equivalent to 74 kilotonnes of CO<sub>2</sub> reduction, or removing almost 23,000 cars from our roads. I am very encouraged that more

companies and institutions are stepping up efforts to make their operations and processes more environmentally friendly – true to the spirit of the Sustainable Singapore Movement.

14. Collectively, we can make a difference. Let us all do our part to make Singapore a more liveable and sustainable home for generations to come.

**Closing**

15. Thank you, and I wish everyone a fruitful two days here at the NEEC.

Mr Gan Seow Kee

Chairman and Managing Director of ExxonMobil Asia Pacific

Distinguished Guests, Ladies And Gentlemen

### **ExxonMobil and Singapore**

1. I am happy to witness the opening of ExxonMobil's third co-generation plant in Singapore. It is a significant addition to ExxonMobil's Singapore Refinery and Chemical Plant, its largest integrated refining and petrochemical facility in the world, and will increase total co-generation capacity to 440 megawatts (MW), meeting nearly all of the facility's power needs. The plant will also boost Singapore's efforts to become a more energy- and carbon-efficient nation.

2. ExxonMobil and Singapore have had a long and fruitful partnership, which dates back more than 120 years, when ExxonMobil's predecessor, the Vacuum Oil Company, sold kerosene and lubricants here. In 1966, one year after our independence, ExxonMobil set up its refinery and became one of our pioneer investors. The refinery now boasts a refining output of almost 600,000 barrels per day - more than 30 times when it first started. ExxonMobil is one of Singapore's largest investors, with over S\$20 billion in fixed assets. You have shared in and partnered us in Singapore's economic and sustainable development path.

### **Singapore's Sustainable Development Story and Tackling Climate Change**

3. Since independence, Singapore has always pursued development on a sustainable basis, even before the term "sustainable development" became fashionable. Given our geographical limits and resource constraints, we believe that economic and sustainable development must be pursued together. Over the decades, even as we grew our economy, we actively greened our country, cleaned up our rivers, and enacted laws against pollution. This has transformed Singapore into a highly liveable and sustainable city. We were ranked the most sustainable city in Asia, and 2<sup>nd</sup> in the world, in the 2016 Sustainable Cities Index by *Arcadis*. But we cannot rest on our laurels as we are facing new sustainability and development challenges

4. Climate change poses a real threat to small island states like Singapore. Our 2015 National Climate Change Study showed that Singapore is very vulnerable to rising sea levels, higher temperatures, and extreme rainfall. Rising sea levels in particular, pose an existential threat to us. In the past two months, we saw the devastating effects of Hurricanes Harvey, Irma and Maria in the southern US and Central America. Scientists have warned that more intense weather phenomena can be expected as global temperatures continue to rise. These events are a stark reminder of why the world must take action now and stay committed to reducing carbon emissions.

5. Singapore contributes only 0.11 per cent of global emissions. We are already among the top 20 most carbon-efficient countries in the world. Nonetheless, we put forward an ambitious pledge in Paris to cut emissions intensity by 36% from 2005 levels by 2030, and to peak our emissions around the same time. There are two key reasons for this.

6. **First**, action on climate change is shared global responsibility. The Paris Agreement, and every pledge under it, is significant because all countries have collective ownership. As former UN Secretary-General Ban Ki-Moon said, "We have only one planet. There is no Plan B because there is no Planet B". As a responsible global citizen, Singapore will do its part. Despite the uncertainties in global climate leadership after the US's announced withdrawal from the Paris Agreement, Singapore will continue to work with other small states and major economies, and stay the course.

7. **Second**, enhancing our economic competitiveness. The future economy will be one where energy-efficient and low-carbon growth takes centre stage. The International Energy Agency (IEA)'s Energy Efficiency Market Report 2017 highlighted that global energy intensity improved by 1.8% in 2016. In financial terms, the world has reaped an "energy productivity bonus" of US\$2.2 trillion, twice the size of the Australian economy – with China accounting for half of this. It is not surprising China is rapidly transiting towards a low-carbon economy. As the middle class grows and society becomes more prosperous, expectations rise.

Sustainable development has become an important political imperative for China. In 2015, China invested over US\$100 billion in renewables, up from just US\$3 billion 10 years ago. China is set to implement its national greenhouse gases emissions trading scheme later this year. To stay internationally competitive, Singapore and our companies must position ourselves to stay ahead in this new and transforming global economy.

8. We amended the Energy Conservation Act this year to help industrial companies enhance energy efficiency through putting in place good energy management practices, and strengthening energy reporting requirements. We have announced plans to introduce a carbon tax and this will take effect from 2019. Revenue from the carbon tax will help to fund measures by industries to reduce emissions. In February this year, ExxonMobil Chairman and CEO Darren Woods said that the point of a carbon tax is to “promote greater energy efficiency and the use of today’s lower-carbon options, avoid further burdening the economy, and also provide incentives for markets to develop additional low-carbon energy solutions for the future”. My Ministry and other Government agencies have been consulting companies on the carbon tax. We have received useful feedback. We will be approaching the industry again soon to seek your views on the draft Carbon Pricing Bill, which will cover the implementation details of the carbon tax.

9. We are aware of industry concerns over the impact of the carbon tax on competitiveness, given that Singapore is an export-oriented economy. But precisely because Singapore is an open, globally connected and export-driven economy, our companies must stay ahead to stay competitive. The measures we are putting in place will facilitate Singapore’s transition to energy-efficient and low-carbon growth.

#### **ExxonMobil’s Cogeneration Plant and Energy Efficiency efforts**

10. I am pleased that ExxonMobil is already a leader in energy efficiency. ExxonMobil’s global refining operations have consistently been ranked in the top quartile by Solomon Survey since 2010. ExxonMobil Singapore’s operations are similarly doing well. Last week, I opened the 5<sup>th</sup> National Energy Efficiency Conference (NEEC), and gave out awards to deserving companies and individuals. ExxonMobil was a winner in the “Excellence in Energy Management” and “Best Practices” categories. Four innovative projects by ExxonMobil led to energy savings equivalent to taking 10,000 cars off the road every year. ExxonMobil has won awards in 2013 and 2016 as well – a testament to your strong commitment to continuous energy efficiency improvement.

11. I am also very encouraged to hear Mr. Gan mention that water conservation is deeply embedded in ExxonMobil’s DNA as well.

12. ExxonMobil’s third co-generation plant will translate to a significant 4-5% energy efficiency improvement in your operations, reduce carbon dioxide emissions by 265 kilo-tonnes and save S\$14 million annually. It will build on the strong foundation that ExxonMobil has established in Singapore, and make the company even more competitive in the refining industry. These efforts are highly commendable. Singapore welcomes energy-efficient investors like ExxonMobil.

13. I encourage more companies to seize energy efficiency opportunities. The benefits are immense. Companies that take action now to reduce energy consumption and greenhouse gas emissions will lead in international competitiveness and future resilience.

#### **The Way Forward**

14. Today, Singapore has an economically vibrant city that is clean, green and liveable. This is the result of integrated planning, good policies and effective implementation. Despite Singapore’s severe constraints, such as energy, water and land scarcity, we have worked to transform constraints into strengths, underpinned by our belief that economic and sustainable development are one and must be pursued holistically.

15. I thank ExxonMobil for partnering us in our sustainable development journey over the years, and for inviting me to officiate at the opening of this plant.

16. Thank you.



Distinguished Guests,

Ladies and Gentlemen,

Good afternoon. I am pleased to join you at this inaugural 3R Awards and Seminar for Shopping Malls.

2 The retail industry is one of the main sectors driving our economy, with wholesale and retail trade making up 14.2% of Singapore's GDP<sup>[1]</sup> and employing more than 490,000<sup>[2]</sup> workers in 2016. Whilst Singapore's shopping malls have contributed to this healthy growth, they are also a significant source of waste.

3 In 2016, large shopping malls of more than 50,000 square feet of net lettable area collectively disposed 225,000 tonnes of waste. This is about 7% of the total waste disposed of in Singapore. Although more than 90% of these malls have waste reduction plans in place, the average recycling rate was less than 10%. Clearly, shopping malls need to step up their waste minimisation efforts.

#### Becoming a Zero Waste Nation

4 Today's event is the first in Singapore that recognises mall operators and tenants for their waste reduction and recycling efforts. I call on more operators to join this national effort towards becoming a Zero Waste Nation.

5 By consciously practising the 3Rs and reducing waste, shopping malls can benefit from lower waste disposal costs. They would also build a reputation as a responsible business operator and increase their appeal to the growing number of environmentally-conscious consumers.

#### 3R Awards for Shopping Malls 2017

6 I am encouraged to note that 37 shopping malls, mixed developments and retail tenants submitted their nominations for this inaugural award. Amongst them, six will be receiving awards, while two will receive certificates of commendation. Let me share exemplary practices from three award winners.

7 First, IKEA Singapore (Alexandra) has incorporated 3R tips into their store displays. It also implemented reusable shopping bags and food takeaway containers. These practices will encourage customers to reduce waste. IKEA also organises for staff, visits to waste facilities to learn about waste minimisation and recycling.

8 Second, the Shoppes at Marina Bay Sands has formed a dedicated sustainability team and monthly working groups to improve recycling and waste management. For example, they conduct a comprehensive waste audit every year to identify opportunities to reduce and recycle. The Shoppes at Marina Bay Sands also organises recycling competitions for tenants and incentivises conservancy workers to meet recycling targets. This motivates the tenants to recycle more, and workers to ensure that recyclables are properly segregated.

9 Third, Kiehl's Singapore, a skin and hair care retailer, uses recycled materials in their product packaging and marketing materials. They also reward customers with gifts for bringing used containers to their stores for recycling. This shows that retail tenants can also play a significant role in waste minimisation.

#### Food Waste

10 Now let me share on a waste stream that we are very concerned about. Food waste made up a fifth of total waste disposed of in Singapore last year. In a typical shopping mall, food waste accounts for about a third of its total waste. As there are many F&B outlets within shopping malls, there is great potential in reducing the amount of food waste generated.

11 NEA has worked with F&B operators to display collaterals that raise consumer awareness on food waste reduction as part of its Food Waste Reduction Programme. In addition, F&B operators can also adopt good practices found in the Food Waste Minimisation Guidebook for Food Retail establishments. For example, they can offer different portion sizes for consumers and adopt food donation boxes at their premises. I understand that shopping malls such as Jem and The Shoppes at Marina Bay Sands have implemented on-site food waste treatment solutions that divert food waste from disposal at NEA's incineration plants.

12 Supermarkets have also introduced initiatives to reduce the amount of food waste. They have donated unsold food and sold blemished fruits and vegetables at lower prices. I would like to highlight the success story of NTUC FairPrice. Its efforts have led to its food waste index to fall from 11.6 kg in 2014 to 6.3 kg in 2016<sup>[3]</sup>. The food waste index measures total food waste per square metre of retail space.

13 To help supermarkets do more, I am pleased to announce that the NEA and the Agri-Food and Veterinary Authority of Singapore have developed a Food Waste Minimisation Guidebook for Supermarkets. This guidebook is a follow up on last year's guide for retail food establishments which I mentioned earlier. It will help supermarkets customise a food waste minimisation plan throughout their operations. The Guidebook is now available on NEA's website. NEA will share more details during the seminar.

#### Concluding Remarks

14 Finally, I congratulate all the winners today. I hope your achievements will inspire more organisations to come on board the next Awards in 2019.

15 Singapore becoming a Zero Waste Nation is not an impossible dream. As long as we are all committed to practising the 3Rs, and take ownership for the environment, we will achieve our vision.

16 Thank you, and I wish you a pleasant afternoon.

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<sup>[1]</sup> According to the share of GDP by industry from 2001 to 2016 by the Department of Statistics Singapore (<http://www.singstat.gov.sg/statistics/visualising-data/charts/share-of-gdp-by-industry>)

<sup>[2]</sup> According to the Labour Market Report 2016 published by the Ministry of Manpower ([http://stats.mom.gov.sg/iMAS\\_PdfLibrary/mrsd\\_qt1mr164.pdf](http://stats.mom.gov.sg/iMAS_PdfLibrary/mrsd_qt1mr164.pdf))

<sup>[3]</sup> According to "FairPrice saves extra 48,000kg of food through waste reduction programme" by The Straits Times on 20 Apr 17 (<http://www.straitstimes.com/singapore/fairprice-saves-extra-48000kg-of-food-through-waste-reduction-programme>)

Ms Isabella Loh,

Chairman of Singapore Environment Council,

Distinguished Guests, Ladies And Gentlemen,

1. A very good morning to everyone. I am glad to join you in today's inaugural SEC Conference. This is an important gathering of businesses, community groups, educational institutions, and other stakeholders to raise awareness of sustainability issues, and ethical and green consumerism. It reminds us to commit afresh to make Singapore a leading hub for sustainable development.

2. Many of you are active members of the Sustainable Singapore Movement, and it is with your continued support and advocacy that we can fulfil the ambitions and goals in our Sustainable Singapore Blueprint, and the UN's 2030 Development and Sustainable Development Goals.

### **Challenges of Climate Change**

3. As a small island city-state, we are particularly vulnerable to the effects of climate change. Last year was the warmest year on record globally and in Singapore. Climate change will have real and far-reaching implications, especially for a small island like us. Organisations need to start thinking about the impact of climate change on their businesses, especially on their supply chains, and prepare the measures to undertake in adapting to the effects of climate change.

4. Under the Paris Agreement on climate change, Singapore has committed to lower our Emissions Intensity by 36% from 2005 levels, and to stabilise our emissions with the aim of peaking around 2030. The Climate Action Plan which the government unveiled last year details our plans and measures for climate change adaptation, which is what we can prepare to do for the effects of climate change, and climate mitigation, which is what we can do to reduce greenhouse gas emission. Thus, we will need to improve on our energy and carbon efficiency; reduce emissions from power generation; develop and deploy low-carbon technology, and encourage collective climate action.

5. The government has also announced enhancements to the Energy Conservation Act which would come into effect from 2018. They include strengthening the measurement and reporting requirements for greenhouse gas emissions, requiring companies to undertake regular energy efficiency opportunity assessments and introducing minimum energy performance standards for common industrial equipment and systems.

6. In addition, we are introducing a carbon tax in 2019 as part of our mitigation effort to protect the planet, and also to stimulate investments in clean, low-carbon technologies and market innovation. Businesses can take advantage of this clean energy trend as more and more countries work towards a carbon constrained future, and transform the way they produce and use energy.

### **Towards a Zero Waste Nation**

7. Businesses can help to mitigate climate change and reduce their operation costs by investing in their business processes to maximize resource efficiency and reduce wastage.

8. First, businesses could reduce water usage. Since January 2015, all large water users who meet or exceed the water use threshold of 60,000 cubic metres per year must submit Mandatory Water Efficiency Management Plans to PUB yearly. These users have to install water meters to monitor consumption at major water usage areas. This will help them better manage their water usage.

9. With the data collected from the Mandatory Water Efficiency Management Plans, PUB is developing efficiency benchmarks and will be sharing with companies "best practice guidelines for water intensive sectors" to help them further improve water efficiency.

10. Second, businesses can reduce waste generation. Start by assessing your business' current waste management practices and identify opportunities to reduce, reuse and recycle (3Rs) waste materials. By adopting the 3Rs, businesses can save costs in procurement and waste disposal. Currently, refuse disposal fee is \$77 per tonne for incinerable waste; a reduction in waste disposal would save costs substantially. It will also contribute to our move towards a Zero Waste Nation and extend the lifespan of Pulau Semakau, our only Landfill.

11. Paying attention to environmental sustainability is not just good for the environment, it is also sound business! Consumers are scrutinising the environmental credentials of companies and choosing sustainable products. I would encourage more businesses to adopt sustainability planning and practices in their daily operations.

### **SEAA Winners in Creating A Leading Green Economy**

12. It gives me great pleasure to present the Singapore Environmental Achievement Awards (SEAA) later to outstanding organisations that have contributed to a clean, green and sustainable Singapore. We recognize them for their success in adopting a balanced approach of economic profitability and environmental sustainability. I would like to highlight Sunseap Group Pte Ltd for special mention.

13. Sunseap is a Singapore-based renewable energy firm, offering a range of zero-cost clean energy solutions. Their Solar Power Purchase Agreement not only manages clients' solar systems locally and overseas, but also reduces energy costs and carbon footprint.

14. Apple Inc is a happy client and recently signed an agreement with Sunseap to procure 100 per cent of its local energy requirements from renewable sources.

15. As a company, Sunseap has been reducing its carbon footprint through recycling and reducing paper wastage. In April, it converted its electricity usage in Singapore to 100 per cent clean energy. This has helped Sunseap's offices offset more than 50 tonnes of carbon dioxide, which is equivalent to planting 937 trees. The firm's dedication is indeed commendable.

### **Conclusion**

16. Let me encourage all of you to use this forum to learn and share the best green practices with other businesses.

17. I would like to thank every company who participated in this year's SEAA for their ongoing commitment to the environment. And to the Award-winning companies, congratulations on a job well done.

18. Thank you, and I wish you all a fruitful discussion at the conference.

NTU President Professor Bertil Andersson,

NTU Board of Trustees Member, Mr Inderjit Singh,

NTU alumni, faculty, staff and students,

Distinguished guests,

Ladies and gentlemen

1 A very good evening and thank you for inviting me to this very special occasion.

2 Tonight, NTU welcomes home her alumni and is also celebrating the achievements of exceptional individuals who will be presented with the Nanyang Alumni Awards. As an NTU alumnus myself, graduating from the School of Electrical and Electronic Engineering in 1988, I am heartened to see so many fellow alumni taking the time today to return to our campus – a place many of us call home when we were NTU students.

### **NTU's efforts in sustainability**

3 I am sure as you entered NTU, you would have been awestruck by the amazing transformation the University campus has undergone, just as I always do when I visit NTU.

4 The NTU campus has always been well known for its vast greenery and beautiful grounds. In fact, it was named in 2012 as one of the world's most beautiful university campuses, and has bold plans in place to become one of the world's most environmentally friendly university campuses.

5 Singapore and NTU are in unique positions to become global leaders in promoting environmental responsibility, addressing sustainability challenges and developing applied sustainability solutions. Singapore is committed to finding workable sustainability solutions, new technologies, management systems and governance structures.

6 Last year, my ministry launched the Sustainable Singapore Movement or SSM. Through this movement, we encourage Singaporeans to take ownership of the environment and to ensure that we do it in our daily lives. The aim is for each of us to do our best to create a cleaner, greener and ultimately, a sustainable Singapore. I am glad to note that as a leading global university, NTU has also been paying close attention to the importance of sustainability.

7 Under NTU's EcoCampus initiative, the entire 200-hectare campus is being transformed into a living testbed for green technologies and innovations, with a target to reduce energy and water usage by 35 per cent by 2020.

8 The University's five-year strategic plan, NTU 2020, aims to propel NTU to greater heights of research excellence. The plan focuses on five key research thrusts – Sustainable Earth, Global Asia, Secure Community, Healthy Society and Future Learning. I am pleased to note that NTU's sustainability initiatives have clinched significant competitive research funding and that the university is already being recognised as a global leader in this area.

9 NTU also received the first Green Mark Platinum Star Champion Award by Singapore's Building and Construction Authority (BCA) – the highest accolade in Singapore for outstanding commitment to sustainable building design. 10 Many buildings in NTU have been constructed or refurbished with sustainability in mind. These include new iconic buildings, including The Hive that supports 'flipped classroom' learning, and The Wave, NTU's new sports hall built using mass engineered timber.

10 NTU is playing an important exemplary role in promoting sustainability and I hope that fellow members of the NTU community, in your respective fields, organisations and communities, will continue to work together towards creating a greener, more environmentally conscious Singapore.

### **Honouring eminent alumni**

11 Tonight, we honour 37 outstanding NTU alumni who have done their alma mater proud by excelling in diverse careers and contributing significantly to their fields of expertise. Receiving the highest honours tonight are the two recipients of this year's Nanyang Alumni Distinguished Award.

12 **Prof Ng Yew Kwang**, the Albert Winsemius Chair Professor of Economics at NTU's School of Social Sciences, is best known for his seminal work in welfare economics, with most of his 200 refereed papers in this field. Prof Ng is also emeritus professor in the Department of Economics at Monash University and he has made important contributions to the economics of happiness.

13 **Mr Chang Long Jong** is a visionary of Singapore's media industry. He joined entertainment company MM2 Asia as Group Chief Executive Officer in April, having spent most of his career with MediaCorp. His last-held position there was as its Deputy Chief Executive Officer and Chief Customer Officer, overseeing its major media assets including television, radio, newspaper, magazines and streaming service Toggle. He also led the company's events business, Vizpro, and training business, Singapore Media Academy.

14 I congratulate Prof Ng, Mr Chang and all of this year's Nanyang Alumni Awards recipients for their outstanding achievements and contributions.

15 Today, an engaged and supportive alumni network is crucial to an institution's success. The success that NTU alumni create for themselves will in turn create a positive cycle of motivation for other alumni and thus further enhances the University's reputation. I look forward to seeing more NTU alumni coming forward to play an active role in the progress and development of your alma mater.

16 Thank you and I wish everyone a pleasant evening.

Ms Melissa Tan, Chairman of WMRAS

Mr Aloysius Arlando, CEO of SingEx Holdings

Mr Ronnie Tay, CEO of the National Environment Agency

Members of the Trade Association and Chambers

Representatives of the Asia Pacific Waste and Environment Alliance

Ladies and Gentlemen

1 Good morning. I am happy to join you at this year's WasteMET Asia Symposium. To our foreign delegates, a very warm welcome to Singapore. Now in its 4<sup>th</sup> run, the Symposium has grown to be a leading regional conference for the waste management and recycling industries.

2 Singapore has come a long way since independence to achieve the high public health and environment standards we enjoy today. Our forefathers overcame the challenges of environmental pollution and poor sanitation as Singapore developed, and transformed the country into a clean, liveable and sustainable city. But with urbanisation and economic growth, we are faced with new challenges to manage our complex waste streams more effectively and efficiently.

3 Last year, Singapore generated about 7.8 million tonnes of waste, a seven-fold increase from 40 years ago. If waste continues to increase at the current rate, our only landfill at Pulau Semakau will run out of space in less than 20 years.

4 One of the goals under the Sustainable Singapore Blueprint is for Singapore to become a Zero Waste Nation. This is aligned with the UN's 2030 Development Agenda, particularly Sustainable Development Goal 12 on Responsible Consumption and Production, which aims to substantially reduce waste generation through prevention, reduction, recycling and reuse. We must continue to instil a strong culture of waste minimisation and promote the 3Rs amongst all sectors of the population. We also need to develop new ways and harness technology to manage our waste. Hence, the theme this year – **Reinvent: Transform the Industry** – is apt in highlighting the important role of the environmental services sector in achieving the zero waste nation vision. Waste management, cleaning and recycling companies must learn to mitigate environmental challenges in an increasingly complex landscape, whilst ensuring competitiveness and productivity.

### **Government Support**

5 Government will help grow the industry. NEA is working with the Waste Management & Recycling Association of Singapore (WMRAS) and other partners on an Environmental Services Industry Transformation Map or ES ITM. The ES ITM will develop capabilities, drive innovation and enhance jobs within the sector. We look forward to seeing more service providers and buyers adopt automation and other technologies to raise productivity in cleaning and waste management processes.

6 Under the Local Enterprise and Association Development or LEAD programme supported by SPRING Singapore, WMRAS is encouraging the wider adoption of technology within the industry to raise productivity and create higher value services. Last month, WMRAS organised a professional sharing session on leveraging technology to reduce food waste. I saw how a food waste digester system has enabled Grand Hyatt Singapore to recycle up to 500kg of food waste daily. I urge other establishments to follow this commendable effort to recycle food waste.

7 WMRAS is also developing training programmes to equip frontline workers, supervisors, and executives with new skills to raise their professionalism. One example is the Professional Course in Waste Management & Resource Recovery, jointly developed by WMRAS and Griffith University of Queensland, Australia. Course participants learnt from experienced lecturers and industry practitioners, and also visited waste management facilities such as Semakau Landfill and Tuas South Incineration Plant to gain practical

insights. I am happy to present certificates later to the 16 PMETs who attended the first run of the course earlier this year.

### **Building Capabilities**

8 I am also pleased to announce the signing of an MOU between WMRAS and eight other Trade Association and Chambers, or TACs. The MOU will strengthen collaboration amongst the member TACs, and promote best practices in waste management and recycling across industries. I understand that one of the TACs, Singapore Food Manufacturers' Association has begun working with WMRAS to develop a food waste treatment system for its member companies. This is a good start.

9 To encourage more of such partnerships, the Government has enhanced its funding support for high impact, multi-TAC projects under LEAD, from 70% to 90%. The Government has set aside a budget of \$100 million till 2020 to help TACs drive enterprise and industry development. The Government is committed to support associations that step up and undertake upgrading projects for their sectors.

### **WMRAS Excellence Awards**

10 Today, I will also present the WMRAS Excellence Awards to recognise frontline workers who have made outstanding contributions. These are the unsung heroes who have gone beyond the call of duty to ensure a clean living environment for us. One of the winners - the team of Tan Beng Hoe, Jumahat Bin Yusof and Amran Bin Che Daud from Veolia ES Singapore - takes great pride in their waste collection duties, and has received positive feedback from customers. Once they even provided assistance to a resident who was locked out of her house. Congratulations to the team. I hope their positive attitude will serve as an inspiration to others.

11 And for the first time, the awards will also recognise companies who have excelled in environmental sustainability and workplace safety and health. I would like to highlight the sustainability effort made by LHT Holdings, which uses recycled waste wood instead of natural resources to manufacture wooden pallets. The company also utilises a biomass-fired cogeneration system to generate electricity from waste wood; thus reducing its carbon footprint by almost half.

### **Conclusion**

12 I encourage companies to seek opportunities to grow your capabilities, locally and internationally. Please take advantage of government funding and industry networks to support your business.

13 I hope the symposium over the next two days will provide you with valuable insights. Do also share your experiences and knowledge for mutual learning.

14 Have a fruitful discussion ahead.

Distinguished delegates,

1. Good morning. We are here to address an issue of international concern. The oceans are increasingly being polluted by plastics. It is estimated that there are more than 150 million tonnes of plastic in the oceans, with about 8 million tonnes added every year. They can affect the safety of fisheries, tourism, sea transport and recreation. As a small island city state, Singapore is inextricably linked to the oceans and seas.

2. Research has shown that ingested plastics in fish act as a sponge for chemicals. Plastic waste in the oceans may also be vectors for the introduction of invasive alien species and facilitate the dispersal of pathogens. Many plastics also contain hazardous chemicals that can leach into the oceans. In addition, plastic wastes are a serious threat to marine biodiversity. Their buoyancy and durability allow them to be carried far from their sources, and remain in the oceans for a long time, affecting a wide spectrum of biodiversity. These are serious issues that confront us all.

3. There is increasing international recognition of the issue of plastic waste in the oceans. This is reflected in various documents and decisions of, among others, the UN General Assembly, the UN Convention on the Law of the Sea, the International Maritime Organisation, the UN Environment Assembly, and the Convention on Biological Diversity.

4. This June, the UN held the Ocean Conference, a high-level dialogue to support the implementation of Sustainable Development Goal 14 on the conservation and sustainable use of the oceans, seas and marine resources. It garnered over 1400 voluntary commitments, and produced an ambitious Call for Action. Singapore was among those which pledged voluntary commitments and we remain committed to implementing them. Singapore also participates actively in regional seas initiatives such as the Partnerships in Environmental Management for the Seas of East Asia and UN Environment's Coordinating Body on the Seas of East Asia.

5. Among our commitments are those pertaining to providing training and capacity building opportunities. We have established the Singapore Cooperation Programme (SCP) in 1992 to provide training and capacity building courses for our partners. In 2015, we launched the Sustainable Development Programme under the SCP to support the 2030 Agenda for Sustainable Development, focusing on climate change adaptation strategies and water quality management. More recently, we launched a course on Sustainable Oceans and Marine Resources. Through the International Maritime Organisation-Singapore Third Country Training Programme, also supported by the SCP, Singapore has provided capacity building assistance on the implementation of relevant international instruments for the prevention of pollution from ships, such as International Convention for the Prevention of Pollution from Ships (MARPOL). We have conducted courses on MARPOL for countries in Africa, Asia, the Caribbean and the Middle East. Under the Singapore-Norway Third Country Training Programme, we also conducted a "Regional Training Programme on Waste Management and Reduction of Marine Litter" earlier this month, with 23 participants from the region.

6. The key to a plastic-free ocean lies in having policies to ensure that plastics are used judiciously and more importantly, that plastic wastes are disposed of properly and do not end up in the watercourses leading to the seas and oceans. Allow me to share with you our Singapore story on keeping the city clean and green. Our founding Prime Minister launched the first Keep Singapore Clean campaign in 1968 to galvanise the community to keep Singapore clean. Since then, we have enforced strict anti-littering laws, developed waterways clean-up measures, and put in place an integrated waste management and collection system to minimise waste at source and ensure proper waste recycling and disposal. We also regulate all discharge of trade effluent, oil, chemicals, sewage or other polluting substances to the watercourses from land-based sources to prevent pollution.

7. While the Singapore Government has played our part in addressing the issue of plastic waste in oceans, we recognise that these efforts alone are not sufficient. The Singapore Government works with the 3P Sectors (People, Private and Public) to reduce land-based solid waste. One such initiative is the Singapore Packaging Agreement. It is a voluntary agreement with the industry and non-governmental organisations to reduce packaging waste. The supermarket operators are also exploring solutions to reduce excessive plastic bag usage. NTUC Fairprice, a major supermarket chain here for example, has implemented a rebate for consumers who bring their own bags. Some retailers such as Miniso has started a 10-cent charge for every plastic bag use.

8. The Singapore Government also works with environmental groups such as the Public Hygiene Council (PHC) and the Waterways Watch Society (WWS) to foster shared ownership in keeping the environment clean. They play an important role in raising awareness and getting the public to take action to keep our land and watercourses clean.

9. The Government also supports environmental groups such as Zero Waste SG, which recently launched a Bring Your Own (BYO) campaign to reduce plastic waste in Singapore. Under this campaign, educational tips are provided and incentives offered to encourage consumers to use their own reusable containers, bottles and bags. Retailers such as Miniso, Bossini and Ikea also encourage consumers to bring their reusable bags by either charging for plastic bags or selling reusable bags.

10. There has been a lot of debate recently on charging for plastic bags like some other countries do. We should recognise Singapore's unique context and design the policies which work for us. Plastic bags are used for bagging refuse to maintain good public hygiene. With the majority of Singaporeans living in high-rise public housing with rubbish chutes, irresponsible disposal of waste down the chutes could lead to public health issues such as pest infestations especially in our hot tropical climate. In Singapore, we incinerate all of our waste, hence the challenges faced by countries that rely more on landfilling their waste are not identical to ours. Our main challenge is tackling the excessive consumption of plastics. We are carefully studying the best ways to address this. For instance, we are carrying out a life cycle assessment of the cost and environmental impact of disposable bags and containers. We are also considering the practices and policies of other countries and their contexts, so that we can find a balanced and sustainable approach to managing the use of plastics. Even more importantly, the Government is determined to ensure that all wastes, including plastics, do not end up in our watercourses.

11. In addition to land-based sources, Singapore is committed to the prevention of pollution from ships. Singapore was among the first in Asia to ratify all six Annexes of the International Maritime Organisation's MARPOL, the main international convention covering prevention of pollution of the marine environment by ships. As part of our MARPOL obligations, Singapore provides reception facilities at ports and terminals for the reception of garbage from ships in our port. Garbage collection and flotsam retrieval craft are deployed daily to pick up garbage from ships and along the waterways. Further, our port inspectors patrol our port waters to ensure that ships in our port do not illegally discharge waste, such as oil, garbage and sewage.

12. To understand the challenges in addressing the issue of plastic waste in our oceans, we need to enhance marine scientific research to support policy and decision-making. We need to promote knowledge hubs and networks to enhance the sharing of scientific data, best practices and know-how. Some research projects Singapore is currently undertaking include establishing a citizen science monitoring and data sharing system for marine debris and the development of a multi-organism and multi-level biomarker system for biomonitoring of marine ecosystem health. These efforts complement the many citizen-led efforts like the International Coastal Cleanup Singapore program that has been ongoing for 25 years.

13. However, governments cannot do it alone. Strong collaboration across stakeholders both domestically and internationally is critical. This conference is a useful opportunity to galvanise greater support from the 3P sectors in addressing the challenges of plastic waste in our oceans. I hope that this conference can spur more action from both the private and public sector.

14. Thank you.

## **Singapore's Water Story: A journey towards greater water sufficiency and sustainability**

Excellencies,

Industry Leaders,

Distinguished Guests,

Ladies and Gentlemen,

1 A very good morning to all. I am honoured to be here at this dynamic and innovative water event, and I would like to thank the Ministry of Infrastructure and the Environment and the Amsterdam City Council for the invitation. Before I begin, allow me to express my condolences to Amsterdam and the Netherlands on the passing of Mayor Eberhard van der Laan recently. I spoke to some of the Dutch counterparts just two days ago and they spoke very fondly of him. I am sure you all miss him.

### **THE DUTCH EXPERIENCE**

2 Today, I will share the Singapore Water Story, it is our journey towards greater water sufficiency and sustainability. First, I would like to relate the insights that I gleaned during my visit to the Netherlands last year where I visited the Dutch town of Zuidplas. Both the Netherlands and Singapore face acute water problems. For Netherlands, it is the case of too much water. This photo shows the Mayor of Zuidplas and I standing at the lowest point in all of Europe, at 7.8 metres below the sea level, in Zuidplas. I understand from the Mayor of Rotterdam just now that 80 percent of the land around Rotterdam is also below sea level. It is quite a norm to live under the sea level in Netherlands. That has not come without problems. The massive flood of 1953 in which thousands perished in Netherlands is etched in the memory of the Dutch people. They are always reminded that whatever they do, they must protect the dykes because intense storm surges could overwhelm infrastructure, inundate homes, and more importantly take away lives.

3 Two things struck me. The first was how the Dutch took the lessons to heart and planned for eventualities. After the flood, they strengthened their system of dykes, pumps and water storage capabilities across the country. In fact, they are famous about this around the world to this day. The second was the

establishment of the Netherlands Water Boards Bank which made possible the hefty investments needed to build and man these infrastructures, which meant that money was available and the Dutch has always paved for that future. Today, over 400 million Euros are still being invested in flood protection every year. Indeed, the Dutch has turned this situation into an advantage and investment from water-intensive industries have grown, and the Dutch exported their capabilities. A great weakness has been turned into strength.

## **SINGAPORE WATER STORY**

4 The Singapore Water Story is of the extreme end of the spectrum. Singapore's story is about water scarcity. We are a small island city state with very limited natural water resources. Because we are a small with 700 sq km of land mass, there is very little space to store water.

5 When we gained independence in 1965, we faced poor water and sanitation conditions. We underwent rapid industrialisation to create jobs for a growing population and we knew that this placed immense pressure on our water resources. In those days, water woes were aplenty and the quality of living was under threat. For me, I remember that I was always frightened about going to the toilet because it was a bucket system outside the house. We do not want to walk from the house to the toilet especially at night.

6 But over the years, Singapore strived relentlessly over the past half-century to secure reliable and good quality water supply for our people, through long-term planning, sound management, innovation, and most importantly, bringing our people on board to build a national awareness of water scarcity.

7 Like the Dutch, Singaporeans have a heightened national consciousness of our water problem. I think that this is the unique thing about Singapore and Netherlands, the consciousness of our water problem and therefore this consciousness is encoded in both our DNA – Water scarcity for Singapore and too much water for the Netherlands. Many decades of public education and close partnership with our people have built this DNA and the consciousness of our water problem. Even today, Singaporeans have an obsessive instinct for water conservation because of water scarcity. This is evident from the feedback that PUB, Singapore's National Water Agency, receives from the public complaints on faulty water pipes. It is not just about fixing the leaking pipes, but that the public do not want to see water wasted. If the pipes are not fixed immediately, they will then write to the Minister even for a small faucet in a public toilet. That they have called PUB and that the pipes have not been fixed yesterday, so please get it done now. Therefore, this is the kind of consciousness you get in Singapore. This explains our zealotry in pursuing innovation and technology to continuously improve our water management, and also our work in engaging our people to

ensure that water is used in a responsible way. Yesterday, Director-General for the European Commission, Daniel Crespo talked about the six ingredients for a successful water policy, which is three more from what the World Bank said. For the Singapore Water Story, we have reduced that by one.

8 We have five ingredients that made a real difference into our water story. The key thing that binds all this together is this keen national consciousness of water.

## **THE FIRST INGREDIENT – OUR FOUR NATIONAL TAPS**

9 The first ingredient in the Singapore Water Story is our Four National Taps, which refer to water from one, local catchments, two, imported water from Malaysia, three, NEWater and four, desalinated water. Singaporeans will remember our four national taps. This diversified water portfolio ensures that we have a robust and sustainable water supply, not just in terms of mechanical reliability but also against weather variations.

### ***Water from Local Catchments***

10 Our first Tap is the water from local catchments. We created new reservoirs and dammed up all our rivers to capture rain. We kept our drainage and sewerage systems separate so that storm water can be channelled to our reservoirs through a comprehensive drainage network before it is treated to potable standards. The water catchment area now makes up two-thirds of Singapore's land surface, making us one of the few countries in the world to harvest storm water on a very large scale.

11 One project that epitomises our national determination is the Marina Barrage and the Marina Reservoir - Singapore's first reservoir system in the city centre. The Singapore River winding through the heart of the city had been a lifeline of trading and business activities since colonial times – almost 200 years ago, but had degenerated into an open sewer and rubbish dump. In fact, it is so smelly that Mr Lee Kuan Yew's assistant, who was blind, said that she knew when she had arrived near office because of the smell of the Singapore River. In 1977, we made a pivotal decision to clean up the river. A massive exercise to remove muck from the river and address all the sources of pollution. Within 10 years, we completed it, and it paved the way for the development of Marina Barrage and the Marina Reservoir. Apart from boosting Singapore's water supply by tapping on an urbanised catchment, the Marina Barrage also plays another role which is to alleviate flooding in the low-lying areas of the city and at the same time provide a leisure spot for Singaporeans and visitors to enjoy.

### ***Imported Water from Malaysia***

12 The Second Tap is imported water from our neighbour, Malaysia. We have been importing water from Malaysia since before our independence. Our agreement with Malaysia currently allows us the full and exclusive right to abstract up to 250 million imperial gallons a day, or 1.1 billion litres a day, up to 2061. This is mostly for Singapore's use. A small percentage is sold back to Malaysia after we treat it.

13 Undeniably, these two Taps are the most critical parts of our supply but we also recognise that they are subject to the vagaries of weather. From 2014-2016, a prolonged dry spell brought down the level of Linggiu Reservoir, our reservoir in Malaysia which is one-third the size of Singapore, to about 20%. Should the dry weather been prolonged further, the reservoir would have been dry by July this year. Therefore, we have chosen to diversify very early in the years before to ensure that massive investments can be made towards weather-resilient sources such as NEWater and desalinated water.

### ***NEWater***

14 Our third Tap, NEWater, is Singapore's own brand of ultra-clean, high grade reclaimed water that has been purified using advanced membrane technologies and ultra-violet disinfection. NEWater allows Singapore to close the hydrological loop and use and re-use its precious water. Engineers would know that if we recycle half of our wastewater, we effectively double our water supply. If we recycle three-quarters of our wastewater, we quadruple it!

15 Singapore first explored water recycling as early as the 1970s but the membranes then were expensive, and could not remove all contaminants to make it potable. Bacteria could be filtered but not viruses and the difference in size between bacteria and viruses is akin to that between a ten-storey building and a truck. But we did not let that stop us. Again, our obsessive instinct meant we kept at it for another two decades. In 1998, our study finally showed that the cost and performance of reverse-osmosis membrane technology had improved sufficiently for wastewater to be recycled to ultra-clean water economically. A demonstration plant was built in 2000 to test this. Subsequently, the first two full-scale NEWater plants commenced operations in 2003 and today we have five NEWater plants. Together, they are able to meet 40% of our water demand.

16 But successfully deploying the technology was only half the battle won, and perhaps the easier half. We needed to convince our people to drink the water, to ensure it is not only always safe, but more importantly acceptable for them to

drink it. Before launching NEWater as our third Tap, we held a series of exhibitions, briefings, and advertisements to engender public acceptance. Our then-Prime Minister Goh Chok Tong also gave his personal endorsement by drinking a bottle of NEWater on national television. The apex Muslim religious leader, the Mufti, also endorsed NEWater as halal. Today, the public is firmly behind NEWater as part of our water supply. In 2012, then-UN Secretary-General Ban Ki-Moon said, after visiting our NEWater complex, that he was “very much impressed by the idea of recycling waste water to help people have access to safe drinking water” and called NEWater the “elixir of life”.

### ***Desalinated Water***

17 Our fourth Tap is desalinated water. This is another important weather-resilient source. Those who have reliable water supply from rain in your country now better think hard about this due to climate change. We had been following developments in desalination since the 1970s but again it was too expensive then. With advancements in membrane technology, it became financially viable for Singapore in the early 2000s. We built two plants which can meet 25% of our water demand, with another three coming on-stream by 2020. But as always, we do not stop there. On the R&D front, Singapore is investing on big, hairy, audacious goals. We are exploring methods to bring energy consumption down from the current 3.5 kilo-Watt-hour-per-cubic-meter to less than 1 kilo-Watt-hour-per-cubic-meter through Electro-Deionisation technology. Other exciting R&D is aimed at developing more energy-efficient membranes based on biomimicry or mimicking the biological processes by which mangrove plants and euryhaline fish extract seawater – how to use their proteins in our membranes so that we can extract potable water with less energy. But as with NEWater, it is not just about technical and economical feasibility but also public acceptability. While Singapore conditions our desalinated water before it leaves the plant, we want to make sure that the people feel and experience the same taste regardless of the water source. Therefore, we blend desalinated water with potable water from other sources to achieve a consistency in taste regardless of where you stay. In Singapore, all the water is sweet and nice.

### **THE SECOND INGREDIENT – RIGHT PRICING**

18 Let me go into the second ingredient which is financial sustainability is the second ingredient, and is of fundamental importance. Harking back to the Dutch experience, the Netherlands established the world’s first and only Water Bank to finance large investments in water. This was made possible because each household contributed its share of water taxes. We just heard Mayor Aboutaleb explain that it is getting harder and harder to explain to people why they are

paying for it. I think this is one of the national consciousness that the Dutch should not lose and in the same way for Singaporeans too.

19 In Singapore, we make sure that people understand that water is unlike any other ordinary public commodity. It needs to be priced right to ensure financial sustainability, so that we can continue to upgrade our water system to tackle upcoming challenges, and ensure a reliable and sustainable supply. We price potable water to reflect its long-run marginal cost which means the cost to produce the next drop of water. With this, consumers can appreciate the scarcity value of water, and cultivate the habit of saving water as part of our collective DNA.

20 We made water accessible and affordable to all. This is done through targeted assistance for households rather than subsidising for everybody.

### **THE THIRD INGREDIENT – REGULATING WATER DEMAND**

21 The third ingredient is regulating water demand. Ensuring an adequate water supply and ensuring that we have the funds for it are only half the equation. Equally important is regulating water demand, which is our third ingredient. By 2060, Singapore's total water demand is expected to double. Our obsessive instinct for conserving water must kick in. Every drop saved means one drop fewer to be supplied. While we have put in place comprehensive initiatives to educate, support and recognise water users in their journey to improve water efficiency, we still require a regulatory push.

22 In Singapore, we require companies that use large quantities of water to look into water conservation measures. We also introduced the Mandatory Water Efficiency Labelling Scheme to help consumers to choose more water efficient water fittings and appliances. Less water-efficient products are being phased out from our market. This scheme has reaped dividends. Our domestic litres per capita per day (LPCD) consumption has gone down over the years to 148 litres in 2016. But we are not stopping here. We plan to lower it to 140 litres by 2030.

### **THE FOURTH INGREDIENT – COLLABORATIONS WITH PRIVATE SECTOR**

23 The fourth ingredient is collaboration with the private sector. We partner the private sector to harness deep expertise, innovation and cutting-edge water technologies, to achieve cost-effectiveness. Since our first Public-Private-Partnership project in 2005, we have awarded a total of seven such contracts, four for desalination plants and three for NEWater factories. One recent example is the Marina East Desalination Plant which will be designed, built, owned and

operated by Keppel Infrastructure Holdings. When completed in 2020, this will be Singapore's, and probably the world's, first large-scale plant that can treat both reservoir and sea water. Machinery and equipment will be located underground to reduce footprint, with a recreational park on the rooftop. It is not a usual water plant but something everyone can enjoy.

24 Like the Netherlands, we have turned our water scarcity into a competitive advantage. Local water companies participate in projects with us and gain a track record in Singapore, and can go on to showcase and sell their expertise on the global stage. For example, Hyflux built and ran two desalination plants in Singapore and went on to build one of the world's largest seawater RO desalination plants in Algeria.

25 Our willingness to work directly with industry partners in seeking solutions has attracted international water companies to hub in Singapore and conduct research. Today, we have more than 180 local and international water companies and more than 20 Research centres for water.

## **THE FIFTH INGREDIENT - BRING WATER CLOSER TO OUR PEOPLE**

26 Finally, the fifth ingredient. We have endeavoured to bring Singaporeans closer to our waters. It is not just about drinking the water but bringing them close physically to the water. We developed greater ownership by our people for our water resources and we did this through the Active, Beautiful, and Clean Waters (or ABC Waters) programme which provides new community spaces where people can be brought closer to the water through recreational activities. Local communities are also able to develop their own sustainable projects around the enhanced water features in their neighbourhoods. One of the biggest and most picturesque of our 36 ABC Waters Projects is the Bishan–Ang Mo Kio Park which had an extreme make-over to include a natural river with a wide array of fauna and flora. What is unique is that the park is designed based on a flood plain concept. During dry weather, the flow of water is confined to a narrow stream in the middle of the river. In the event of a storm, as the water level rises, the park area doubles up as a conveyance channel which gradually carries the rainwater downstream. Access to water facilities allow people to own the water that they drink, enjoy even as they learn to keep the water clean.

## **CONCLUSION**

27 Despite having done much to address Singapore's water scarcity, there is no "happily ever after" in the Singapore Water Story. Unfortunately, the World Resources Institute study in 2013 ranked Singapore with the greatest risk of

water stress in 2040. This is not about what we have done, but about the fate of who we are. We cannot afford to be complacent. Going back to the Dutch experience, you are acutely aware of the consequences should flood prevention measures fail and have never stopped making investments since the disaster of 1953. Singapore too needs to ensure that the national consciousness of water is passed down across generations. In the same way that the people of Zuidplaspolder living seven metres under sea level must always be conscious that this is not natural, infrastructure always need to be maintained and upkeep so that disasters do not happen, and that we need to pay for this. This is especially critical as climate change is bringing disruptive change to our operating context and has the potential to tip us over from success to failure. As Mayor Ahmed Aboutaleb said in his speech earlier about the measures taken in Rotterdam, all of us need to take new measures whether or not we believe climate change will happen. Singapore thus constantly reviews our policies and strategies to ensure that all aspects of our water management, the whole ecology, not just production but the maintenance of the network channels, take into account resilience and reliability so that we remain robust and adequate.

28 Part of that is made possible by participating in events such as this, so that we can exchange experiences and learn from one another. Similar to the Amsterdam International Water Week, Singapore also organises a water conference called the Singapore International Water Week or SIWW since 2008. The next edition is in July 2018 and I encourage all of you to pencil it into your calendar. The two conferences share a common purpose in bringing global water leaders together to co-create innovative water solutions and build capabilities to solve particularly urban water challenges. It is through this kind of meetings that we can create potential synergy and I hope the organisers will work closely together so that we can be the icons, both Amsterdam and Singapore, to show that even if you have too much water or too little water, there is a solution, that there are ways to overcome this. But that we also have to do this through a national consciousness.

29 While every city or country faces its own unique challenges, I hope that the Singapore Water Story has provided some inspirations and insights. I take this opportunity to wish everyone a fruitful conference.

Ms Christina Lee,

Founder & CEO, Global Green Economic Forum

Distinguished Guests,

Ladies and Gentlemen,

Good morning. I am happy to join you for the Global Green Economic Forum 5<sup>th</sup> Annual Conference. I am also delighted that many business leaders, academics and policymakers are gathered here to discuss solutions for a sustainable economy.

## **SINGAPORE'S ENVIRONMENTAL JOURNEY**

2 Sustainable development has been the cornerstone for Singapore's continued progress since our independence. We did not start 10 years ago, we did not start 20 years ago, we started when we became independent 50 years ago. Over the past five decades, Singapore has transformed itself thanks to the hard work and vision of our pioneers. Singapore has always believed in pursuing economic development without sacrificing our environment. Our founding leaders had embraced sustainable development long before it became fashionable.

3 Singapore's approach to sustainable development is based on two key factors. First, we take a pragmatic and long-term view in governance and implementation. Our policies are based on what works, with a focus on outcomes, even if they may not be widely accepted initially. Take for example water, a scarce and strategic resource given our limited land area. To diversify our water supply, we introduced NEWater in 2003. It is actually recycled used water. We use advanced membrane technology and ultraviolet disinfection to purify the treated used water into ultra-clean water. Today, NEWater is one of our four National Taps and it is widely accepted as an integral water source.

4 Second, we build capacity through partnerships with the 3P, or People, Private and Public sectors. Given Singapore's lack of natural resources, it is necessary to develop human capital through collaborations. My Ministry has partnered citizens, industries, academia and the civil societies to tackle environmental challenges. Let me cite some examples. To promote energy efficiency, the National Environment Agency (NEA) has gathered 260 companies to join the Energy Efficiency National Partnership (EENP) in October 2017. In August this year, my Ministry organised the inaugural Partners for the Environment Forum that saw more than 350 partners from the 3P sectors coming together to co-create ideas on environmental sustainability. So in Singapore, sustainability is well and alive.

## **OUR SUSTAINABILITY AND DEVELOPMENT CHALLENGES**

5 Despite Singapore's efforts in tackling environmental challenges on air and water pollution as well as waste management over the last fifty years, we face new sustainability and development challenges. Our limited land area means that we have to continually balance our land use between various competing needs, such as industry, housing, transport, infrastructure and recreational spaces. This is further compounded by our high population density and natural resource constraints.

6 As a low-lying, small island-state, Singapore is particularly vulnerable to the impacts of climate change like rising sea levels. Many countries are already experiencing them. Globally, this has accelerated the shift towards renewables and sustainability. Organisations will also need to start thinking about how climate change will impact their businesses and supply chains, and prepare to undertake measures to adapt accordingly.

7 The future economy will also be one where energy-efficient and low carbon-growth takes centre stage. Singapore and our companies must position ourselves to stay competitive. We launched the Climate Action Plan last year, which details efforts to strengthen our resilience through long-term planning. One of the measures to reduce carbon emissions is the introduction of a carbon tax on our larger emitters from 2019. The carbon tax provides a price signal to encourage companies to reduce emissions, while giving them the flexibility to take action where it makes the most economic sense.

## **SUSTAINABLE SINGAPORE BLUEPRINT**

8 Our journey towards sustainability is an on-going endeavour. The Sustainable Singapore Blueprint (SSB) is our roadmap to deal with the many challenges that Singapore faces. It outlines our plans and guides our efforts in sustainable development until 2030. There are five focus areas under the SSB, and I will focus on two of them today.

9 First, we are growing a Leading Green Economy. We encourage companies to adopt greener practices and more efficient, sustainable processes. We also invest in research and innovation to develop and implement smart and sustainable urban solutions. We have focused on the use of renewable energy to grow our economy sustainably. Given our unique geographical features, solar energy is the most viable option. Our current plan is to raise the adoption of solar power in our system to 1GWp beyond 2020. The adoption of solar energy strengthens Singapore as a green economy. This will in turn nudge businesses towards sustainability while benefitting from it.

10 Second, we are working towards becoming a Zero Waste Nation. With a limited land area, unrestrained growth in waste generation can pose a major challenge to our environment. The amount of solid waste generated has grown by 50% over the last decade. Everyone has to minimise waste generation and maximise recycling. The government has set regulations on the provision of dual chutes for waste and recyclables in new housing developments.

11 I encourage businesses to contribute more towards a sustainable and zero-waste Singapore. Many businesses are already taking steps to reduce water, energy and carbon usage. The next step for businesses would be to consider how to deal with their products at the end of their life cycle. My Ministry is currently studying overseas examples, like the Extended Producer Responsibility (EPR). Under the EPR, producers take responsibility for the treatment or disposal of post-consumer products, either physically or financially. As a result, businesses will have to manage the environmental impact of their processes, and design products that can be reused or recycled.

## **ENCOURAGING STEWARDSHIP OF THE ENVIRONMENT**

12 The journey towards environmental sustainability requires the active participation of businesses and the community. Governments cannot achieve this alone. Strong collaboration across stakeholders is vital. To facilitate this, I launched the Sustainable Singapore Movement last July to mobilise the 3P sectors to work in partnerships and take ownership of the environment. Many organisations have since initiated ground-up efforts to raise awareness and encourage people to take action. Let me cite some examples.

13 Food Bank Singapore engages volunteers to collect and distribute surplus food donations from manufacturers, retailers and distributors to the less fortunate. It collected 2 tonnes of food in 2012, which grew to 720 tonnes in 2015. Their efforts have contributed to a reduction in food waste, which might have ended up in the incineration plants.

14 Avelife, an NGO which partnered Sembcorp Industries, had initiated the Green Xchange to inculcate recycling habits into the community. The Green Xchange worked with grassroots organisations to encourage residents to exchange recyclables for staple food items.

15 City Developments Limited (CDL) collaborated with the Sustainable Energy Association of Singapore (SEAS) to open the Singapore Sustainability Academy in June this year. The academy provides a training and networking facility on sustainability for the industries and youths. This is a significant ground-up initiative between a private developer and a non-profit organisation to bring the Sustainable Singapore Movement to a wider audience.

16 As you can see, there are many opportunities for us to make a difference. Collaborations across sectors allow organisations to pool resources and tap on diverse skills and talents to co-create solutions. This can lead to cost savings while impacting the community positively on sustainability issues.

## **CONCLUSION**

17 I am glad that this conference will discuss actionable solutions to build a sustainable economy. I am confident that the conference will generate new ideas and reaffirm the commitment towards a sustainable environment. I wish everyone a fruitful discussion. Thank you.

Mr Desmond Choo,  
Executive Secretary of Young NTUC and MP of Tampines GRC

Distinguished Guests,

Ladies and Gentlemen,

Thank you to all of you for coming this afternoon, as we see how we can address your queries, your search for a possible career in the green industry.

## **THE NEED FOR CLIMATE ACTION**

2. But first, before we talk about the green industry, let us talk about what is driving all these. What is driving this, is our worries about climate change. Because ultimately, when we talk about pollution, it has an immediate effect – it is what we breath, what we drink, what we see. It usually has immediate health impacts. But climate change is going to cause tens of millions of people to be forced from their homes. When? By the end of this century. If we look at what is happening around the world recently, the weather pattern is changing. We see this even in Singapore. For example, in July when it was supposed to be dry season, it was raining. Growing up, I remember that Singapore has four seasons too – wet and wetter, hot and hotter. And we know that it always rains in June and December. And the rest of the time is generally very dry. But for the past few years, and the last decade, it has not been so. If you look at what happened in the US recently, the hurricanes that came at the heel of one another in a matter of weeks is phenomenal. People who understand weather are really frightened.

3. You saw what happened to our neighbours recently. Just a week ago, in Vietnam and Malaysia, therefore we must worry for ourselves. That is why we have signed the Paris Climate agreement, because in addressing climate change, it is not about what one or two countries can do; it is what everyone must do. Therefore, we must orientate ourselves towards this fight against climate change at the international, regional, national and individual levels.

4. For our Ministry, we are going to take action quickly. Indeed, for 2018, we are going to declare it the year for Climate Action. We want to rally companies and every individual to understand that every bit we do to reduce the greenhouse impact on the climate matters. Even for small countries like ours. Infact, more so for us, because we are a low-lying island, and we are very vulnerable. If Penang can be inundated with just one day's rain, which is equivalent to one and a half month's rain, and if this phenomenon repeats itself for weeks or days, Singapore too will be inundated. A storm surge, a high tide, is a worrying phenomenon that we will see more of at the end of the century, if we do not do anything together.

5. Three years ago, we launched the Sustainable Singapore Blueprint 2015, or SSB 2015. It maps out our strategies for sustainable development. For my Ministry particularly, we want to achieve what we call a Zero Waste Nation. There are a lot of opportunities there. We also talk about a car-lite society, a sustainable urban development, green energy and so forth. All these put together, is not just about making Singapore a vibrant and sustainable city, but also if you read SSB 2015, it talks about opportunity. While climate change is like a crisis, on the flip side, there is also opportunity. This green economy is the opportunity to respond to this crisis.

6. One such area is the adoption of renewable energy. For Singapore, this largely means solar energy. The Singapore Economic Development Board (EDB) launched the SolarNova programme to promote and aggregate solar demand across government agencies. This is important, because aggregating demand allows scale. There will be economy of scale, and costs will be driven down, which means it would be more viable. Indeed, in Singapore, we do not need to subsidise solar energy. Many companies have made it their corporate strategy to actually acquire renewable energy. Yesterday I met with Mr Piyush Gupta, CEO of DBS, for the POSB 140<sup>th</sup> year anniversary. I was happy to hear from him that POSB is one of the first banks to be under RE100, to subscribe to buying only renewable energy, and they have enough renewable energy now to power all their branches in Singapore, and they will continue to do so. I think all these spurring of demand for solar energy, will lead to an increase in demand for skilled employees who understand how to use their skills to supply the demand that many industries in Singapore will want.

## **GREEN JOB OPPORTUNITIES**

7. I hope that at the same time, it is not just about the opportunities, but how you see these opportunities. There may also be a need for a shift in what you were trained for, and where the opportunities lie, therefore the kind of skills you need to acquire. Opportunities will be offered in the job itself, there will also be opportunities in R&D, creative solutions and things you will need to support the industry, and not just the industry itself.

8. At the Asia Clean Energy Summit (ACES) last month, six new clean energy investments in the fields of solar, wind, microgrids and energy management in Singapore were announced. About 400 professional jobs will be created and S\$500 million in cumulative business spending has been projected in the next five years. We are not talking about an end-of-century situation; we are talking about now. Now is the time for you to seize these opportunities, as there are a lot of these areas where there will be shortage, if not already felt by many of the people in the industry. I see so many young faces here, you are the kind of people they would want, people who can shift, people who can think differently. If you don't have a young face, have a young heart. I am sure you can pick up new skills and get something done for yourselves.

9. The Government also recently announced the Industry Transformation Map (ITM) for the construction industry. The ITM targets to have 80,000 personnel trained in digital technology – talking about digital technology, I was just briefed about our new Deep Tunnel Sewage System (DTSS), which is very much involving digital imaging; things we did not do in the first DTSS. It is a very new approach of being able to see things ahead of time as you construct, and not make mistakes as you construct. So I think that those kinds of areas are very new areas that are very much in demand. Like I mentioned, digital technology, pre-fabrication and green building capabilities by 2025, up from 32,600 currently. Green building technology is part of the sustainability sector. It can contribute \$6.2 billion to Singapore's GDP and provide about 50,000 - 60,000 jobs

10. NEA has been working with the industry, union and other stakeholders to develop the Environmental Services Industry Transformation Map or ES ITM. This is beyond just productivity measures. I would be announcing it soon, but it is the overall vision of what I said just now – to achieve a Zero Waste Nation vision. Although not quite visible, because all these, though essential, are all in the background. You make a mess, you go home, someone cleans up for you. It is the same thing, you make a mess, someone incinerate for you and do something about the ash. In that alone, there are so many opportunities for business, technology and R&D. And we are going to do it differently, in years to come. And, as we all know, only transformation can sustain Singapore's competitiveness for the future. We cannot continue doing what we have been doing. The old economy, as we know, services, finance and so forth, are necessary, but are not enough to take us forward. There are competitors that are much bigger than us, like China for example. Therefore, what we need to do is to ensure that the ITMs are transformational, even for cleaning and waste management sectors. At the end of the day, we want to grow good jobs that will also develop technology that would not only let us lead in that sector, but also to be exportable.

11. But if you look at what NEA is doing, like I mentioned, we must also not neglect traditional economies, and that includes even the hawker trade. There are things that we are doing in the hawker trade to not just increase productivity, but to make sure that is a viable trade for even the young people to go in. There are five stalls that I know in Ci Yuan CC where young graduates have taken over and run in very clever ways. What Ci Yuan has done is to curate recipes from hawkers who are giving up their trade – one is Penang Chendol and the other is a chicken rice stall. And the people who do not want to do this work anymore, were selling fantastic hawker fare. So the entrepreneur bought the recipe and the process of producing the food, and trained young people. I know one came from Republic Polytechnic, one came from NUS. They took over this trade, tried it out, and they are still there. And they are producing really good chicken rice – I cannot taste it as it is not halal, but I know the Penang Chendol is very good. So go to Ci Yuan, be inspired, look at them, and look at possibilities. We are not just talking about green technology in the sense of technology in the high-end, but also how we use productivity measures to develop sustainable jobs.

## **PREPARING FOR THE GREEN INDUSTRY**

12. Your roles in the green industry will have an impact on Singaporeans. A green economy is where every country is advancing towards – they are going very big on this. I just came back from Holland, and I saw that they are way ahead of us in the way they think, the things they do and the kinds of jobs they are producing. These are really exciting times. Have we done it before? Yes. We have done well in water technology. We were innovative, we were producing what people had thrown away through sewage, we

have converted it to NEWater, made it drinkable, make it something we can rely on, when for example, our Johor waterworks was not running. Not only have we just produced jobs, our companies like Hyflux, have produced some of the biggest water plants in the world, because of what we did in Singapore. That is what we want to do in the ES ITM.

## **CONCLUSION**

13. So I hope all of you will find a way into this ITM, or the 23 others that we will be announcing. I will be doing for my sector soon, and I hope that as we transform together, we also, at the end of the day, will have a better liveable environment for ourselves as well as for the next generation.

Thank you.

Mr Peter Seah,  
Chairman of DBS

Mr Piyush Gupta,  
Chief Executive Officer of DBS

Mr Desmond Tan,  
Chief Executive Director of The People's Association

Friends from DBS/POSB

**Ladies and Gentlemen,**

Good evening. It is my pleasure to join you in celebrating POSB's 140th anniversary. POSB has always been regarded as the People's Bank, a bank that touches the hearts and lives of many ordinary Singaporeans. As one of our key institutions, POSB has served Singaporeans from all walks of life since its founding in 1877.

2 From creating a nationwide savings movement to playing a key role in the development of Singapore, POSB has become an integral part of the Singapore story. Today, POSB continues to serve the banking needs of Singaporeans. I am particularly delighted that the bank continues to reach out to children and seniors in the community by working closely with the People's Association.

3 In its 9th year now, the money raised by the run goes into the POSB PAssion Kids Fund to support meaningful and innovative community initiatives for children below 16 years of age. I thank POSB and all donors for your generosity in contributing \$1 million annually since 2011 towards the fund, which has supported more than 105 programmes, with over 400,000 children. These programmes have helped to build the children's character through their areas of interest like the environment, sports and arts, and exposed them to important life skills like budgeting and IT.

4 POSB also officially launched the Smart Buddy Programme in August to cultivate sensible saving and spending habits. This contactless payment ecosystem allows students to use a watch to pay for their purchases at school canteens and bookstores, while an accompanying mobile app enables parents to remotely manage their children's spending and saving habits.

5 I am heartened that POSB did not leave the seniors behind in the digital advancement. The bank incorporated its Digital Banking course into PA's "Seniors for Smart Nation" curriculum. This provides seniors in the community with hands-on training by POSB staff on their latest digital services and mobile payment applications.

**POSB Kidstarter Programme & Sponsor-A-Buddy**

6 Some examples of the wide-ranging types of programmes powered by the POSB PAssion Kids Fund this year include a six-session programme on financial literacy and simple coding lessons for 140 children aged between 8 and 11 years old from Tanjong Pagar GRC and Radin Mas SMC. A few partners, notably

POSB, Hewlett Packard Enterprise and Samsung, came together to ask the children how they could encourage others to save or help those in need. The children would then share their solutions through animation using the coding tools. I believe the children and the volunteer trainers enjoyed themselves over these lessons with learning made more fun and interesting with technology.

7 With the Sponsor-A-Buddy programme, 700 underprivileged children and their families joined the POSB PAssion Run for Kids at Marina Promontory, through co-sponsorship by the run participants and POSB PAssion Kids Fund.

### **Environment Sustainability**

8 Apart from the community initiatives, I am delighted that DBS is part of the RE100, a global renewable energy initiative, and is already procuring enough renewable energy to power POSB branches island-wide. I would like to commend DBS for its effort to combat climate change, which may have significant implications for Singapore.

9 All these initiatives by corporates to reduce their own environmental footprint will contribute towards creating a more sustainable Singapore. This is aligned with the Sustainable Singapore Movement launched by my Ministry last year, which encourages everyone to play their role in Singapore's sustainability journey. I encourage more corporations to explore how they can play their part to protect the environment and safeguard our future.

### **Call for Continued Contribution and Support**

10 I wish to thank the donors and sponsors once again for your generosity. Your contributions have brightened the lives of young children, who would otherwise not have had the chance to attend the programmes. Finally, I call on other corporations to emulate the fine example of POSB by stepping forward to continue to engage the community and play their part for environmental sustainability.

11 Thank you.

Distinguished guests,

Ladies and gentlemen,

1 I am happy to join you for the groundbreaking of Phase 2 of the Deep Tunnel Sewerage System (DTSS). Today marks a very significant milestone in Singapore's water story.

2 The DTSS is a key strategic asset in enhancing our water security. Planning for DTSS started in the 1990s with the recognition that this is a costly but critical investment that we needed to make to strengthen our long term water security to benefit Singaporeans for generations to come. Phase 2 of DTSS is estimated to cost some S\$6.5 billion, with the deep tunnels and link sewers alone costing about \$2.3 billion.

3 We have experienced how unpredictable weather patterns can be, and we expect dry seasons to worsen with climate change. It is therefore critical to augment our water sources by reclaiming water, so that it can be used again and again, in an endless cycle. Reclaimed water, better known in Singapore as NEWater, can currently meet up to 40% of Singapore's water demand. Phase 2 of DTSS will give a boost to our NEWater supply. NEWater will eventually meet up to 55% of our water demand in future.

#### THE DEEP TUNNEL SEWERAGE SYSTEM PHASE 2

4 When completed by 2025, Phase 2 of DTSS will serve the western part of Singapore, including the downtown area and major upcoming developments such as Tengah Town and Jurong Lake District. About 100km of enhanced deep tunnels and link sewers will be constructed to convey used water to the new Tuas WRP and integrated NEWater factory. There will also be a separate deep tunnel for the collection of used water from the growing industrial sector in Tuas.

5 The successful implementation of Phase 2 will see the completion of the DTSS. The footprint of used water infrastructure will be reduced by half with land savings equivalent to 214 football fields. Existing conventional WRPs and used water pumping stations will be phased out, and the land freed up for other uses. We also minimise the risk of contamination to the environment. Such progress would not be possible without the hard work of pioneering engineers who helped to make Phase 1 a reality. I am pleased to have them here with us today. We have come a long way from when construction on DTSS started in 1997, and it is exciting to embark on phase 2 of this project, which will bring us right to the edge of technology.

LEADING INNOVATION AND TECHNOLOGY

6 Drawing on lessons learned from Phase 1, PUB has leveraged cutting-edge innovation and technology for Phase 2. For instance, to ensure better protection against weathering and corrosion due to bacteria and gases present in the sewers, the DTSS Phase 2 tunnel walls will be constructed with up to four layers. For the first time, operators will be able to remotely monitor tunnel integrity in real time with embedded fibre optic sensors. In the rare event that maintenance of the tunnel is needed, individual segments of the tunnel may be safely isolated from the rest of the system without causing any disruption to service. With all the technology in place, the DTSS will serve Singapore quietly and unobtrusively for generations to come.

#### PARTNERSHIP AND COLLABORATION WITH INDUSTRY

7 Such a complex mega project could not have been implemented without the support of you, our industry partners. This close partnership allows us to harness the latest technologies and tap on progressive methods of construction.

8 PUB has appointed five contractors to design and build the first 50km of the tunnels. I'm pleased that we have a homegrown company – Koh Brothers Eco Engineering Ltd. – among the successful bidders for this tunnelling project. This is just the beginning. More tenders will be called as we progressively implement other components of the project and I urge industry players across the value chain, and especially local companies, to contribute innovative ideas and join us in developing this used water superhighway. Such partnerships allow companies to strengthen their water expertise, so that they are well positioned to venture onto the regional and global stage. At the same time, exciting new jobs are created, which demonstrate that our engineers have the knowledge and skills to take on and deliver large, complex, world-class projects. This further creates an opportunity for us to export our capabilities overseas.

9 I am heartened that DTSS 2 is also contributing to the transformation of the construction industry, The Industry Transformation Map (ITM) for the construction industry aims to have 80,000 personnel trained in digital technology. Unlike Phase 1, Phase 2 uses digital imaging to allow engineers to see things ahead of time as they construct and pre-empt design issues.

#### CONCLUSION

10 To sum up, the DTSS will not only help secure greater NEWater supply for our future in a more cost-effective and sustainable manner, but it will also create meaningful and exciting jobs. Being on the cutting edge of innovation and technology, it will help our companies build

capacity and export to the region and beyond. Together, let us look forward to 2025 when this engineering marvel, a key milestone of Singapore's water story, is completed. Thank you.

Industry partners,

Distinguished guests,

Ladies and gentlemen,

1 A very good afternoon to all. I am pleased to join you at the Water Efficiency Awards and Industrial Water Solutions Forum 2017 to recognise the outstanding efforts of our partners in achieving greater water efficiency.

## **INVESTING AHEAD OF WATER NEEDS**

2 In Singapore, we invest ahead of our water needs. Over the next three years, three new desalination plants, namely at Tuas, Marina East and Jurong Island will be completed. Yesterday, we just had the groundbreaking ceremony for the Phase 2 of the Deep Tunnel Sewerage System or DTSS. Those are the tunnels that will allow us to collect used water for large-scale recycling of used water into NEWater. These mega investments exemplify our relentless drive to strengthen the resilience of our water supply. Making these investments now will ensure that we can continually meet the needs of our economy and our people. We cannot stop doing so in the face of threats from climate change.

## **INDUSTRY PLAYS AN IMPORTANT ROLE IN MANAGING WATER DEMAND**

3 While we continue to invest in water infrastructure, we must also manage Singapore's increasing water demand for long-term sustainability. Non-domestic water demand is expected to increase from 55% of our current water demand to 70% of our future water demand by 2060. Therefore, it is important that our partners in the non-domestic sector join us in this move to conserve water, and reduce water demand.

4 As the old management adage goes, you cannot manage what you cannot measure. Monitoring water usage is the first step in water efficiency management. With the Water Efficiency Management Plan, or WEMP for short, companies can study their water usage patterns and target their water-intensive operations to improve water efficiency and save on their water bills.

## **SHARING INDUSTRY BENCHMARKS AND BEST PRACTICES**

5 I would like to thank all of you for your strong support of WEMP. There are many insights that all of us can glean from the WEMP data. For example, PUB found that water demand for cooling needs takes up a substantial 25% of the total water demand of large water users. PUB is now working closely with companies, particularly those located at or near the seafront on Jurong Island, to encourage the use of seawater for cooling. PUB has also published a Technical

Reference for Water Conservation in Cooling Towers. This will be a reference for developers, building owners and managing agents to improve on their operation and maintenance of cooling towers.

6 We can do even more with WEMP data. The data collected through the WEMPs has enabled PUB to develop water efficiency benchmarks, as well as gather insights on best practices. Here, I am pleased to announce that for a start, PUB has developed a Best Practice Guide for the building sector, that is, offices, hotels, and retail buildings. In the guide, you will find both the water-efficiency benchmarks and best practices for the sector.

7 PUB will refine this guide with your experience and expertise. As we work towards launching the guide in 2018, we welcome you to share your comments with PUB. A draft copy of the guide is available on the PUB website. We want this to be a collaborative effort. This will be a resource that is developed together with the industry, for the industry.

8 PUB will progressively develop benchmarks for other sectors. Later today, PUB will share on their benchmarking methodologies and the associated water efficiency indicators that it has established together with hotels, retail, office buildings and wafer fabrication plants.

9 That is not all. PUB has also been working closely with Singapore Polytechnic to improve on the Water Efficiency Manager Course. From 2019 onwards, all WEMP representatives are to be certified as a Water Efficiency Manager. This will equip facility managers with the knowledge and skills to conduct water audits and formulate water efficiency plans.

## **GIVING WATER EFFICIENCY A BOOST**

10 Experience-sharing is just as important. Companies such as Asia Pacific Breweries, GlobalFoundries Singapore, Marina Bay Sands and Singapore Refining Company have demonstrated strong commitment to make their processes more water-efficient and reduce their water footprint. This afternoon, they will be sharing their experience in implementing water conservation initiatives.

11 Companies are not alone in this journey towards greater water efficiency. PUB has made available funding schemes like the Water Efficiency Fund and Industrial Water Solutions Demonstration Fund to assist companies on water recycling or conservation projects. I encourage all to approach PUB and explore tapping on these funds. PUB will also be more than happy to share its expertise in evaluating and implementing water efficiency improvements.

12 Finally, I would like to congratulate all the Water Efficiency Award recipients for your outstanding efforts. By making water conservation a part of your vision and your day-to-day operations, you demonstrate the collective Singaporean DNA for water conservation. Whether you are representing a school or a company, be our water ambassador and urge your stakeholders to do likewise.

13 Every effort and commitment goes a long way to help us conserve our precious water resources and achieve water sustainability. Together, we can make water conservation a way of life. Thank you.

Achim Steiner,

Administrator, UNDP

H. E. Jeffrey Radebe,  
Minister of Planning Monitoring and Evaluation, South Africa

H. E. Kitchai Sophastienphong,  
Vice Minister of Finance, Thailand

Mr. Haoliang Xu,  
Assistant Secretary-General, Assistant Administrator &  
Director, Regional Bureau for Asia and the Pacific, UNDP

Distinguished guests,

Ladies and Gentlemen,

1. A very good morning to all of you. To our foreign friends, a warm welcome. Singapore's hosting of the Responsible Business Forum (RBF) on Sustainable Development for the sixth time is a strong demonstration of the region's commitment to sustainability. Both RBF and the Singapore Government are working towards achieving the Sustainable Development Goals (SDGs) to ensure an equitable and sustainable future for all. I thank the co-organisers, Global Initiatives and the UNDP, for inviting me to highlight Singapore's pledge towards sustainable development.

2. Singapore works closely with our neighbours to improve sustainability outcomes in the region, including those related to climate change, water resource management and economic growth. Collaboration between countries in the Asia-Pacific region is vital to achieve the SDGs. With RBF focusing on 'performance and impact' this year, I am glad that both Singapore and her neighbours have made steady progress since the SDGs were launched in 2015. For example, Singapore is coming close to meeting the health-related targets. Asia-Pacific as a whole is on track to meeting the target of zero deforestation, with Laos and Bhutan heading towards an increase in forest cover by 2030.

3. But there are many challenges ahead and some way to go to achieve the SDGs by 2030. While Singapore has made progress on sustainability issues, we remain vulnerable to the impacts of climate change and other threats. Around the world, changing environmental conditions, conflicts, poverty and disease continue to consume resources and test our capability to respond. We must scale up and accelerate our sustainable development efforts to overcome these challenges. Governments must work in partnership with the UN, private sector and civil society. I am glad that there are representatives from more than 40 countries at this forum. They include CEOs from multinationals, SMEs and

leaders from across the UN system. This wide representation reflects the importance businesses place on sustainable development partnership across the region.

## **SINGAPORE'S CLIMATE ACTION PLAN**

4. Governments have to take the lead in setting policies and norms to mitigate the effects of climate change, which are already posing serious threats globally. In recent months, we have seen the devastating effects of storms and typhoons in different parts of the world. Nearer to home, we saw devastating floods in Penang and Danang. I urge countries and companies, especially those with global operations, to start thinking about how to deal with the impact of climate change on their businesses and supply chains, and to undertake measures to adapt accordingly.

5. Under the Paris Agreement, Singapore has pledged to lower our emissions intensity by 36% from 2005 levels, and to stabilise our emissions with the aim of peaking around 2030. Climate change is a shared global responsibility. All countries should see through the implementation of the Paris Agreement. Although Singapore only contributes 0.11% of global emissions, we will play our part as a responsible member of the international community. We published the Climate Action Plan last year, which details our efforts. One such measure is to work with the industry to improve energy efficiency from the current level of 0.6%, to 1 to 2% annually. This is the annual energy efficiency improvement rates achieved in leading countries like Belgium and the Netherlands.

6. The future economy will be one centred on low-carbon and energy-efficient growth. Companies can no longer afford to adopt a business-as-usual approach to remain competitive internationally. Let me share what we have done.

7. First, Singapore will introduce a carbon tax from 2019 to create a price signal for companies to reduce emissions. The revenue collected from the carbon tax will go into supporting initiatives to improve industry energy efficiency. Instead of shying away from this transition towards a carbon-constrained world, I urge companies to start thinking of what it means for their business and to adopt measures to stay ahead of the curve.

8. Second, Singapore has invested heavily in clean energy. In fact, clean energy is a key focus area for urban solutions and part of our national sustainability efforts. Among the various renewable energy options, solar energy currently has the greatest potential for wider deployment in Singapore. The Government has implemented the SolarNova programme to accelerate solar growth locally and to aggregate solar demand across various agencies. With our limited land area, we will be deploying floating solar panels on reservoirs to further increase our solar capacity.

9 Third, research is a key aspect in the development of Singapore's clean energy sector. Our research centres, such as the Solar Energy Research Institute of Singapore (SERIS) and the Energy Research Institute at NTU (ERI@N), are collaborating with industry to support efforts towards large-scale deployment of solar systems.

10. With the combined efforts in improving energy efficiency, reducing emissions and research into renewable energy, Singapore is on track to meet our commitment under the Paris Agreement.

## **PARTNERSHIPS AND SINGAPORE'S SUSTAINABLE DEVELOPMENT APPROACH**

11. These efforts towards sustainable development require the support and collaboration of all stakeholders. Partnerships are critical. The 3P or people, private and public sectors have to play their part in encouraging the adoption of sustainable practices, as well as making informed purchasing decisions. In particular, businesses play a key role in the mitigation of global warming, through decisions to invest in research, and implementing new energy technologies and energy efficiency measures.

12. Last week, Singtel Group became the first company in Asia, not including Japan, to have its carbon reduction targets approved by the Science Based Targets initiative. This is a collaboration between CDP, World Resources Institute, World Wide Fund for Nature (WWF) and the United Nations Global Compact. Their target is an ambitious one especially when factoring in the expected increase in energy consumption as Singtel expands its network. Singtel Group has also endorsed the new reporting recommendations made by the international Task Force for Climate-related Financial Disclosures on climate change risk in June this year. I applaud Singtel for taking the lead in corporate responsibility and ask that more companies, big and small, undertake efforts to study and publish their carbon footprint. Being transparent is the first and crucial step to reducing carbon emissions. We also encourage companies to undertake efforts to build operational resilience in the face of climate change. These measures do not necessarily result in a trade-off with the bottom line. On the contrary, we have seen examples where such decisions help businesses stay sustainable and profitable as the world transits to a low-carbon economy.

13 On the global front, Singapore works closely with international partners to exchange knowledge on climate change and green growth. We are also working with other countries to help build their capacity. Under our Singapore Cooperation Programme, more than 112,000 officials from developing countries have visited Singapore to study key areas such as sustainable development, urban planning, and water management to date. Singapore further joined the NDC Partnership in June, and will also join the Ministerial Declaration of Carbon Markets. International market mechanisms will play an important role in

facilitating enhanced delivery of mitigation contributions under the Paris Agreement.

## **CONCLUSION**

14 In conclusion, governments, businesses and civil society must work together to achieve the SDGs, so as to realise significant and lasting climate action. I encourage all of you to take the opportunity at this Forum to think about how your initiatives can help to accelerate action on sustainable development. I hope that you will learn from each other, and explore opportunities for further collaboration. I wish you a fruitful discussion. Thank you.

Mr President of UN Environment Assembly Edgar Gutierrez,

Excellencies and distinguished delegates,

## INTRODUCTION

1 As a densely populated city state, Singapore, from its early days, has had to grapple with the challenges of balancing economic development with preserving a clean, green and liveable environment.

2 Pragmatic policymaking based on sound economic principles and science, a focus on long-term planning, and the ability to mobilise popular support have been crucial in Singapore's sustainability journey. Such an approach is no less relevant today as we tackle pressing environmental challenges such as climate change and pollution.

## SINGAPORE'S APPROACH TO SUSTAINABLE DEVELOPMENT

3 This year is the 40th anniversary of the cleaning up of the Singapore River, a herculean endeavour that aptly reflects our approach to sustainable development. In the 1970s, the Singapore River was terribly polluted and was literally an open sewer. As part of a long-term plan to meet burgeoning water needs, we worked hard over a decade to clean up the catchment area of the Singapore River, resettling thousands of farms, factories and street hawkers. The support and involvement of the people of Singapore were crucial. Today, the Singapore River has been radically transformed. It is clean and beautiful – a place for recreation, and a source of drinking water.

4 Sound policy-making, long-term thinking and the mobilisation of broad support are just as relevant today.

5 For example, to tackle air pollution, Singapore has steadily enhanced our air quality standards for industry and transport over the years, taking into account economic and health studies on the impact of air pollution.

6 On this evidence, we have crafted policies to justify incentives to encourage the early replacement of older and more pollutive diesel commercial vehicles with new models that meet Euro 6 standards. We have also imposed a volumetric diesel tax.

7 Over the long-term, these policies bring benefits in improved air quality. This in turn gives better health for our citizens and sustains a liveable environment for our people. They also discourage the use of fossil fuels and help fight climate change.

## TACKLING ENVIRONMENTAL ISSUES THROUGH NATIONAL AND GLOBAL ACTION

8 Mr President, national efforts to address pollution are critical, but they are insufficient. Pollution is also a regional and international issue that requires multi-lateral action. As countries work together to address environmental problems, we similarly need to apply the principles of sound policy-making, long-term thinking and mobilising broad support

## ENSURING CLEAN AIR

9 Let's take air pollution. Under the Association of Southeast Asian Nations (ASEAN) Agreement on Transboundary Haze Pollution, ASEAN members have been working together to prevent, monitor and mitigate haze. All ASEAN members have ratified the ASEAN Agreement on Transboundary Haze Pollution. The successful implementation of this agreement will go a long way towards achieving a haze-free ASEAN by 2020. This has also sent a strong signal to agro-companies to adopt sustainable practices. The regional and world communities do not condone forest burning to clear them for agriculture.

## ENSURING CLEAN OCEANS

10 Second, ensuring clean seas and oceans is another area where national policy intersects with international efforts. Singapore has a direct interest in keeping our waterways clean, because we collect and treat every drop of water, both used water and stormwater, for potable use. To address sea-based marine pollution, we have rolled out initiatives on clean and green shipping, some of which go beyond the standards set by the International Maritime Organisatio

11 Third, we ensure that our solid waste is well managed within our shores and not dumped into the sea. We have done this well; but we do not stand still because we strive to become a Zero Waste Nation. Technology will play a big role and we will invest in R&D to achieve this. We will also involve our citizens and industries to play their part to reduce waste in the first place and separate waste properly to maximise resource recovery. Ultimately, very little should go to the landfill, and nothing to pollute the sea.

## ADDRESSING CLIMATE CHANGE AND POLLUTION

12 Mr President, climate change is closely interlinked with pollution. Our policies should also aim to reduce greenhouse gas emissions and achieve them together. As nations come together to address climate change, part of this lies in how we also address pollution.

13 Our policies should also aim to reduce greenhouse gas emissions as we try to tackle pollution from gas emitters. In Singapore, for instance, we not only adopt policies to promote cleaner and greener transport, but have also announced a freeze on private transport growth while growing public transport options. Such policies will preserve the environment and fight climate change at the same time.

14 Singapore will also be introducing a carbon tax in 2019 to send an economy-wide price signal to encourage emissions reductions and the adoption of low-carbon technologies. It will complement our wide-ranging climate mitigation measures to achieve our pledge under the Paris Agreement on Climate Change. We know that as companies adopt energy-efficient alternatives to reduce their carbon footprint to avoid this tax, they will inevitably also reduce emission of other pollutive substances.

15 Ultimately, change comes from each citizen being aware and inspired to care for the environment. That is why Singapore is designating 2018 as the Year of Climate Action, when we rally the whole nation to come together to do our part for the environment and our climate.

#### MOBILISING BROAD SUPPORT

16 Mr President, beyond strengthening co-operation between countries, international bodies like UN Environment also play an important role in mobilising support from all stakeholders, including the citizens of each country.

17 Government efforts alone are not enough. We need the support of citizens and businesses for sound environmental policies that bring long-term benefits but require near-term adjustments on their part. Hence, I am glad to see many more ground-up initiatives in Singapore to promote sustainability and fight climate change.

18 Civil society groups such as Singapore Youth for Climate Action, #LepakinSG, PM Haze, Plastic Lite, Zero-Waste SG, WWF-Singapore, Forum for the Future, and Save that Pen are encouraging Singaporeans to shop sustainably. Plastic-Lite Singapore has initiatives to reduce the use of single-use plastics. Such ground-up efforts are bearing fruit as companies respond to consumer demand, for example, by getting their products certified for sustainability. Businesses in Singapore are also joining the fight against climate change and pollution. For example, the Singtel Group, a major Singaporean telecommunications company, has pledged to cut greenhouse gas emissions across its Singapore and Australian operations. Siloso Beach Resort has pledged to procure sustainable palm oil and use environmentally-friendly toiletries. Other companies that have pledged effort to reduce pollution, including carbon emissions, are City Development Limited, and Swire Pacific Offshore. The efforts by our civil society groups and companies are highlighted in the voluntary commitments that they have submitted.

## CONCLUSION

19 Mr President, let me end by returning to the story of the Singapore River. The restoration of the Singapore River is testament that with vision, determination and unity, we can take concrete steps towards a pollution-free planet. Singapore stands ready to contribute. Thank you, Mr President.

Ladies and Gentlemen,

A very good afternoon to everyone.

1 I am pleased to join you today at the launch of the Environmental Services Industry Transformation Map.

### **Environmental Services Today**

2 We enjoy a clean and green environment today. We step out of our homes onto cleanly swept streets, and head to the office where our work spaces are kept equally clean. Take your disposed leftovers from dinner last night for example. Early this morning, a cleaner would have wheeled it from the base of your apartment block to the nearby bin centre. By dinner tonight, a waste collection truck would have taken your leftovers to an incineration plant in Tuas. Many of us take these services for granted. TODAY Online recently published a feature on waste collectors Amran Chedaud, Jumahat Yusuf, Sairon Runa and Tan Beng Hoe from Veolia Singapore. They won the Gold and Bronze awards at last month's WMRAS (Waste Management and Recycling Association of Singapore) Excellence Awards which recognises the contributions of frontline workers. We thank these unsung heroes for keeping Singapore clean. Even as we sleep, they work tirelessly behind the scenes to clean our surroundings and remove the waste we generate. This is typical of our environmental services industry today – manual and labour intensive.

### **Development of Environmental Services ITM**

3 However, the Environmental Services industry cannot continue to operate in the current way as our manpower shrinks due to an ageing workforce. Nor can we expect more foreign workforce to make up for the shortfall. Hence, we must transform our industry and the workforce for the future.

4 This is why my Ministry has been working closely with the industry, unions and other stakeholders to develop the Environmental Services Industry Transformation Map, or ES ITM. This is one of four ITMs in the Built Environment cluster. The ES ITM outlines the plans to keep the industry competitive and attractive. It focuses on improving productivity and growing good jobs in these sectors through the adoption of technology and innovative solutions.

### **Environmental Services of Tomorrow**

#### *Driving innovation and encouraging technology adoption*

5 I will highlight the three thrusts under the ES ITM. First – driving innovation and encouraging technology adoption, as part of our Zero Waste vision. Waste should not be seen as something to be disposed of and incinerated, but as a valuable resource that can be mined and re-used. Our efforts towards a Zero Waste vision are positive steps to reduce carbon footprint as we head toward the year of Climate Action in 2018.

6 I earlier mentioned how cleaning and waste collection are mostly done today. Let me cite an example of how technology can transform the way our industry works. In Stockholm, some districts are equipped with Pneumatic Waste Conveyance Systems or PWCS, which we are progressively implementing here. In such districts, bagged rubbish is transported through sealed underground suction pipes to a central station, where a collection truck hauls it away in a fully enclosed container, when the sensors there indicate that the container is full. Because the pipes and container are enclosed, smell and pest nuisance is eliminated, ensuring a clean and hygienic environment for residents and the workers.

7 Street cleaners would no longer need to manually collect rubbish from the litter bins. At residential estates, instead of five workers wheeling the bins from the refuse chutes in each block to their respective bin centres, we require only one truck driver to pick up the waste container now. This shows how technology has significantly reduced manual handling of waste and improved the working conditions that may allow us to reduce our reliance on foreign manpower, and cleaning jobs become better jobs.

8 The use of technology does not stop at the waste collection stage. The recyclables collected are brought to materials recovery facilities which can potentially use robots to sort the different types of materials such as aluminium cans and paper. It also uses near-infrared optical sorting technology to sort plastics into different categories for recycling.

9 Automation can make the work easier; robots can perform routine, repetitive, or unpleasant tasks; data analytics can optimise the deployment of limited resources – all these will enable the industry to be smarter and better in its service delivery. For example, Changi Airport has already deployed autonomous floor cleaning robots that work alongside the cleaning crew.

10 In the near future, we can see autonomous cleaning equipment having the capability to “talk” with one other and take the lift to other floors to perform indoor cleaning operations more independently. This will free up their human co-workers’ time to focus on higher value work such as equipment fleet management and maintenance, or customer service. NEA is looking at more autonomous solutions. Later this week, NEA, together with the Ministry of Transport, will be putting out a Request-for-Proposal for the design and development of Autonomous Environmental Service Vehicles for street cleaning.

11 The Letter of Intent (LOI) signing ceremony that will take place later will provide more space for ideas to be tested in a real world context. Seven Innovating and Curating Better Automation and Technologies for Environmental Services partners – in short INCUBATE partners – will kick-start a series of trials at their premises over the next few years. This LOI embodies the partnership between technology providers, service providers, premises owners, and the Government, to develop capabilities and deliver innovative environmental services. It will also pave the way for local companies to export their technologies and expertise to cities facing similar challenges as ours. Some companies have already done so. An example is Biomax, a local SME. The company, which develops and produces proprietary enzymes and on-site organic waste digester systems, has successfully exported their solutions to countries such as Australia, New Zealand and even Kenya.

### ***Upskilling The Workforce To Take On Better Jobs***

12 The second thrust of the ITM is upskilling the workforce to take on better jobs. Jobs cannot stay the same. The future of delivering environmental services via system-level infrastructure like PWCS and autonomous machines is one that calls for new skills sets. These include process improvement and optimisation, robotics and automation, and data and statistical analytics.

13 I am pleased to launch the Skills Framework for Environmental Services. The framework is developed by SkillsFuture Singapore, Workforce Singapore and NEA together with industry stakeholders. Jobseekers can refer to this resource for the existing and emerging skills required for each of the occupations listed in the five career pathways. Employers can also reference the Skills Framework to map out clear career progression plans and training for their employees. It can also help education and training institutes develop training programmes that address the needs of the industry even as it transforms.

14 At the green jobs symposium organised by Young NTUC last month, I was pleased that 170 participants turned up to find out more about the green jobs available. Many were graduating students from tertiary institutions and young working adults looking for a career change. The strong attendance at the event indicates the strong interest in green jobs among our youth. The unions, industry associations, institutes of higher learning and government agencies are working closely together to roll out more career placement programmes such as the SkillsFuture Earn and Learn and Professional Conversion Programmes to attract young entrants and mid-career switchers to the ES industry. Young NTUC is planning for another employment and employability symposium in the next few months.

### ***Improving Productivity Through Better Procurement Practices***

15 The third thrust of the ES ITM is improving productivity through better procurement practices. Service buyers also play a key role in helping the environmental services industry become smarter. We need to push for outcome-based contracting based on wider technology adoption to improve productivity in the cleaning sector. NEA, together with the facilities management associations, trade associations and the union, will roll out training workshops and learning journeys to service buyers and providers to help them make the shift in industry procurement practices so as to support more manpower-efficient work processes.

16 With the implementation of these three key thrusts of the ES ITM, we can expect some 30,000 individuals, in the environmental services industry to benefit from the upskilling opportunities and companies adopting technology by 2025.

### **A Collective Effort**

17 All stakeholders need to work hand-in-hand on this exciting journey to transform the environmental services landscape. At the same time, all of us living in Singapore also have to take personal responsibility for the environment we live in, to ensure a clean and sustainable Singapore.

18 In short – Stronger Businesses, Better Jobs, and a Clean and Sustainable Singapore! Thank you.

Excellencies,

Distinguished Delegates,

## **Introduction**

Singapore is a small island city state with little natural water resources. Hence, over the past 50 years since independence, we have worked relentlessly to build and strengthen our water security. Beyond specific policy measures, what has driven and sustained our efforts is a national consciousness of water that we have developed over time.

## **National Consciousness of Water**

2 This heightened awareness of water is something that many Singaporeans have. We know that a consistent and clean supply of water does not come easy and cannot be taken for granted. Hence, from our early days, we embarked on long-term planning for our water supply while not losing sight of the need for demand management. Today, we have diversified water sources - our Four National Taps, which not only meet our current needs, but also help us stay resilient in the face of climate change.

3 Our First Tap is water from local catchments. We started with three reservoirs in the 1960s, and now have seventeen, despite having limited land. Two-thirds of our land surface is water catchment, and we intend to continue expanding it. Our Second Tap is imported water from Malaysia. Our agreement with Malaysia, expiring in 2061, allows us the right to draw up to 250 million imperial gallons a day, from the Johor River in Malaysia.

4 However, these two Taps are susceptible to the vagaries of weather. This led to us developing our weather-resilient sources, our Third and Fourth Taps. Our Third Tap, NEWater, is Singapore's own brand of ultra-clean, high grade reclaimed water. NEWater allows Singapore to close the water loop, and re-use our precious water. Currently, our five existing NEWater factories can meet up to 40% of our water demand. In 2027, this supply will increase with the completion of the Tuas NEWater Factory.

5 Our Fourth Tap is desalinated water, a natural option for a country surrounded by seawater. Our two existing desalination plants can meet up to 25% of our water demand, and we will have another three by 2020.

6 Despite all these efforts, Singapore remains a water-stressed nation, and also has to contend with the looming threats of climate change. We have thus declared 2018 as Singapore's Year for Climate Action. As we rely more on desalination and water reclamation which are energy-intensive, we are actively pursuing R&D into technologies such as electro-deionisation and biomimicry to significantly cut down on energy needs and reduce our carbon footprint.

7 A robust and sustainable water supply is essential, but equally important is demand management. Schools help to develop conservation habits in our young. Regulatory measures such as the Water Efficiency Labelling Scheme enable consumers to choose water-efficient fittings and appliances and have reaped dividends. Households are using less water compared to the past, and we hope to lower per capita consumption to 140 litres a day by 2030. Industries are also major water users and we work closely with them to develop Water Efficiency Management Plans to help them better understand and manage their water consumption.

8 But we do not stop here. Our Active, Beautiful, and Clean (or ABC) Waters programme not only integrates our green and blue spaces, but more importantly, brings people closer to water, so that they learn to value and conserve it.

## **Strengthening Regional Collaborations**

9 We cannot do all these alone. We had benefitted from technical assistance and cooperation from the World Bank and UN agencies when we were a fledgling nation. So, we recognise the importance of collaboration and of platforms such as this Asia Pacific Water Summit. To give back to the international

community, we started the Singapore Cooperation Programme (SCP) way back in 1992. Through the SCP, we have promoted the exchange of know-how in water and environmental technologies.

10 We also hold the Singapore International Water Week (SIWW) biennially. This allows water leaders to co-create innovative solutions, share best practices and showcase latest technologies. SIWW will be held from 8 to 12 July next year and I hope to see you there. The Singapore Water Academy was launched in July 2016 to provide local as well as international practitioners a platform to enhance their urban water management capabilities.

### **Conclusion**

11 In closing, let me assure you that Singapore stands ready to contribute to these discussions here, as well as to the vision of enhancing water security in the Asia Pacific region. Thank you and have a most fruitful conference ahead.

Ms Isabella Loh, Chairman of Singapore Environment Council (SEC),

Distinguished Guests,

Ladies and Gentlemen,

A very good afternoon to everyone. I am pleased to join you at today's inaugural SEC Eco-Certifications Appreciation Lunch.

2. The eco-certifications for Eco Office, Eco Shop and Eco F&B, are indication of your commitment towards sustainability. With your continued dedication and environmental stewardship, Singapore can fulfil the goals in the Sustainable Singapore Blueprint (or SSB), and the United Nation's 2030 Sustainable Development Goals.

### **CHALLENGES OF CLIMATE CHANGE**

3. As a small island city-state, Singapore is vulnerable to the effects of climate change. Last year was the warmest year on record globally and in Singapore. Rising sea levels and intense rainfalls will have real and far-reaching implications. It is important that businesses consider the impact of climate change on their operations and supply chains as well as develop measures to reduce their carbon footprint.

4. Under the 2015 Paris Agreement, Singapore had committed to reduce our emissions intensity by 36% from 2005 levels, and stabilise our emissions with the aim of peaking around 2030. We have designated 2018 as Singapore's Year of Climate Action to bring about greater awareness of climate change, as well as to encourage individuals, communities and businesses to take action to mitigate climate change.

5. The Government unveiled the Climate Action Plan last year. This plan details our plans to adapt and mitigate the effect of climate change, improve energy and carbon efficiency, and encourage collective climate action.

6. The government will be enhancing the Energy Conservation Act to ensure companies undertake regular energy efficiency opportunity assessments and introduce minimum energy performance standards for common industrial equipment and systems. We will also be introducing a carbon tax in 2019 to encourage larger emitters to reduce emissions and stimulate investments in clean, low-carbon technologies and market innovation.

7. We hope to encourage more companies to adopt best-in-class sustainability practices and be well-prepared for a low-carbon future.

### **SEC'S SINGAPORE GREEN LABELLING SCHEME (SGLS)**

8. One area where businesses can do their part to mitigate the effect of climate change is by embracing eco-labelling programmes. The SEC's Singapore Green Labelling Scheme (or SGLS) allows consumers to choose eco-friendly products that are marked with the green leaf logo of the SGLS.

9. This January, SEC launched the enhanced SGLS for pulp and paper products, which requires companies to meet stricter environmental standards. Companies are required to map areas of high fire risk and invest in daily hotspot monitoring, training and firefighting equipment. They are also required to protect the biodiversity of peatlands through proper assessment and water management. This helps the peatlands to be restored to their saturated state which will lower the risk of fire substantially. This in turn leads to significant reduction in carbon footprint by companies as forest fires emit large amount of greenhouse gas, apart from causing haze pollution.

10. I am happy that the enhanced labelling programme has made significant progress. SEC will be awarding Kimberly Clark with the enhanced SGLS certification, the first company to receive it. I would like to congratulate Kimberly Clark and encourage other pulp and paper companies to get on board the enhanced SGLS programme. I would also like to encourage consumers to continue to procure eco-friendly products

certified under this enhanced labelling programme. This ensures that the products we buy come from sustainable sources and are not contributing to climate change.

## **ACTIONS TO MITIGATE THE EFFECT OF CLIMATE CHANGE**

11. Companies can also play their part to reduce carbon footprint by assessing their current waste management practices and identify opportunities to Reduce, Reuse and Recycle waste materials. In fact, someone told me during my recent trip to Nairobi for the United Nations Environment Assembly, that “there is no such thing as waste, until it is wasted”, and I completely agree. By adopting the 3Rs, businesses can save costs. With less energy used in producing more materials, less carbon dioxide is released. This will help mitigate climate change and moves us closer to achieving our Zero Waste vision.

12. Companies can also choose to use energy and water efficient equipment. They could choose air-conditioners that have the highest ticks under the NEA’s Mandatory Energy Labelling System (MELS) and waterless urinals or dual-flash low capacity flushing cisterns that perform best under PUB’s Water Efficiency Labelling Scheme (WELS).

13. was told that Courts Orchard organised a Green Christmas campaign last week to encourage customers to make environmentally-friendly choices during their Christmas shopping by buying MELS and WELS products. This was Court’s initiative to support the Sustainable Singapore Movement. 5% of the proceeds from this campaign were donated to Habitat for Humanity Singapore. I commend Courts for driving sustainability with a social cause.

14. I also like to encourage companies to start promoting carbon-reduction programmes to schools and communities to bring about greater awareness of climate change, and to encourage them to take climate action. For example, Sembcorp Marine has been organising the Green Wave Environmental Care Project for schools for the past 15 years to get students to be responsible for the environment and take action to mitigate the effects of climate change.

## **GREEN GOES DIGITAL**

15. One of the SSB pillars is the goal of achieving “Eco-Smart” Endearing Towns. Singapore is embedding more smart technologies and eco-friendly features into our towns and homes. We can become a ‘Smart Green Nation’ by building on the technological edge our nation enjoys.

16. I am pleased that SEC is launching its new SEC Green Map App. This digital SEC Green Map will provide a convenient, one-stop green platform for Singaporeans. Think about having a mobile application that indicates the location of the nearest recycling point and details of upcoming green activities, such as beach clean-ups and car-free events. Businesses will showcase their eco-friendly products and encourage consumers to live and buy green products. Communities will engage residents by hosting regular green events and share it via the application. By the second half of 2018, the app will also be enhanced to include a carbon calculator for individuals to track and calculate their carbon footprint on a daily basis.

17. I encourage all consumers, businesses and communities to leverage this platform to conserve our precious resources, and champion a sustainable way of life. With greater usage of the SEC Green Map, the App will evolve and have more functions and capabilities that provide an even better user experience in future.

## **CONCLUSION**

18. I would like to thank all the companies which have taken the initiative to embrace greener business practices. To all eco-certified organisations, congratulations on a job well done and I hope that you can continue to play an active role in Singapore’s climate action journey.

19. Thank you, and I wish you all a pleasant afternoon.

Mr Yeo Li Pheow

Principal/ CEO

Republic Polytechnic

Ms Isabella Loh

Chairman and Board Director,

Singapore Environment Council

Ms Melissa Tan

Chairman, Waste Management & Recycling Association of Singapore

Distinguished Guests

Ladies and Gentlemen

1 Good afternoon. I am glad to be here for Republic Polytechnic's official launch of the SkillsFuture Earn and Learn Programme in Environmental Services and Management, as well as its eco-friendly rain garden.

2 These initiatives are timely. Given the serious impacts of climate change, it is imperative that the world takes action now. Singapore has designated 2018 the Year for Climate Action. We want to raise the level of national consciousness around the need to take individual and collective action to fight climate change.

### **The Environmental Services and Waste Management Sector**

3 For Singapore, our vision is to be a climate-resilient global city that is well positioned for green growth. Reducing waste is one key aspect of realising this. Around the world, waste generation rates are rising. Increasing urbanisation,

population growth and growing affluence bring about higher consumption and more waste. In 2016, Singapore generated about 7.8 million tonnes of waste, a seven-fold increase from 40 years ago. If waste continues to increase at the current rate, our only landfill at Pulau Semakau will be completely filled in less than 20 years.

4 This is why Singapore is working towards a Zero Waste Nation, as reducing waste is an important aspect of climate mitigation. Our strategy is to reduce waste generation in the first place, re-use and recycle more, and enable useful resources to be mined from waste. To do this, we will need a forward-looking environmental services industry, which as of 2016 comprises a workforce of more than 78,000 individuals and 1,700 companies in the cleaning and waste management sectors. As we increasingly face manpower constraints due to low birth rates and an ageing workforce, it is even more critical to ensure that the sector is progressive, competent and productive.

5 The Environmental Services Industry Transformation Map, or the ES ITM in short, was launched last month to meet this challenge. The ITM outlines a suite of initiatives to systematically drive wider adoption of technology and innovation, raise productivity, upskill the workforce and promote internationalisation for the environmental services industry – an industry which is estimated to contribute about 0.5% to Singapore’s Gross Domestic Product (GDP). With the implementation of these strategies and initiatives, about 30,000 individuals in the environmental services industry will benefit from higher value-added jobs through upskilling and technology adoption by companies by 2025. Indeed, transforming the environmental services industry is necessary to promote growth and competitiveness across the economy and create good jobs for Singaporeans.

### **Aligning Workforce Training and Education with National Goals**

6 The Government cannot do this alone. A true industry transformation requires deep partnerships between companies, education and training providers, unions and the Government. I am glad that many industry partners are with us in this journey.

7 I am heartened that Republic Polytechnic is rolling out its SkillsFuture Earn and Learn Programme leading to a part-time Diploma in Applied Science (Environmental Services and Management). This programme is aligned to one of the initiatives of the ES ITM to provide an opportunity for fresh students and employees in the industry who are looking towards upskilling themselves to take on higher value jobs created as a result of the transformation of the ES industry. To date, a total of 62 Earn and Learn Programmes have been developed and more than 1,200 trainees have participated in the training.

8 Some of you here today will eventually enter the green industry to take on executive officer roles or management functions, such as Environment, Health and Safety Specialists or Facilities Managers. Your work in this sector will be meaningful and exciting because climate change is our reality, and you will be called upon to play a role in co-creating innovative solutions to address the challenge. The green industry is not just an important vertical sector, but also an enabler to support other critical sectors in Singapore. Waste management and cleaning are no longer just about ensuring good hygiene and public sanitation – it is a vibrant industry that is full of potential and promise, with many career opportunities. This programme will help nurture a skilled workforce of environmental professionals that are both competitive and future-ready. I am happy to know that 14 companies have already agreed to be part of the inaugural run which will commence in June this year.

9 As part of the continuous effort to transform the sector, Republic Polytechnic will also work closely with SkillsFuture Singapore and the National Environment Agency to curate modular Continuing Education and Training programmes to meet the emerging skills needs brought about by evolving and new SMART technologies.

### **Official Opening of Republic Polytechnic's Rain Garden**

10 Let me now touch on the blue sector – water. Over a decade ago, PUB launched the Active, Beautiful, Clean Waters (ABC Waters) Programme to transform the utilitarian concrete drains, canals and reservoirs into vibrant, aesthetically pleasing and clean flowing rivers, streams and lakes. With two-thirds of Singapore's land harnessed for water catchment, it is important to ensure that the water that flows over the land and streets into our water bodies is kept clean and of good quality.-

11 I am pleased to see that Republic Polytechnic has embraced the ABC Waters concept and now has a “soakaway” rain garden in its premise. “Soakaway” rain gardens is a product developed by PUB and NUS through a joint R&D project. Unlike conventional rain gardens that have three well-graded soil layers and sub-soil pipes that discharge cleansed water to a nearby drain, “soakaway” rain gardens can be designed with only one filter layer and without the need for subsoil drainage pipes, nor connection to the drainage system. With the treated runoff discharged directly into the surrounding soil, this innovative yet simple design overcomes some of the site constraints faced in conventional rain gardens and promotes community adoption of such “soakaway” designs. Aesthetics and biodiversity of the surrounding area is also enhanced in the process. Drawing from the success of the “soakaway” rain gardens, PUB will be encouraging more schools and developments to include these functional green spaces in our urban environment. To facilitate knowledge sharing, a design guide

on these innovative features will also be added in the ABC Waters Design Guidelines as reference for professionals and industry players.

12 To date, PUB has built “soakaway” rain gardens at ten schools, including Republic Polytechnic. The rain garden at Republic Polytechnic collects stormwater run-off and then passes through the plants and soil layers, which remove the impurities and nutrients. The rain garden serves as an outdoor classroom where students can learn about water and nature in a real-life setting and even conduct onsite water quality testing. It provides an immersive and experiential environment for the younger generation to learn about how they can play a part in keeping our surroundings and water bodies clean.

13 In the past year since its completion, the rain garden’s vegetation such as Singapore Daisy, Pandan and Firecracker plants are flourishing, while the host and nectaring plants enhance the aesthetics of the rain garden and increase the butterfly diversity in the campus. I am told that at least five educational tours have been conducted for schools outside of Republic Polytechnic, including one for preschoolers of Kinderland. I am sure there are more of such tours underway to provide students with such great learning experiences.

## **Conclusion**

14 The SkillsFuture Earn and Learn programme in environmental services and management as well as implementation of a “soakaway” rain garden are excellent examples of how educational institutions, government and industry partners can work together to derive synergies and contribute to the wider national objectives of environmental sustainability. Congratulations to Republic Polytechnic, and thank you for helping to create a liveable and sustainable Singapore.

Ms Low Yen Ling  
Mayor of South West District

Grassroots Leaders  
Distinguished Guests  
Ladies and Gentlemen

A very good morning  
Selamat Pagi  
Vanakkam  
大家早上好！

## INTRODUCTION

Happy New Year one and all! I am happy to join you at ECo Day Out 2018 @ South West! Let me first say a few words in Mandarin before I continue in English.

2

首先，我很高兴的能再一次参与今年的“环保社区在西南”。这是西南社区发展理事会每年举办的活动。这个活动主要的目的是要给大家提供环保的讯息，而且要鼓励大家采取环保精神和活动。

## 2018 YEAR OF CLIMATE ACTION

3

今年，我们将2018年指定为“气候行动年”。这主要理由是因为气候变化是我们这一代人所面对的环境问题。虽然我国未面临天灾，我们也会受到气候变化的影响。研究显示未来的新加坡有可能会经历更严重天气变化以及海平面上升。因此，我们每一个人都要采取行动来应付气候变化，影响自己的未来。

4 Climate change is a serious environmental challenge for all of us. That is why MEWR and NEA has declared 2018 as the year of climate action. Everybody can do their bit to fight climate change. As an island state, Singapore is vulnerable to climate change. For example, we may be subject to higher sea levels in the future. This is something we need to address.

5 All of us can play our part. We can practice the 3Rs – reduce, reuse, recycle. South West district has initiatives which looks at recycling of e-waste, and food waste in school canteens. E-waste and food waste are two of the key waste streams. Every year, each Singaporean generate 11kg of e-waste on average, which is equivalent to the weight of 73 mobile phones. This amounts to more than 60 000 tons of e-waste a year, of which half are from households.

6 We want to increase the recycling rate for e-waste. We can take action by cutting down on the need for electrical appliances, and use energy efficient appliances, which would help towards protecting the environment.

7 Food waste is another issue. As Chinese New Year is coming, we have a tendency to buy more food. However, one out of every four households buy more than they need, which results in a lot of food waste. In 2016, more than 790 000 tons of food was wasted. This is equivalent to every household throwing away a 10kg bag of rice a month on average. When we cut down on food bought, we can not only help to reduce waste, but save money!

8 These are two waste streams we are concerned about. As Mayor Low had said, we are working towards a zero waste nation.

## LOCALISED INITIATIVES TO MITIGATE CLIMATE CHANGE

9 We are thankful to Mayor Low and all the stakeholders for their contribution. Last year, there were a total of 36 000 volunteers, who organised 92 initiatives and reached out to 700 000 residents. For their efforts, the South West District had clinched the Best Community Commitment Award in 2017. Congratulations!

10 As 2018 is the Year of Climate Action, we look forward to working more closely with the South West District, as well as the other CDCs to do more programmes. We need to intensify our outreach and raise awareness about climate action, and encourage everyone to commit to take action against climate change. We look forward to working together on future projects such as roadshows.

## SOUTH WEST SKILLSFUTURE ADVICE & GREEN CAREER ROADSHOW

14 I am also very happy that Mayor Low and her team have organised the SkillsFuture Advice & Green Career Roadshow. This complements the Environmental Services Industry Transformation Map or ESITM that Minister Masagos had launched. The ESITM aims to raise productivity, and value-add to the jobs within the environmental sector. This is important because of urbanisation, our growing population and the need to address climate change.

15 The green sector is a growing sector. We will need more people in this sector, but we are facing manpower constraints. That is the reason we need to upskill everyone and raise productivity. I would like to encourage everyone to find out more at today's roadshow. There are more than 200 vacancies at this roadshow, from Logistics Supervisor to Certified Arborist.

18 In addition, there are courses available, such as the Certification Course for Green Mark Managers offered by BCA Academy and the Diploma in Green Building Energy Management offered by Republic Polytechnic. This is an Earn and Learn programme which may be interesting for the fresh ITE graduates.

## CONCLUSION

19 I would like to emphasise once again that climate change is an existential challenge for all of us. It was reported that with the exception of 2016, which was the El Nino, 2017 was the warmest year on record since the 19th century. In fact, seventeen of the eighteen warmest years have occurred since 2000, confirming a warming trend. To quote Prof Dave Reay, University of Edinburgh, "When even the 'colder' years are rewriting the warmest year record books, we know we have a problem."

20 I encourage everyone to continue with the good work, and help adopt environmentally friendly habits. Everyone can do their part. No effort is too small in terms of contributing towards an environmentally friendly district and a sustainable Singapore.

21 Thank you very much, and I wish everyone a happy, healthy and green new year.

Professor Alan Chan,

Professor Ute Meta Bauer,

Mr Markus Reymann,

Guests and Friends of the NTU Centre for Contemporary Art

Good evening. Let me begin by welcoming all of you to the Year of Climate Action. I just launched the Year of Climate Action this morning with a good company. We expected about 160 people to attend, but this time, ambassadors, corporate chiefs, school principals, academics, NGOs and interest groups turned up by the dozens. More than 200 people turned up. All of them are very passionate and enthusiastic to be part of the action and I look forward to them influencing and inspiring others to take action too.

### **IMPACT OF CLIMATE CHANGE ON SINGAPORE**

2. We also launched the Climate Action Pledge. When I arrived at the ceremony, I was told that there were 140 pledges, by the time I was about to make the speech, there were 180 pledges. By the time I came here, it has reached almost 300 pledges. The momentum is growing. More importantly, more than half of the pledges came from the corporates. Corporations are now beginning to understand that they should pledge to reduce greenhouse gas emissions. They are doing it with hard numbers, because they know that at the end of the day, it is not going to be good for their business, and we will save the planet for the future generation.

3. As we all know, climate change is a key reason for the increasingly erratic weather. It is not supposed to be raining in this time of the month, but it is raining intensely and more frequently. For the last two years, I did not worry too much about rain – I worried more about droughts. We had one of the longest droughts three years in a row, such that our water supply was threatened. The Linggiu reservoir, where our imported water comes from in Johor, went down to 20%. If the drought had continued, we would have run out of imported water from July last year. Fortunately, the weather turned around. Now we have the other extreme; we have frequently intense rain, and there are flash floods in Singapore.

4. For Singapore, climate change means we have to brace ourselves for more droughts on the one hand; and intense rainfall with a higher risk of flash floods on the other. The amount of rainfall we projected would reduce by end of century, but there would be more frequent intense rainfall. It means that we get intense rainfall frequently, but when you add up the rainfall, it would be less than what we had a century ago. This is worrying for us as a low-lying island-state.

5. Climate change is real, and its effects are aggravated by human actions. It might not be as devastating as for our friends in the Caribbean or the Pacific, but it is as disruptive as it can be for our businesses and daily lives.

### **SINGAPORE'S ROLE IN TAKING CLIMATE ACTION**

6. In actual fact, Singapore contributes only 0.11% of global greenhouse gas emissions, but we will do our part as a responsible global citizen to reduce our emissions to fight climate change. Only when everyone puts their skin into the game, every country in the world can hope to reduce emissions. Singapore has committed to reducing our emissions intensity by 36% from 2005 levels by 2030, which is a difficult task. Singapore is also taking climate action towards fulfilling the Sustainable Development Goals (SDGs). In particular, Goal 13, which calls for countries to take urgent action to combat climate change and its impacts.

7. For Singapore, we started on this journey far earlier than others, without realising that we were mitigating the effects of climate change. We treated our sewage water since 1965. In those days, we dumped it into the sea, but we were worried about the sea around us. It was also where fishermen fished and caught the fish we eat. Therefore, we have always treated our sewage water to the highest prevailing standards by WHO, decade after decade. What was surprising to us though, was that because we were treating sewage water before we put it back into the sea, the water was clean enough for us to put it back into our system. Today, about 25-35% of our water supply comes from the water that we recycle. We could do this

because we clean it well enough and now we have science and processes to remove viruses from used water. That water is now back in the reservoir.

8. In engineering terms, this means that if you can take half of what you have used, and put it back into the system, you practically double your supply. By 2030, we have been projected to be one of the most water-stressed countries. We are able to take care of ourselves by closing the water loop. Through our processes, we do not have to use so much energy to supply water, which helps us emit less greenhouse gases. We also believe that the Government cannot do it alone. Unfortunately, in Singapore, the Government has always taken over problems that people cannot solve, and we have solved them. The expectation is that when we have a problem, the question they would ask is: what are you going to do about it? This time round, we are going to ask everyone to do this together. This was why we launched the Year of Climate Action in 2018.

9. We want the people to take small and simple steps that they can understand and contribute to reduce greenhouse gas emissions. Can you use less water when you shower? Can you use less electricity by turning off the lights when not in use? Right now, if we can reduce from using 150 litres of water per person per day, to 140 litres per day, which is about two minutes less of showering time, we can build one less desalination plant. Can we choose products with efficient ratings for water and electrical appliances? Can we look at the labels before we buy the products? Can we buy green products?

### **IMPORTANCE OF CLIMATE CONVERSATIONS**

10. I think it is important for everybody to come on board – artists, academics, film-makers. Do what you can to spread the message that climate change is real, and we better do something about it because sooner, or later, ourselves or our children would suffer the worst of it.

### **CONCLUSION**

11. Let me conclude that we need to work together to ensure that we have an environment that is sustainable for the future. The vision is to build a sustainable Singapore, a liveable city, with good economic climate policies, so that when businesses make their investments to build plants, they would choose Singapore. This is where climate policies are effective.

Thank you.

Your Excellencies,

Mr Sherman Kwek,  
Chief Executive Officer of City Developments Limited

Ladies and Gentlemen,

1. Good morning. We are here today to mark a significant event – the official launch of the Year of Climate Action for Singapore. I am happy to see such a big gathering – from ambassadors to corporate chiefs, trade association representatives, school principals, NGOs and the media.

#### **WHY YEAR OF CLIMATE ACTION?**

2. Why did Singapore designate 2018 our Year of Climate Action? Climate change is an important issue affecting Singapore and the international community. Our world is warming at an unprecedented rate, caused by the excessive emission of greenhouse gases, in particular, carbon dioxide, primarily from the burning of fossil fuels. Climate change poses an existential threat. The impact of rising sea levels, and weather extremes such as droughts and flash floods caused by intense rainfall, can have devastating consequences for lives and livelihoods. Singapore is already feeling the impact. 2017 was our warmest year on record that was not influenced by an El Niño event.

3. Consciously or otherwise, our journey to fight climate change is well embedded throughout our development policies: in our care for the environment, greening, public transport and even by putting funds to half the energy needed to produce desalinated water.

4. We feel however, it is as important to raise the level of national consciousness around the need to take individual and collective action to fight climate change for a sustainable Singapore. Because the government cannot do it alone. This is a year when we will join forces with all of you here, plus many other parties across Singapore and beyond, to rally everybody to take action to reduce our carbon footprint and fight climate change. Our vision is to ensure Singapore's sustainability and make Singapore the best liveable city for our citizens and visitors.

5. Recently, UN Secretary-General Antonio Guterres identified the fight against climate change as one of the top priorities for the UN and international community. And next year, the UN Sec-Gen is convening a climate summit to mobilise the international community for more ambitious emissions reductions and climate change adaptation. We welcome the Secretary-General's commitment to the global fight against climate change.

6. Internationally, there is an urgent need for all countries to work together to fulfil the goals and commitments of the Paris Agreement. Although Singapore contributes a minuscule percent, we will do our part as a responsible global citizen to reduce our carbon emissions. Our Climate Action Year also supports the 2030 Development Agenda, and we are working with countries around the world to build capacity and help them achieve the Sustainable Development Goals (SDGs). In fact, SDG 13 calls for urgent climate action to combat climate change and its impacts. Taking climate action as part of the international community's concerted effort to fight global warming is both our moral obligation and commitment to ensure that future generations can inherit a sustainable planet.

#### **TAKING CLIMATE ACTION**

7. Singapore has long-term plans to adapt to and mitigate the impact of climate change. We are strengthening our resilience and adaptive capacity, and integrating climate change measures into our policies, strategies and planning. These include significant investments in infrastructure, such as raising the height of coastal roads, building seawalls, widening drains and erecting flood barriers.

8. Even if we had done much in the past to build a sustainable Singapore, we will do even more. We have invested in solar energy. We continue to encourage green buildings with more stringent standards. We have frozen the growth of the car population and expanded public transport. We are funding R&D for low carbon technology. This year, we will be passing legislation to introduce a carbon tax from 2019. The carbon tax is part of our wide-ranging suite of climate mitigation measures. It will provide the price signal to catalyse economy-wide behavioural changes to prepare our businesses to be more energy and carbon efficient. This will help enhance the competitiveness of our industries, and transition our economy to a low-carbon future. Not only do we want to make Singapore the best liveable city, we also want Singapore to remain the best choice when companies decide where to place their business because of our successful climate action policy and active citizenry.

#### **INITIATIVES FROM 3P PARTNERS**

9. At the same time, we should focus on what the individual, the organisation and the community can do. Everyone has a part to play. Many of you have come forward to express your strong support for the Year of Climate Action and what you plan to do. Let me share a few examples.

10. CDL recently launched a sustainability blueprint – ‘CDL Future Value 2030’, which sets out key climate action goals and targets contributing to more than half of the Sustainable Development Goals or SDGs. CDL also worked with DBS to launch its ‘Green Bond’, connecting green building with sustainable financing.

11. Global Compact Network Singapore (GCNS), the sustainability arm of the Singapore Business Federation (SBF), is helping the business community, particularly SMEs, to take action to be more climate friendly and environmentally responsible. It is developing a “Climate and Business 101” seminar to help companies build capacity to manage their resources more efficiently, and champion climate action in their operations. I believe SMEs will find it beneficial to learn how to invest in green business practices and ready themselves for a low carbon future economy.

12. Sembcorp Industries is developing a carbon emissions intensity reduction target, which will focus on ambitious plans to reduce emissions intensity, and manage the impact of its businesses on the environment. This includes having a diversified energy generation portfolio of thermal and renewable energy assets.

13. SingTel has clear carbon reduction targets and is committed to transparent disclosure of its climate-related risks. It has partnered SingPost to add more options for a nationwide electronic waste

recycling programme. The public may dispose of their e-waste at ReCYCLE bins or by mailing them through any post box, with waiver of postage cost.

14. Schools have always been passionate champions for climate action. Youths and children readily embrace the call to action because they see the impact of global warming to the environment and damage to wildlife. Anchor Green Primary School has been infusing climate action content in its school curriculum and website. They also have a long-term partnership with IKEA Tampines to campaign for a sustainable living environment; projects include converting recycled fabric into bookmarks which are sold to help needy pupils. Jurong Junior College will be organising the Love Fiesta 2018 where students will act as environmental ambassadors to encourage the schools and community in the Jurong district to adopt green practices.

15. I will be visiting Bukit View Secondary School to see their JOULES (Junior OUstanding Leaders in Energy for Sustainability) Smart Centre. This is a learning platform showcasing and educating students on the functionalities of green products contributed by companies. Students have this innovative green space to get inspiration for design and project work.

16. The Singapore Youth for Climate Action (SYCA) members produced a new year video to energise the ground on climate action and organised a forum discussion with the green groups in Singapore to synergise their climate action efforts. An idea that came out from the discussion was People's Movement to Stop Haze (PM.Haze)'s initiative of a "Social Change Toolkit" which aims to empower advocates to address underlying systemic causes of climate change and to drive individuals towards a more sustainable Singapore.

17. Individuals are playing their part for climate action too. Ms Pamela Low, from the SYCA, started a project, Tingkat Heroes, to encourage schools and youths to go disposables-free and tackle food waste.

18. I hope to see more of such ground-up initiatives throughout this year and beyond.

### **SPECIAL ASEAN MINISTERIAL MEETING ON CLIMATE CHANGE**

19. As the ASEAN Chair this year, we look forward to leading discussions on climate action. We intend to raise awareness on the need for climate action at several key events. In July, we will organise the Singapore International Water Week, CleanEnviro Summit Singapore, World Cities Summit, and the Partners for the Environment forum, a week-long event to drive the conversation on sustainable development. In conjunction with this, Singapore will host a Special ASEAN Ministerial Meeting on Climate Change on 10<sup>th</sup> July. This will be an important meeting for ASEAN to show leadership on climate action. We will also hold a back-to-back expanded meeting between ASEAN and Ministers from China, Japan, ROK and the UNFCCC COP current President and President-designate Fiji and Poland. It will send a strong signal internationally that we in Asia remain fully committed to the Paris Agreement and will take collective action to tackle climate change.

### **LAUNCH OF CLIMATE ACTION PLEDGE & LOGO**

20. To signify the official beginning of our rallying together for climate action, I am happy to launch the Climate Action Pledge. By making a pledge, we make a public declaration of our readiness to take climate action and be counted as a positive influence to inspire others to do likewise.

21. We have received more than 200 pledges from individuals and organisations to date. I want to encourage everyone here to make a pledge, if you have not already done so. It is a good positive action and will help us push forward collectively during this Year of Climate Action.

22. We have set up a new [Climate Action SG blog](#) to keep the public up-to-date on all climate-related matters in Singapore. This blog will be a community-run effort and I hope all of you can contribute and share your climate action stories, articles, events and photos with us on this site.

23. I also encourage all of you to use the Climate Action Logo to brand your sustainability activities and events. The “red dot” in the logo references Singapore as a small country amongst the global family of nations; while the iconic Singapore skyline forms a strong base, and shows that everyone has a part to play in Climate Action. Taking climate action will help to preserve a Sustainable Singapore. Please use the hashtag #ClimateActionSG for your social media posts – to help raise awareness on this call to action.

### **CONCLUSION**

24. Let me conclude by sharing a story with you. There was a king who loved the game of chess so much that he granted its inventor any reward he desired. The inventor requested for rice, for the king to place one grain on the first square of a chessboard, double the amount on the second square, and so on, with each square containing double the amount of rice on the previous square until all 64 squares on the chessboard was filled. Thinking that it would just be a small amount, the king agreed. As we all can guess, the amount of rice added up to an astronomical sum, far beyond what the king expected.

25. Likewise, our efforts can multiply like the grains on the chessboard if all of us were to influence and encourage others to take climate action. We want to make Singapore the best liveable city to live and do business. This is our vision. The government cannot do it alone. Together we can help build a Sustainable Singapore. And from Singapore, to ASEAN, to Asia and the world, we want to work together as one global community to ensure that our planet remains liveable for generations to come.

26. I thank CDL for co-organising this event with my Ministry, and for graciously hosting us at this beautiful Singapore Sustainability Academy. I also thank all of you for attending this morning’s event and supporting our Year of Climate Action.

Mr Ong Poh Kwee, COO, Sembcorp Marine

Dr Phillip Choi, Chief Judge for Green Wave Tertiary Level Competition

Ms Wong Lee Lin, Advisor, Repairs & Upgrades, Sembcorp Marine and Chairman of the Green Wave Committee

Students, Ladies and Gentlemen

Good morning,

### **Introduction**

1. I am happy to grace the 15<sup>th</sup> Anniversary award presentation of Sembcorp Marine's Green Wave Environmental Care Project for schools. It is a pleasure to meet so many students and like-minded individuals who share a passion for our environment.

2. In the last 15 years, close to 15,000 students have participated in this competition. Last year, more than 1,000 students had submitted 307 projects. This is a sizeable growth from the event I attended in 2016. It is heartening to learn that our younger generation is coming forth, to put together concrete proposals on what we can do to care for our environment, more so now that people are aware of the challenges we are facing with the impact of climate change.

### **The Climate Change Challenge**

3. I hope you have seen the climate action video that we have put up outside. It is advocating in a very subtle way that climate change is here and it will not go away. Singapore and everywhere else in the world is experiencing the impact of rising sea levels, and weather extremes. You know how the last drought a few years back affected our water supply, made our green grass brown, and caused us to worry about water not coming to our taps. With also the flash floods which we have been experiencing the past few days, these few phenomenon will become more intense and more frequent. 2017 was already our warmest year on record amongst all those years not influenced by an El Niño event. We always have a reason for the warm weather, but this time around, something else is amiss.

4. This is why we launched in 2018, the Year of Climate Action. We want to rally everyone to reduce our carbon footprint and fight climate change. Do our part, because the government cannot fight this fight alone. We have to join forces with all of you,

whoever you are, corporate leaders, students, and household members, to rally everybody to reduce our carbon footprint. This is how we can ensure Singapore continues to be a liveable city, where we can live, work and play in a liveable environment.

5. Internationally, Singapore only contributes 0.11% of the global greenhouse gas emissions. But it does not mean we will not do our part. We will be a responsible international citizen. We are committed to our targets under the Paris Agreement, and Climate Action Year also supports the 2030 Development Agenda. Sustainable Development Goal 13 calls for urgent action to combat climate change and its impacts. This year, we want to drive home the urgency of climate change to our family and friends, and pledge towards climate action.

### **Collective Action as a Driver of Effective Solutions**

6. Collective action across the 3P, or people, public and private sectors, is all crucial to substantially reduce our carbon footprint before it is too late, not just for our children or future generations. In fact the impact can be felt right now. I will use the example of Sembcorp Marine's Green Wave initiative to demonstrate how cross-sectorial partnerships contribute to our long-term climate action efforts.

7. While the government can implement policies to encourage and even force green practices, it will be ineffective if we do not have people making responsible sustainable purchasing decisions or have companies only doing the minimum to comply. Beyond contributing to economic growth, I am glad that companies are cognisant of their potential to effect social and environmental changes. The Green Wave project by Sembcorp Marine and its partners, BP Shipping and Shell, represents efforts by companies coming together to raise the national consciousness in climate action.

### **Leading the ASEAN Climate Action Efforts**

8. Our environmental and climate challenges today know no national boundaries. I am heartened to see Green Wave crossing national boundaries to encourage youth activism in our shared environment. Where climate change is concerned, the world realise that we are all living on the same planet. With us today are three Indonesian teams who will be sharing their winning projects. One such project is from the students of Sepuluh Nopember Institute of Technology, Surabaya. They have created the Coco Fibers Converter, or COFITER, an integrated machine to help coastal communities convert coco fibers into green concrete rooftops, thereby reducing gas emitted from the traditional method of burning clay. I also encourage all of you to visit the various student booths to learn about their bold ambitions and ideas.

9. 2018 is also an important year for Singapore as we take on the responsibility of being the ASEAN Chair. We look forward to leading discussions on climate action, and hosting a Special ASEAN Climate Action Conference for Ministers in July, which will be a platform for us to demonstrate the members' collective commitment to the Paris Agreement.

## **Conclusion**

10. This event has brought together many government agencies, educational institutions, environmental groups, and companies. I would like to thank everyone who have committed time and effort in organising this annual competition since 2003. I hope that others can similarly lead ground-up efforts in championing and supporting the Singapore Year of Climate Action.

11. To our leaders of tomorrow, continue to pursue and implement these wonderful projects. The world you will be working in will demand solutions that you are thinking of right now. As I unveil the Green Wave 2018 Challenge for the Schools, I encourage you to demonstrate the same boldness and innovation to come up with practical solutions for our climate and environment.

12. We are part of the change. Since the launch of the pledge site of climate action, we have grown from 200 pledges to over 1,270 pledges. This may be a thousand more, but there are at least 5.4 million people in Singapore. Let us now add to these bold commitments thus far by typing [climateaction.sg](http://climateaction.sg) in your mobile phones right now. Scroll down and click pledge in your own fields. Think also about what you can do after making your pledges either in your capacity as a leader, CEO, student leader, principal, whoever you are, to propagate and proliferate the message of how important climate action can be. For individuals, just tick the boxes which you would pledge to do. At the same time, share the Climate Action video with your friends and family, which has since garnered more than 27,000 views, though I think we can do with a million more. These are simple and effective ways to communicate the importance of taking action together.

13. Let me thank you again for doing your part for climate action today. Remember that everything you do every day will impact your future and future generations, so let us leave behind a better planet, for a better generation. Thank you.

Mr Lars Svensson  
Sustainability and Communication Director of IKEA Southeast Asia

Ladies and Gentlemen,

### Introduction

1. Good afternoon. Before I begin, allow me to express my condolences on the recent passing of your founder, Ingvar Kamprad, whose pioneering work has made IKEA into the worldwide brand it is today. I am glad that the IKEA Concept – which has sustainability at its core, continues on.
2. The installation of solar collectors at Alexandra, and solar panels at Tampines, are a boost to IKEA's sustainability efforts, and shows that environment and economic objectives need not be at odds. In fact, by embarking on green and sustainable practices, it is good for business, the environment, and people. These efforts are also a step towards reducing IKEA's carbon footprint and taking climate action. The solar energy harnessed will be used to power the cooling systems at the Alexandra store, and cut approximately 10% of electrical costs at the Tampines store. This is commendable.

### Sustainable Development and Deployment of Solar Energy

3. As energy demand in Singapore grows, we will continue to explore all energy options to meet our needs in a secure, competitive and sustainable manner. Among the clean energy options, solar energy is the most feasible for Singapore. Under the Sustainable Singapore Blueprint, we plan to raise the adoption of solar power in our system to 350 megawatt peak (MWp) by 2020.
4. We are taking proactive steps to support solar deployment in Singapore. Through the SolarNova Programme, we intend to provide lead demand in solar energy, to build industry capacity in this sector. Other initiatives include the piloting of a floating solar photovoltaic (PV) installation in Tengeh Reservoir, the Renewable Energy Integration Demonstrator (REID) micro-grid test-bed on Pulau Semakau, and the Energy Market Authority's \$6.2 million research grant to develop solar forecasting capabilities. Such projects can be the seeds for scaling-up innovative clean technologies in Singapore, as well as regional markets. All these initiatives become even more important as we face the threat of climate change.

### Impacts of Climate Change and Climate Action Year

5. As an island city state, Singapore is especially vulnerable to the effects of climate change. Rising sea levels poses an existential challenge for us; while weather extremes can result in droughts and flash floods. It is important that people are made aware of the impacts of climate change, and start to take action now
6. This is why Singapore designated 2018 as the Year of Climate Action. Addressing climate change is a collective responsibility. Although Singapore only contributes 0.11% of global emissions, we will do our part as a responsible global citizen to meet our targets

under the Paris Agreement. The Year of Climate Action also supports the 2030 Development Agenda. We are working with the international community to achieve the UN Sustainable Development Goals (SDGs), including SDG 13 which calls for urgent action to combat climate change and its impacts.

7. While we have in place a comprehensive Climate Action Plan that maps out the various climate adaptation and mitigation measures, the Government alone cannot achieve our targets. We will need the strong support and collective action from businesses, communities and individuals.

8. Together we can fight climate change, make Singapore the best city to live in, and the best choice for companies to locate their business.

#### Role of Businesses in Climate Action Journey

9. Whilst climate change poses operational risks, there are also opportunities to be seized. Globally, we are seeing greater demand for clean energy and significant investments in renewable energy solutions. In 2017, global investment in clean energy totalled close to US\$333 billion, compared to US\$182 billion 10 years ago. Businesses can benefit by reaping cost savings through the use of renewable energy, or enhance brand reputation through sustainable practices.

10. Businesses can also take the lead in raising awareness and encouraging climate action from individuals. I am heartened by IKEA's local initiatives such as the recycling of light bulbs, ceasing the issuance of plastic bags, and recycling waste oil to bio-diesel.

11. I also understand that IKEA has committed to make the Climate Action Pledge in support of Climate Action Year. All these are positive actions that not only help conserve our planet, but also instil an environmental consciousness among people. Businesses are one of the key players in the climate action journey, and it is crucial that they are on board. Effort from all stakeholders is required

#### Conclusion

12. In this Year of Climate Action, I would like to encourage all of us to step up and do our part. Please take out your mobile phone, go to [www.climateaction.sg](http://www.climateaction.sg) and take the Climate Action Pledge. You will join the thousands of individuals, organisations and schools who have done so.

13. I congratulate IKEA for this commendable step, and look forward to even more sustainable practices from IKEA. Thank you.

Mr Zainal Sapari, Assistant Secretary-General, NTUC and MP for Pasir Ris-Punggol GRC

Mr. Desmond Choo, Director, Industry Transformation & Productivity, NTUC, Mayor of North East District and MP for Tampines GRC

Distinguished Guests

Ladies and Gentlemen

Good afternoon. I thank NTUC and the National Environment Agency for inviting me to the Green Jobs Symposium.

2. Twelve companies from the cleaning and waste management sectors, which form the Environmental Services industry, will offer over 300 jobs at today's event. They range from managerial to technical and operational roles, such as engineers, building managers, supervisors and cleaners. I encourage you to find out more about the jobs, which contribute to the important role of keeping Singapore clean and green.

#### **The Environmental Services Industry Transformation Map**

3. The Environmental Services industry currently comprises over 1,700 companies and 78,000 workers. But like other local sectors, it faces a shrinking labour force. The industry needs to transform to remain competitive and be able to create better jobs for Singaporeans.

4. In December 2017, the Environmental Services Industry Transformation Map (or ES ITM) was launched to drive innovation and technology adoption, raise productivity, upskill our workforce and help companies venture overseas. By 2025, some 30,000 workers can benefit from higher value-added jobs. Today, NTUC will share how the ITM can bring about new opportunities and better jobs, and support your career advancement amidst the transformations.

#### **Job Opportunities within the Industry**

5. More companies are now making work simpler and more productive with technology and automation. For example, workers in the past have to clean outdoor pavements on foot with a broom. The distance covered a day is limited and tiring. By upskilling workers to operate machines such as the pavement sweeper, they can ride on them to cover more distance, and clean hard-to-reach areas, such as under the benches and around planters. This reduces fatigue and makes jobs more effective.

6. Here in Our Tampines Hub, the toilets come with detection sensors and a user counter to track odour and usage levels. The system informs cleaners via SMS when toilets require attention, resulting in more effective deployment of manpower resources.

7. With the help of technology, jobs in the Environmental Services industry will become more productive and attractive to job-seekers. But we will have to adapt to these transformations that will help us in our work. To do so, we need to gain new knowledge and upskill ourselves. This is where the Skills Framework for Environmental Services will be useful. Launched together with the ES ITM, the Skills Framework provides guidance on the skills needed for the different job roles and career pathways within the industry.

8. Indeed these are exciting times for the Environmental Services industry. Do consider to be a part of it, and take on the challenge of building a better environment for our future generations.

Thank you, and I wish you a Happy Chinese New Year ahead.

Distinguished guests

Ladies and Gentlemen

1. A good morning to everyone. I am happy to be here at the inaugural forum on “Unlocking Capital for Sustainability” organised by Eco-Business and its partners. The forum is timely and relevant in light of the pressing environmental challenges facing the world, in particular, climate change.

### **The Need for Climate Action**

2. We can already see and feel the impacts of climate change. Temperature records are routinely broken. According to the World Meteorological Organization, 2017 is the warmest year on record, among all those years without El Niño conditions. In 2017, the world also witnessed various extreme events, among them hurricanes Harvey, Maria and Irma, one after another, in a matter of weeks. We are only at the start of 2018, but already, there is a heat-wave in parts of Australia, with temperatures reaching 47 degrees Celsius in Sydney. Cape Town is suffering from a three-year drought, bracing itself for Day Zero in two months, because people are still not used to using less water – people still need that much water every day. Rains had been forecasted for late 2017, but they never came. Helen Zille, premier of the Western Cape Province in South Africa, tweeted that “climate change has destroyed predictability of old forecasting models”.

3. Having gone through the same kind of problems that we did from 2014 to 2016, we should also learn very quickly that we have to take these issues seriously. We are not spared from changing weather patterns. As climate change intensifies in the coming years, these intense weather patterns will occur more frequently.

4. Climate change cannot be tackled by any one country alone. Global effort is needed and that is why Singapore signed on to the Paris Agreement. To spur efforts to fight climate change, we have designated 2018 as the Year of Climate Action. Why did we do this? Just like how one country cannot solve climate change problems, the government

alone cannot do it alone. Everyone has to play a part in reducing our carbon footprint; be it individuals, companies, or organisations. The Government's Climate Action Plan since 2016 sets out how various sectors will reduce their greenhouse gas emissions. This involves enhancing industrial energy efficiency, expanding public transport, promoting green buildings, and investing in solar energy. To complement all these, we will also be implementing a carbon tax on large emitters from 2019, as announced by the Minister of Finance at last year's Budget.

### **Role of Financial Institutions**

5. Financial institutions too, have a key role in climate action. At the basic level, financial institutions, like any business, should encourage green practices within the company, such as promoting energy and water efficiency, and practicing recycling.

6. But beyond that, our financial institutions can be the change-makers for sustainability, by catalysing sustainable finance in Singapore, the region and globally. The market is substantial. A report on Green Finance Opportunities in ASEAN published by the DBS and UN Environment Programme last year estimated that there is US\$3 trillion in green finance opportunities in the region from 2016 to 2030 in the areas of energy efficiency, renewable energy as well as food and agriculture and land use.

7. I would also strongly urge financial institutions to keep up efforts to incorporate Environmental, Social and Governance (or ESG) principles into your business decisions. Your lending and investment decisions can help to redirect financial flows away from environmentally destructive business activities, and instead, promote resilient and sustainable markets. Let me elaborate.

### **Growth of Green Finance**

8. Green finance is gaining momentum. According to the UN Environment Programme's green finance progress report, globally, sustainable assets under management have increased by about 25% from 2014 to 2016. Green bond issuance doubled from 2015 to 2016. There is also increasing demand for green investment funds and green loans.

9. The London Stock Exchange has 50 green bonds listed, raising more than \$14.8 billion across seven currencies. Closer to home, China has become one of the world's largest issuers of green bonds. In the first half of 2017 alone, China issued US\$11.7 billion worth of green bonds. China also launched 'green finance' pilot zones in five provinces in 2017, to support energy conservation and emissions reduction.

10. Financial institutions in ASEAN are catching on. Banks in Indonesia are developing a range of green financial products and services to facilitate renewable energy, energy efficiency, and sustainable agriculture. This is in line with the Indonesia Financial Services Authority's (or the OJK's) 2016 Master Plan. Last year, Malaysia, with support from the World Bank, launched their first green bond or *green sukuk*, compliant with Sharia principles.

### **Where we are in Singapore**

11. Singapore too is incorporating sustainable financing in the activities of our financial centre. I am glad that some positive moves have been made:

a. In 2015, the Association of Banks introduced Guidelines on Responsible Financing that required banks to disclose their senior management's commitment to responsible financing and to build capacity and set up processes to achieve this.

b. SGX has made it mandatory for listed companies to undertake sustainability reporting on a 'comply or explain basis' from financial year 2017.

c. Last year, the Life Insurance Association Singapore (LIA Singapore) reaffirmed its support for member companies to adopt ESG principles in their decision-making processes. Similarly, the Investment Management Association of Singapore (IMAS) has expressed support for global and local sustainability standards and strongly encouraged its members to adopt the Singapore Stewardship Principles.

### ***Green bond market***

12. To kick-start the development of a green bond market in Singapore, the Monetary Authority of Singapore (MAS) launched the Green Bond Grant Scheme in 2017. MAS will also recognise the ASEAN green bond standards launched last year, as a qualifying standard under the Green Bond Grant Scheme.

13. We have also seen an increase in green bonds being issued in Singapore. In April 2017, City Developments Limited financed its investments in energy saving and efficient infrastructures through green bonds which raised S\$100 million. DBS Group also issued a green bond worth S\$685 million in July 2017, followed by Manulife Financial which issued a \$500 million green bond.

14. SGX has also made good progress in attracting green bond listings, attracting over 20 local and international listings amounting to almost \$15 billion in recent years.

### **What the Year of Climate Action means for Financial Institutions**

15. All these initiatives are an encouraging start for green finance in Singapore. They show that it is possible to do well and do good at the same time. But there is much more that we can achieve. For example, a 2017 report by the World Wildlife Fund (WWF) on Sustainable Banking in ASEAN, highlights that banks could develop sustainable finance guidelines; as well as require their clients to commit to sustainable agricultural practices.

In this Year of Climate Action, I urge financial institutions to think deeply about what you can do to embed sustainability in your businesses. Let me highlight some possibilities:

a. First, integrate ESG practices into your company's core decision making processes. In particular, financial institutions could do the following:

i. Review your clients' sustainability profiles and work with them to improve sustainability practices. I understand that our local banks are currently doing so and targeting to complete the review of their entire customer portfolios by end-2018.

ii. Prioritise activities that pose higher risks to the environment,<sup>[1]</sup> and undertake measures to address sustainability risks specific to these activities. For example, DBS Bank has recently pledged that it will stop financing new greenfield coal-fired power generation projects in OECD and developed markets. The bank will also cease all project financing of greenfield thermal coal mines.

iii. Actively seek opportunities to channel financing to projects that can meet the sustainability needs of Singapore and the region, including in renewables and energy efficiency, sustainable infrastructure as well as food and agriculture. For example, the United Overseas Bank (UOB) has provided financing for solar projects in Singapore.

iv. Include responsible financing disclosures in your annual reports and their websites. Here, I understand that local banks are on track to fully implement the SGX sustainability reporting requirements this year.

b. Second, continue to develop different kinds of green finance products and foster the growth of a green asset class in the region.

i. As mentioned earlier, green bonds are gaining traction in the region. It offers issuers here a useful avenue to access an additional class of international “green” investors.

ii. Banks can also explore offering longer term loans suitable for green infrastructural projects.

iii. Insurance players can enhance research and analytics into environmental risks in the region, for example in natural catastrophes that can underpin the development of innovative disaster risk financing solutions for the region.

c. Third, set goals for reducing your carbon footprint, such as by using more renewable energy.

i. For example, DBS Bank has pledged to power all its operations in Singapore using renewable energy by 2030, while HSBC aims to source 100 per cent of their electricity

from renewable sources by 2030 and cut annual carbon emissions per employee from 3.5 tonnes in 2011 to 2 tonnes by 2020.

16. There are many possibilities. We are limited only by our imagination and more by our will. I encourage you to think about what you will do as an institution. Let us start by doing something which is easy – take out your smartphone, go to MEWR’s website, and make your climate pledge.

## **Conclusion**

17. In conclusion, let us work together to make Singapore the best liveable and sustainable city to live and do business in, now and in the future. As the saying goes, ‘money makes the world go round’. Financial institutions have the potential to be a powerful force for good, or otherwise. The responsibility lies in the hands of the leaders, to shape the directions that their institutions will take. In the face of looming challenges and risks to our planet, today’s forum on unlocking capital for sustainability is timely and pivotal. Let us take action today, for a sustainable future.

18. I wish all of you a fruitful discussion.

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[1] These 8 industries include agriculture, chemicals, defence, energy (including coal), forestry, infrastructure, mining and minerals, and waste management.

UN Environment Chief Scientist, Dr Jian Liu  
Distinguished guests  
Ladies and Gentleman

### **Introduction**

1. Good morning. This is the fourth day of the Lunar New Year and the Year of the Dog. It is a very special year and I hope that this changing of the year brings everyone happiness, good health and continued success in whatever you do. Let me also warmly welcome you to Singapore for the Fourth Authors' Meeting of the Sixth Global Environment Outlook, or GEO-6, and the inaugural Asia Pacific GEO-6 for Youth meeting. Singapore is of course honoured to host these important meetings with the UN Environment Programme.

2. I am delighted to see such a large gathering of academics and scientists for this important meeting, which is the final Authors' meeting before the publication of the GEO-6 report. I understand there are now no less than 200 scientists and related officials coming together for this meeting.

### **State of the Environment**

3. Since the last GEO report published in 2012, the threat of climate change has grown even more urgent. It is something everyone in the world is very well aware of. Everyone now understands that it is real and palpable. Already, global temperature records are routinely broken. 2016 was the hottest year on record, while 2017 also broke the record as the hottest year without the influence of El Niño. Extreme weather events often feature in the news.

4. Pollution also remains a global threat to human health. Rapid urbanisation, particularly in Asia and Africa, has resulted in greater environmental degradation, bringing problems such as air pollution, water shortages, and indiscriminate waste disposal. As the world continues to urbanise, sustainable development challenges will be increasingly concentrated in cities.

5. Nevertheless, there has also been progress on key environmental fronts since 2012. In a commendable show of solidarity, world leaders adopted the 2030 Agenda for Sustainable Development in September 2015 and shortly after, the Paris Agreement on Climate Change in December 2015. A year later then in Kigali, the world welcomed an amendment to the Montreal Protocol to phase down another group of greenhouse gases – hydrofluorocarbons or HFCs. These agreements are significant steps forward for sustainability and against climate change.

6. Beyond national governments, cities and states have stepped up efforts to curb global warming and address pollution, along with the private sector and civil society. Every major corporation you can think of, including Nestle, Amazon, Microsoft and IBM, have led the way with their public pledges and actions to mitigate climate change. Financial institutions are developing green finance solutions that will catalyse economic development based on sustainable principles.

7. However, science tells us that time is running out. We need to act decisively now to reduce carbon emissions, if we want to avert the worst climate change scenarios. The work of scientists and academics, such as you will be pivotal in providing evidence-based assessments to galvanise global action on climate and the environment.

### **Singapore's Sustainable Development Journey**

8. This is also a key reason why Singapore readily agreed to host this GEO-6 meeting. Singapore has declared 2018 the Year of Climate Action. Throughout this year, the Government, businesses, civil society and the people of Singapore will rally together on climate action; hosting GEO-6 is part of the act. Moreover, Singapore since its early days, has always subscribed to the values of environmental protection and sustainable development that also underpin the GEO process and the work of the UN Environment. We are glad to be your partner.

9. Let me tell you a little bit about the Singapore story where environment is concerned. In the 1960s, Singapore was like any other developing country – dirty and polluted, lacking proper sanitation and facing high unemployment. These challenges were particularly acute, given our constraints as a small island state with limited resources; we did not even have enough drinking water.

10. Today, you have come to a very different Singapore. Our approach has been to build a liveable and sustainable city, through pragmatic policymaking based on sound economic principles and science; a focus on long-term planning and effective implementation; and the ability to mobilise popular support for the common good.

11. One of Singapore's transformations involved the cleaning of the Singapore River, which was literally an open sewer in the 1960s and 1970s. The clean-up took ten years and involved thousands of Singaporeans relocating from farms, factories and street-food stalls that were polluting the river catchment. The successful clean-up also set in motion a process to create a reservoir in the heart of the city. By damming up the river mouth, the Marina Barrage offers the triple benefits of water supply, flood control, and an attractive lifestyle destination. The clean water and greenery there has lured smooth-coated otters, a species native to Singapore. You will get to see the reservoir on Wednesday, and hopefully the otters too.

12. Indeed, the otters have proven to be such a welcome curiosity for our own citizens and they are being used as celebrities to relate to the public what they can expect in our Budget speech to be delivered this afternoon.

### **Science and Technology for Sustainability**

13. While Singapore can now enjoy a clean and green environment, we face new environmental challenges that have to be tackled through forward planning and innovation. I would like to highlight two key aspects of our approach. First, the importance we place on grounding our policies in science; and second, how we leverage science and technology to achieve policy outcomes.

14. Science underpins how we prepare for climate change. For example, climate change adaptation measures, such as protecting against sea level rise, are often long-term. Hence, we need to ensure that they are based on robust climate science and projections. This is why in 2013, Singapore set up the Centre for Climate Research Singapore (or CCRS) to develop research capabilities on the weather and climate of Singapore and Southeast Asia.

15. In 2015, CCRS published the Second National Climate Change Study, which made use of high-resolution models to project Singapore's future climate up to the year 2100. We cannot rely on global climate projections as these are too coarse for a small island that is hardly a dot on the map. The projections by CCRS are currently being used to inform our national adaptation policies. CCRS is still growing its capabilities and we welcome collaborations with climate scientists who are keen to work with us to deepen our understanding of tropical weather and climate.

16. We also leverage science and technology to address sustainability challenges. Singapore's Research Innovation & Enterprise (RIE) 2020 plan, for example, includes a \$900 million Urban Solutions & Sustainability programme to support piloting, test-bedding and accelerating adoption of promising new technologies.

17. In the area of waste, specifically to convert waste to resources, we have set aside S\$45 million to boost Singapore's R&D capabilities in developing solutions to extract value and resources from key waste streams including plastics, food, electrical and electronic products, and incineration ash. For example, we are looking to put incineration ash to good use, instead of dumping it in the landfill. This is part of our vision to become a Zero Waste Nation, where as little as possible goes to the landfill.

18. Over the years, we have invested strategically in R&D to address our water challenges. NEWater, Singapore's brand of reclaimed water is a key achievement. Today, Singapore is a global hydrohub with a thriving cluster of over 180 water companies and 26 research centres. Given that water is an existential issue for Singapore, we continue to pursue R&D with the aim of reducing energy requirements of energy-intensive processes such as desalination. This will help us achieve both carbon emissions reduction and water resiliency.

### **Year of Climate Action**

19. Ladies and gentlemen, while we have done much to build a sustainable Singapore, the work is not done. Internationally, there is an urgent need for all countries to work together to fulfil the goals and commitments of the Paris Agreement. UN Secretary-General Antonio Guterres has identified the fight against climate change as one of the top priorities of the UN and for the international community. Next year, the UN

Secretary-General is convening a climate summit to mobilise the international community for more ambitious emissions reductions and climate change adaptation. We welcome the Sec-Gen commitment to the global fight against climate change.

20. Although Singapore contributes a miniscule percent of carbon emissions globally, we will do our part as a responsible global citizen. We are promoting industrial energy efficiency, investing in solar energy, and encouraging green buildings. We have frozen the growth of the car population and expanded public transport. This year, we will be passing legislation to introduce a carbon tax from 2019.

21. However, this cannot be the work of the government alone. Hence, Singapore has designated 2018 as the Year of Climate Action to raise the level of national consciousness around the need to take individual and collective action to fight climate change for a sustainable Singapore. We are pleased to see many ground-up initiatives in Singapore by companies, civic organisations and individuals to promote sustainability and fight climate change.

22. Our Climate Action Year also supports the 2030 Development Agenda, and we are working with countries around the world to build capacity and help them achieve the Sustainable Development Goals (SDGs).

### **Conclusion**

23. Let me conclude. First let me congratulate the UN Environment for its excellent work in promoting scientific knowledge on the causes and impacts of environment change, and providing sound policy recommendations. This GEO-6 meeting has brought together many eminent scientists and academics to contribute to such efforts.

24. We are faced with stark choices today: to continue with business as usual, and carry on with wasteful habits that poison our planet and disrupt our climate; or forge a new and sustainable path to development, no matter how challenging. As for Singapore, our vision is to continue to build the best liveable and sustainable city for our citizens, visitors and businesses.

25. With that, thank you once again for your time in putting together this important publication. I wish you a fruitful discussion as you exchange insights on sustainable development. Lastly, I wish you all a pleasant stay in Singapore. Thank you.

Mr Vasuthevan K Ramamurthy

Principal of Bukit View Secondary School

Dear Teachers and Students,

Good afternoon.

1. I am happy to visit your school, which has been a strong advocate for environmental sustainability over the years, and now also a climate action champion.

### **Achievements of Bukit View Secondary School**

2. Indeed, Bukit View Secondary School was the first school to initiate the Water Rationing Exercise in collaboration with the Public Utilities Board (PUB) as part of World Water Day 2016. The school has also won numerous environmental awards, particularly PUB's Watermark Award in 2012 and NPark's Community in Bloom Award in 2014 and 2016.

3. In 2016, it won the highest environmental accolade, which is the President's Award for the Environment. Therefore, let me congratulate you for winning award after award and being exemplary to the schools in Singapore. Congratulations!

### **Impact of Climate Change**

4. My Ministry has chosen your school because you serve as a role model for many of us in Singapore, and also because you have chosen to take this climate action journey with us. What you are seeing now and experiencing are the impacts of climate change. I hope you have read that there are more extreme weather events around the world and in Singapore. Around the world, you will see more prolonged droughts. Cape Town, a very important city in South Africa, is now suffering a 3-year drought and a possible shortage of water. The city is likely to have no water by June this year.

5. 2017 was also the warmest year on record and did not come because of El Nino. Recently, there was also a cool spell of 21 deg C around Singapore. That was also an unusual phenomenon for us. Therefore, when climate change takes its ugliest head, you will see more frequent extreme weather patterns, which will take a toll on all of us unless we take action.

### **JOULES Smart Centre**

6. I am delighted to open the JOULES Smart Centre today. This is one of Bukit View Secondary School's initiatives for climate action. The JOULES Smart Centre was built in collaboration with the Singapore Green Building Council (SGBC). This is a consortium

of green building professional firms and product suppliers, and they have helped the Centre to be energy efficient while creating a healthy indoor environment for students. I hope the JOULES Smart Centre will serve as a learning platform for all of you and for others around this area. I hope you will also use it for special curricular classes and academic events, and invite not just students of other schools but also people from the community to learn from this Centre.

### **Ways to Reduce Carbon Footprint**

7. On an individual level, staff and students can all play their part by reducing their carbon footprint. It is very simple. For example, you can practise the 3Rs – reduce, reuse and recycle, or cut down on the use of disposables - use less paper; use less electricity and use less water.

8. Let us take public transport; let us cycle or walk if we can; switch off electrical appliances and the lights when you leave the room and; use water wisely. If you have to use air-conditioning, you do not have to put it at 18 deg C; 25 deg C is a comfortable temperature.

### **Climate Action Pledge**

9. Singapore has designated 2018 the Year of Climate Action. In January, we launched a Climate Action Pledge to encourage schools, organisations and individuals to commit to fighting climate change. Again, I want to commend Bukit View Secondary School for supporting this movement as it is the first school to have collected pledges from ALL staff and students, amounting to 1,030 pledges altogether. Congratulations!

10. I hope that Bukit View Secondary School's efforts have also inspired other schools to follow suit. Springfield Secondary School and Pasir Ris Secondary School will be organising a similar mass pledging session for staff and students for Earth Hour in March and Earth Day in April respectively. Cedar Primary School will also be collecting pledges from staff and students during recess this week. Jurong Junior College will be collecting pledges from visitors during their environmental event, Love Fiesta 2018 on 10 March.

11. The Minister for Education will support the plan for schools to organise mass pledging sessions as part of Youth for the Environment Day in support of the Year of Climate Action. Such exercises are useful in letting students know that they can play their part in mitigating climate change.

12. Moving forward, I urge you to not only practise a more sustainable lifestyle, but encourage your family members to take the climate action journey.

### **Conclusion**

13. No effort is too small to make a difference. We all have to do our part to protect our environment. Every small action we do will go a long way to protect ourselves against

the worst effects of climate change. Only when we work together can we reduce our carbon footprint and at the same time, inspire each other to follow and do the same. Let me end by congratulating the school again for taking initiative in this Year of Climate Action.

14. Thank you for your support.

Ms Melissa Tan, Chairman of WMRAS

Mr Ronnie Tay, CEO of NEA

Members of WMRAS

Ladies and gentlemen

1. A very good evening. It is my pleasure to celebrate Chinese New Year with all of you.
2. The waste management industry is an essential services sector that supports Singapore's future economy. But, amidst a backdrop of a shrinking labour force, it will need to reinvent its processes and improve operational productivity. In short, the industry needs to transform to meet the challenges of the future.
3. During Budget 2018, Minister Heng Swee Keat announced a slew of measures to help companies transform for the future. They comprise near-term help to cope with rising costs, and longer-term strategies to drive innovation, capability development and overseas expansion.
4. Noteworthy initiatives include the **Productivity Solutions Grant** to support the adoption of technology, the **Enterprise Development Grant** to grow expertise and the **Capability Transfer Programme** to support the transfer of skills from foreign specialists to locals. I strongly urge all companies to embrace these opportunities and embark on a transformation journey to scale greater heights.
5. Another key enabler for the future economy is the Industry Transformation Map. Last December, Minister Masagos launched the Environmental Services Industry Transformation Map (or ES ITM), together with the industry, unions and other stakeholders. WMRAS will be working closely with NEA to upgrade the industry's capabilities through innovation, technology adoption, upskilling of the workforce and overseas ventures.
6. The ES ITM will ensure that the industry remains competitive and attractive. Businesses can look forward to more opportunities for technology collaboration and adaptation. By 2025, some 30,000 workers can benefit from higher value-added jobs that harness technology and automation to reduce routine and laborious tasks.
7. To encourage greater use of technology and increase overall productivity, funding support is also available for companies. NEA's new \$45-million "Closing the Waste Loop" research funding initiative, which was launched together with the ES ITM, aims to develop solutions to extract value and resources from key waste and residue streams. NEA has also been allocated S\$10.8 million from the National Robotics Programme to develop robotics solutions in the areas of cleaning, waste management, as well as pest and pollution control. Companies may also wish to tap on existing funding programmes administered by EDB, e2i, IMDA, SPRING Singapore and WSG.
8. NEA also launched a grant call on 29 January to drive innovation in the cleaning and waste management industry. Two problem statements pertaining to the waste management industry were surfaced - To reduce the physical strain of the work crew in waste collection operations as well as to develop a cost-effective and efficient on-site non-domestic mixed waste treatment system. I encourage all of you to submit your ideas and technological solutions to NEA by the end of March for consideration.
9. To build capabilities and raise the professionalism of the industry, WMRAS launched its inaugural Professional Course in Waste Management and Resource Recovery for PMETs, in collaboration with Griffith University of Australia, in 2017. I presented the pioneer batch of graduates with their certificates at last year's WasteMET Asia Symposium and heard from WMRAS that the participants have gained a lot from the programme.

10. This professional course is aligned to the Skills Framework for ES industry. So do consider sending your PMETs and especially staff who are new to the sector to attend the subsequent runs. Their participation in this course will also demonstrate your readiness to invest in manpower development. This will hopefully attract more entrants to work for your companies in the future.

11. At the Symposium, I also witnessed the signing of an MOU between WMRAS and 8 Trade Associations & Chambers (or TACs) to work on Collaborative Industry Projects (or CIPs). An example would be the collaboration between WMRAS and Singapore Food Manufacturers' Association (or SFMA) to encourage the adoption of onsite food waste recycling systems in food manufacturing premises. I hope to see more of such mutually beneficial collaborations this year that would advance your business objectives.

12. I would also like to encourage you to participate in the upcoming CleanEnviro Summit Singapore (or CESS) at the Marina Bay Sands from 8 to 12 July 2018. Now into its 4th edition, CESS has become an internationally renowned platform for senior government officials and industry captains to discuss the latest trends and solutions in the environment sector. CESS is an excellent opportunity for your companies to plug into the international market, showcase your solutions as well as to explore business opportunities with key decision makers and leaders around the world.

13. Indeed, this year promises to be an exciting one, with an abundance of growth opportunities for the ES industry. 2018 is also the **Year of Climate Action**. I seek your support to take action to reduce carbon footprint and fight climate change. You can start by making a commitment – take out your smartphone now, go to [Climateaction.sg](http://Climateaction.sg), and make a pledge to be part of Singapore's climate action. Together we can create a sustainable future and make Singapore the best liveable city for our people.

14. I wish you an enjoyable Chinese New Year Dinner and a Happy, Healthy and "Huat!" Year of the Dog! Thank you.

Ms Elaine Tan,

Chief Executive Officer, WWF-Singapore,

Distinguished Guests,

Ladies and Gentlemen,

1. Good morning everyone. I stood in this room a month ago to launch the Year of Climate Action, together with the climate action pledge, to raise the level of national consciousness around the need to take individual and collective action to fight climate change for a sustainable Singapore. Today, I am happy to return and witness another milestone in our environmental sustainability journey.

### **Sustainable Palm Oil – The Way Forward**

2. Transboundary haze pollution is a perennial problem in our region and elsewhere in the world. Its impact is felt globally given the vast amount of climate change inducing gases released when biomass is burnt. We cannot resolve this issue without addressing the production of palm oil. If done in an irresponsible way, palm oil production can bring about widespread deforestation, air pollution and carbon emissions resulting in climate change. That said, the palm oil sector brings important economic benefits to our region which produces 85% of the world's palm oil. The palm oil sector contributes to an estimated 2-2.5% to the Gross National Product in Indonesia, and is the fourth largest contributor to the Gross National Income in Malaysia. The palm oil industry also supports the transition of many communities out of poverty and significantly improves the livelihood of farmers. Hence, Singapore supports the growth and success of a sustainable palm oil industry in our region.

3. With demand for palm oil projected to grow by another 50% by 2020, sustainable production must take root in this industry. This underscores the significance of the Southeast Asia Alliance for Sustainable Palm Oil, or SASPO. I commend WWF-Singapore and its founding members – Ayam Brand, Danone, IKEA, Unilever and Wildlife Reserves Singapore – on the progress. Being the first of its kind, this industry-led initiative provides a platform for localised insights and shared resources for companies that source for sustainable palm oil. Such palm oil is produced with long-term and sustainable benefits both for the environment and the industry.

### **Regulatory Efforts by Governments**

4. The palm oil industry must adopt sustainable practices to secure its own future, as consumers are increasingly demanding this.

5. The Indonesian government has stepped up efforts to prevent the occurrence of forest fires that cause haze. The number of hotspots has decreased from over 20,000 in 2015 to 3,915 and 2,567 in 2016 and 2017 respectively. In 2016, ASEAN Member States adopted the Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control. Effective regional co-operation will help us achieve the shared vision of a haze-free ASEAN by 2020.

6. Singapore has enacted the Transboundary Haze Pollution Act (THPA) to complement the enforcement efforts of other countries. The THPA facilitates the prosecution of entities that contribute to transboundary haze pollution in Singapore. Through the THPA, we send a message to companies practising unsustainable production of palm oil and other products, that their actions will be met with stern enforcement.

### **Private Sector's Efforts towards Sustainability**

7. While Governments can do their part, we need to adopt a multi-stakeholder approach to address the issue of transboundary haze pollution. Businesses need to understand that sustainability is not an economic trade-off. Instead, it makes good business sense to build environmentally resilient supply chains that thrive in the long-term.

8. Today, I am happy to announce that 10 new companies will be officially joining the SASPO alliance. This is a milestone for the alliance and sends a strong signal that businesses in Singapore have started the transition towards 100% sustainable palm oil. I would like to congratulate these new SASPO member companies and acknowledge their commitment towards using 100% certified sustainable palm oil. They are:

1. Bee Cheng Hiang,
2. F&N,
3. Commonwealth Capital Group,
4. Compass,
5. Crystal Jade,
6. Delfi,
7. Paradise Group,
8. Super Group,
9. Tong Seng Produce and
10. Tung Lok

Together, these companies account for over 81 brands and 200 F&B outlets island-wide.

9. This is testament to the fact that the movement for sustainable palm oil has gained traction. I hope to see more companies in Singapore come on-board this sustainability journey.

### **Sustainable Financing**

10. Singapore's financial institutions also play a pivotal role in influencing regional forestry and palm oil companies to promote and adopt sustainable business practices. The Association of Banks in Singapore (ABS) released a set of responsible lending guidelines by banks in October 2015. The guidelines comprise environmental, social and governance (ESG) criteria, requiring banks to provide disclosure of their commitment towards responsible financing and the policy framework that supports this. ABS will be engaging the ASEAN Bankers' Association to encourage regional banking associations to adopt similar responsible financing guidelines. The Singapore Stock Exchange (SGX) has also introduced a "comply or explain" sustainability reporting requirement from the financial year ending on or after 31 December 2017, with reports to be published from 2018.

11. I am happy to note that local banks, such as DBS and OCBC, have already taken the lead and pledged towards climate action and sustainability. These banks have established their own set of ESG policies and procedures in accordance with ABS' guidelines. DBS has also introduced ESG funds on its product shelves and is exploring ways to create awareness and encourage green consumer behaviour through its product offerings.

12. These efforts by the private sector are important to help shift the industry towards making sustainable business practices a norm and phasing out unsustainable palm oil supply chains.

### **Civil Society and Consumer Efforts**

13. Civil society can also serve as a strong catalyst for change. A YouGov study showed that 56% of Singapore's consumers support companies with ethical supply chains. Just three months back, as part of a campaign ran by WWF-Singapore, people in Singapore sent more than 50,000 emails to local brands to urge them to switch to sustainable palm oil. Consumers have a big say in demanding transparency and accountability of companies in their supply chain, so that they can make informed choices. There have been promising developments and ground-up efforts by the civil society over the past year. Singapore supports these ground-up initiatives that will influence consumers towards more environmentally sustainable attitudes and behaviours.

14. Through its #GoHazeFree campaign, the People's Movement to Stop Haze (PM.Haze) has been encouraging restaurants to switch to haze-free cooking oil. They also produced a "Your Guide to Haze-free Cooking Oil" to help restaurants ease into this transition. Through their extensive outreach, companies such as Vegan Burg, nomVnom,

Wildlife Reserves Singapore, IKEA, Siloso Beach Resort and Grain, the caterer for today's event, have started using sustainable palm oil.

15. In January last year, the Singapore Environment Council (SEC) launched a holistic green labelling category for pulp and paper products, under the enhanced Singapore Green Labelling Scheme (SGLS), which encompasses peatland management and fire prevention standards as part of its criteria. This maintains one of the most stringent environmental performance standards globally, and requires companies to have their entire supply chain audited against these criteria. Since this launch, 12 Kimberly-Clark products have been certified under the enhanced SGLS and SEC is hard at work to ensure that other pulp and paper companies get on-board the enhanced SGLS programme. I encourage consumers to continue to procure eco-friendly products certified under this enhanced labelling programme. This ensures that the products we buy come from sustainable sources and are not contributing to haze and climate change.

### **Conclusion**

16. The transition towards 100% sustainably sourced palm oil requires all stakeholders – consumers, investors, palm oil growers, users and traders – to move towards the common goal. We cannot expect changes overnight, but we can get there if everyone plays his or her part as a responsible consumer and business operator.

17. I congratulate WWF-Singapore and SASPO members on the growth of the alliance. We encourage other companies to come on board. We also encourage everyone to make your Climate Action pledge on my Ministry's [climateaction.sg](http://climateaction.sg) site. In fact, all SASPO companies should make your pledge to let everyone know of your climate actions. Together we can create a sustainable future and make Singapore the best liveable city for our people.

18. Thank you.

Mr Sherman Kwek  
Group CEO of City Developments Limited

Mr Robin Hicks,  
Deputy Editor of Eco-Business

Ms Esther An,  
Chief Sustainability Officer of City Developments Limited

Distinguished guests  
Ladies and gentlemen

Good afternoon.

It is my pleasure to join you at the opening of the EcoBank Bazaar 2018 and the launch of Fashion 3R. These initiatives are timely and relevant in the light of pressing environmental challenges facing the world, in particular, climate change.

### **Taking Climate Action by Reducing Waste**

2. Our earth is experiencing many natural disasters as a result of climate change. Singapore is already feeling the effects of climate change. 2017 was the warmest year on record, among all those years without El Niño conditions.

3. The generation of waste contributes to climate change. In Singapore, we incinerate all our waste at our incineration plants, except for those waste that cannot be incinerated. Though measures are in place at the incineration plants to minimise the emissions, incineration inadvertently results in greenhouse gas emissions. Hence we must incinerate less, by minimizing waste at source and recycling more. Our current rate of waste generation is not sustainable. Over the period 2006 to 2016, the waste we generated increased by 50%. At this rate, we will run out of space at Semakau landfill by 2035, which for many of us, will be within our lifetime. Recycling collections from community events, donation drives and events such as EcoBank promotes awareness about recycling and contribute significantly to our domestic recycling rate.

4. Taking action to move towards a Zero Waste nation will help in the fight against climate change. Singapore has designated 2018 as the Year of Climate Action – in fact, we launched the Year of Climate Action in this building at the Singapore Sustainability Academy. We contribute about 0.11 per cent of global greenhouse gas emissions, but we need to do our part as a responsible global citizen and meet our targets under the Paris Agreement. We will work towards achieving the UN Sustainable Development Goals (SDGs), including SDG 13 which calls for urgent action to combat climate change and its impacts. Fighting climate change is not just the government's business – it is everyone's business. Everyone has to play a part in making Singapore a sustainable and liveable city.

5. Locally, initiatives such as EcoBank and Fashion 3R are important events that support the Year of Climate Action. Beyond education and awareness campaigns, it is important for everyone to make changes in their lifestyle in order to contribute towards Climate Action. Initiatives like EcoBank and Fashion 3R remind us to be responsible consumers,

to recycle our possession to prolong their useful lifespan, and to embrace pre-loved items as a fashionable choice.

## **Ecobank**

6. Ecobank Bazaar 2018 has saved nearly 18 tonnes of pre-loved, usable items from becoming waste. This marks an impressive 62% increase from close to 11 tonnes collected in 2017. This is the first year a collection bin has been placed at the Environment Building for EcoBank Bazaar. We had to keep on extending the period of collection and clear the bins regularly. According to a report by the Turnkey Group, EcoBank has been able to prolong the use of the products to the equivalent of saving thousands of tonnes of carbon emission to landfill.

7. The EcoBank Bazaar is an annual reminder to us to be an Active and Gracious Community, by sharing what we have instead of throwing them away. This is part of our Sustainable Singapore Movement that has gained momentum over the years. EcoBank Bazaar allows us to partner with communities in need while doing our part for the environment. All funds raised from the three-day bazaar will go towards supporting six charities under the Children's Charities Association. I hope that everyone can play a meaningful part in helping EcoBank do more for the beneficiaries. Today, you have "license" to shop and swap.

8. EcoBank Bazaar 2018 is possible because of City Developments Limited and Eco-Business which continued to put in much efforts to organise this successful event since 2016. It has grown in scale with like-minded partners comprising individuals and corporate donors, and 540 volunteers who have contributed more than 2,000 hours of their time and effort. These are expensive volunteer hours, because we have the heads of sponsors and donors who came down to swap the products. All of us here also contribute to its success by supporting the cause of responsible and sustainable consumption with our actions.

## **Fashion 3R**

9. The EcoBank team is launching a Fashion 3R campaign, which will raise awareness on the practices of responsible fashion purchase and disposal over the next three years, through rolling out workshops, clothes swaps and other activities. The fashion industry is one of the most polluting industry in the world. In a 2016 report by National Environment Agency, 150,700 tonnes of textile and leather waste was generated and only 7% was recycled in that year alone. For this year's EcoBank collection, approximately 43% of donated items were textile.

10. Through a partnership with Raffles College of Higher Education, Fashion Design students have run a month long campaign with Eco-Business to share knowledge on various methods of responsible fashion disposal. Fashion Design students have also taken donated goods to upcycle into 25 beautiful outfits which you can see at the Bazaar.

11. Another partnership with NGO Connected Threads Asia will see a fun and lively Swap Party at the Singapore Sustainability Academy to introduce swapping pre-loved clothes as another option that can save your wallet and the environment at the same time. These partnerships show that there are so many various ways to recycle, reuse and to extend the lifespan of our purchases.

## **Conclusion**

12. Let us all commit to living a 3R Zero Waste Lifestyle, where everybody can be a Zero Waste hero. Make use of every opportunity we have to reduce, re-use and recycle. Today is a good opportunity to put this into practice. Buy from EcoBank Bazaar. Learn from the booths set up by Raffles students. Swap items at Swapaholic. Since we are all gathered here, let us take our climate action pledge together. Please take out your mobile phones, go to [www.climateaction.sg/pledge](http://www.climateaction.sg/pledge) and take your pledge now. Join the 6,000 plus individuals, organisations and schools who have already done so. This morning, President Halimah had made her climate action pledge at the Singapore World Water Day. Your pledge is also important and you can make a difference.

Thank you and I wish you a good weekend shopping and swapping for a good cause!

**Er Dr Lee Bee Wah:** Thank you, Sir. I have three clarifications. Firstly, is there a role that the *karang guni* man can play in EPR and, if yes, how?

Secondly, I am very happy to hear about the replacement of energy saving bulbs for one- and two-room flats. I would like to ask how is this to be implemented so that the bulbs are in the light fitting instead of lying around. Is there a plan to get the corporation to come in to help? And for those cases where the bulb does not fit into the old light fitting, is there a plan to change the light fittings?

Lastly, it is about anti-littering. I have four covered basketball courts in Khatib where basket-ballers from all over Singapore come every day to enjoy. However, at the end of the day, it looks like a war zone. How will the Ministry help in fighting this littering issue? Can we use gadgets, modern technology, to nab the culprits?

**SMS:** I thank the Member for her questions.

Firstly, for the *karang guni* man, as I have said, we think that the *karang guni* man will continue to have a role to play when we implement the EPR e-waste management system. They can provide convenient door-to-door collection of the used appliances and, where it cannot be reused, then they can actually send it to the recyclers through the PROs.

With regard to the light bulbs, we are working out the details, taking feedback from retailers, as well as with the community, NGOs and companies who may want to do CSR on how we can more effectively implement the replacement of the light bulbs for the one- and two-roomers.

Regarding littering issues in the basketball courts at Khatib, I am given to understand that the North West Regional Office staff from NEA is working closely with your grassroots to address the littering problem at the courts. I think the issue is that there are actually multiple parties using the courts and it is very difficult to identify who are the litterbugs. But I know that CCTVs have already been installed. So, we will work closely with the grassroots to do this.

But at the end of the day, I think we need to ensure that people take ownership of the environment. If they use the courts, then they must take ownership and prevent littering. So, some kind administrative process should be implemented so that we can identify who are the ones who are using the courts, too.

**Mr Seah Kian Peng:** Thank you, Mr Chairman. Two clarifications for Minister Masagos. First is, I am delighted that our per capita water usage has just gone down to 143 litres a day. I would like to ask is there a target that we are aiming towards to make it more sustainable and, if so, by when?

Second clarification is: Minister mentioned that if we get our policies right, there is no need for Day Zero campaign. I certainly hope so. My question is: having a campaign, having a water rationing exercise island-wide, would this not nudge us, bring the entire population towards this goal and, in the process, also build our water, physical or mental resilience? So, I see a lot more benefits, I do not see any downside. So, I would urge Minister to review this decision.

**Minister:** We thank the Member for the questions.

The first question is whether we will revise the target or do we have a target. Yes, we do have a target. We have a target of 140 litres per capita per day, as inferred by Mr Pritam Singh, by 2030. I am glad it is going down, and what we would like to see is that it will go down sustainably and not just episodically. So, over the next one or two years, we will watch this figure. We will put in water conservation efforts to help our residents, our citizens to save water and then look at whether we need to revise it one or two years down the line. But, certainly, there is a lot of scope for us to put in technologies, to put in measures that will, hopefully, get us better than 140 litres per day, as we targeted.

Secondly, whether we should do a national water rationing campaign. Right now, what we have started is a school-based water rationing campaign. We started with only about 10 schools. Now, a lot more schools have come on board. And even as we try to do this at both the primary and secondary schools, there are issues in ensuring that it is safe. Basic hygiene is still something we want to ensure, particularly the aged, and, in this case, they are very young. Let us go through that exercise and then, over time, not make a water ration exercise become a disaster for individuals. So, I think, for the moment, let us just do this at the school level first and, over time, if there is ever a need for us to have that national consciousness tilt up again, probably we will need to do that. But not for now.

**Mr Png Eng Huat:** Thank you, Chairman. I have just got a question for the Minister. Water conservation affects all. The objective affects all. And the low pressure that is experienced by households affects only certain households on certain levels of a HDB block. So, for PUB to cite water conservation objective as a reason for not setting a minimum water pressure, to these affected households, it is a bit unfair because everyone else in the block is enjoying good water pressure. So, would the Minister be doing something about this or would be reviewing this?

**Minister:** The professional bodies, PUB as well as the industry came together after the Member raised this issue in 2015 to actually see whether they need to revise the CP48 to see whether we should actually put a minimum level. Water conservation issue is only one of them. There are many other issues – how reticulation will be laid out, the kind of appliances that would be used, the sizes of the rooms, the number of people in the room – fairly complicated. So, it is not just one factor. It is a number of factors. Therefore, the decision of this body of professionals, engineers, the industry, consultants, as well as PUB, finally decided that we should not put up a particular number. It is just not sound engineering-wise, and let the PE set it out, design it at the start, and make sure it is right.

As a former Town Council Chairman, I have addressed some of these issues in the households who complained about the water pressure, and it can be done. You have to work with PUB, work with plumbers. Sometimes it is a problem inside, sometimes it is a problem outside, sometimes it is the booster pump. There are many issues that we can try to address for the residents individually. It can be overcome.

**Mr Lim Biow Chuan:** Sir, just two clarifications for the Senior Minister of State Amy Khor. I just wanted to ask the Senior Minister of State whether she thinks that the state of cleanliness in Singapore, is it better today compared to five years ago. Second clarification: why does NEA feel that issuing a CWO is a more serious offence as compared to imposing a fine? When you impose a fine on a litterbug, he pays the fine, five minutes later, he forgets about it, but he walks away complaining that the

Government is trying to make money out of him. But if you impose a CWO on a litterbug, you take one hour away from him, make him pick up litter, he will realise better the effect of the litter that other litterbugs have thrown on the ground, and the lesson will stay with him for a much longer period of time and, hopefully, that will deter him from littering again.

**SMS:** I thank the Member for his questions. I am also pleased that he is extremely passionate about keeping Singapore clean. Asking me whether I think Singapore is cleaner now or not, I may not be the right person to ask. I might be biased. Actually, we have done some surveys. We had done a public cleanliness perception survey between late 2016 and early 2017 with 2,000 respondents. In the public cleanliness perception survey, it actually showed that 87% of the respondents said that they were satisfied with the overall cleanliness of Singapore – hard as it may be for you. But it is a properly done survey, 2,000 respondents, 87%. But, of course, their satisfaction with different areas vary. So, they were most satisfied, for instance, with transport nodes, MRT stations, and so on. They ranked that – they were most satisfied, in terms of cleanliness. Areas where they were not satisfied with, which I think we all have some idea of, would be like HDB void decks, F&B establishments, that is, the eating establishments, as well as places after public events. They scored about 59%. So, it varies. I think NEA does work on having more enforcement, for instance, at hot spot areas, and also getting volunteers to adopt bright spots to turn these hot spot areas into bright spots.

As regards the efficacy, for instance, of enforcement, as I have said, we couple enforcement as a deterrence with education, and I agree with the Member that we need to start young, from schools. And that is what the Public Hygiene Council and Singapore Kindness Movement have done. If you look at enforcement, for the 30,000-odd offenders caught in 2017 for instance, about 5% are repeat offenders. So, there is a deterrent effect. Of the CWO repeat offenders, those who have done CWOs before, repeat offenders are about 10%. So, I think there is some deterrence. As regards why not CWO on everyone, I think we also need to realise that there may be people who, for medical reasons, cannot do CWOs, for instance. CWO is actually harsher because if it is a fine, they just pay. But CWO, they all have to take leave, they will have to go and do their CWO, and it may be in public places where they do not want to be seen.

**Mr Leon Perera:** Sir, firstly, I would like to thank Minister Masagos for his reference to the coastal adaptation study. I do not believe he touched on this particularly, but could he confirm if the study is also looking at parts of the coast, like intertidal coral reef zones, sands and mudflats and mangroves, as well as the islands like Pulau Tekong, Pulau Ubin and the Southern Islands. Look at the climate change impact on those areas as well.

The second question is: are soft engineering approaches, such as planting coastal vegetation, if they do not exist right now, also being studied as part of MEWR's plans?

**Minister:** The answer is "yes". When the coastal protection study is ready by 2018, we will see the details. So, the consideration will need to be made when we reinforce or increase the coastal protection that we will have to do over the years.

**Mr Louis Ng Kok Kwang:** I have two questions, Sir. Can I ask if MEWR will be studying the issue of the usage of single-used plastic bags further, especially with regard to implementing the usage plan? It has been proven effective in other countries. It has resulted in the reduction of the use of plastic bags, which is exactly what MEWR's role is.

So, I want to stress that we should look into that further and to stress also that this is not a ban on the use of plastic bags.

Secondly, does MEWR have data on the number of plastic bags used in Singapore? If not, does MEWR intend to collect such data so that we can measure the effectiveness of the current retailers' schemes?

**SMS:** As I have said, the lifecycle assessment study did show that for plastic bags, it has got the highest greenhouse gas emissions and energy used. But on the other hand, other disposable bags, for instance, biodegradable bags which are so-called more eco-friendly also actually have some environmental impact in terms of production. Paper bags require lots of water to produce and, of course, there is this issue of land deforestation. We have to plant trees to produce paper pulp, and so on. Another example with the oxo-biodegradable bag which actually is made of plastic additives that will help to accelerate the degradation of the bag and that is supposed to be more eco-friendly. But actually, because we incinerate power waste, including plastic, these oxo-biodegradable bags will still have the same environmental impact as plastic bags. If we actually place a charge or ban, where we have a ban on bags, what will happen is there will be substitutes for using other bags. So, what we are saying is that because we incinerate waste, we do not have the same issue as many of these other countries who actually land fill directly. But we agree that we should curb or tackle the issue of excessive use of such plastic bags and other disposables. What we want to do is to tackle it at source. So, we will have mandatory reporting of packaging waste, as well as the waste reduction plans by businesses by 2021. In addition, we will work with the VWOs and other organisations to raise awareness and encourage people to reduce their use of such disposables. In our new hawker centres, for instance, we have already disallowed use of disposable crockeries, and so on, for dine-in.

**Dr Chia Shi-Lu:** Just a quick one for the Senior Minister of State. Could I just ask or clarify whether it is possible for someone who has been caught for littering, if he is unable to pay the fine, could he choose to take a CWO instead of paying a fine?

**SMS:** The CWO is actually issued by the court. So, if they are repeat offenders, they go to court and we do recommend CWOs. So, the courts will decide on that. If they are first offenders and they cannot pay the fine, we will look at various ways to assist if we can.

**Er Dr Lee Bee Wah:** Sir, I would like to thank the Minister, Senior Minister of State and everyone in MEWR for taking great effort to address all the issues raised. I would like to thank my GPC Members for filing the cuts and speaking up passionately. And to all in this House, I would like to urge you to take climate action pledge if you have not done so. Let us take positive action to save the earth for our next generation. Sir, I beg leave to withdraw my amendment.

Amendment, by leave, withdrawn.

The sum of \$1,304,123,800 for Head L ordered to stand part of the Main Estimates.

The sum of \$921,297,500 for Head L ordered to stand part of the Development Estimates.

**Speech by Dr Amy Khor, Senior Minister of State for the Environment and Water Resources, at the MEWR COS 2018 debate on 6 March 2018**

**A. Introduction**

1. Mr Chairman, in the Year of Climate Action, MEWR will rally everyone to take action against climate change, this year and beyond. We hope all Singaporeans will join forces to ensure Singapore remains our best liveable home and a vibrant, sustainable city for generations to come.

**B. Community Participation in Climate Action**

2. Since the Year of Climate Action was launched in January, the video on MEWR's Facebook page has received over 167,000 views, and I am glad that more than 21,000 individuals have made Climate Action pledges online.

3. Associate Professor Muhammad Faishal Ibrahim asked what role businesses and the public can play in climate action. My Ministry will intensify engagement to galvanise action amongst NGOs, businesses, communities, households and individuals. Let me elaborate.

**NGOs**

4. NGOs have always been passionate about sustainability, and many took the initiative to work together even before this year began. We will reinforce and support their ground-up efforts.

5. I had a dialogue with NGOs in January this year, where we agreed that climate action collaboration and co-ordination across all stakeholders could be stronger. Arising from this dialogue, Ms Jessica Cheam, Managing Editor of Eco-business brought together NGOs and business leaders to form the Climate Action SG Alliance to advocate climate action and raise public awareness on climate issues. It will be chaired by Ms Cheam in her personal capacity. MEWR will support this ground-up initiative and I have agreed to act as the Advisor. We will also be launching a Climate Action SG Grant. NGOs and Grassroots Organisations can apply for this grant to defray some of the costs of organising programmes in support of the Year of Climate Action. Upon application, each eligible organisation can be provided with up to \$5,000 on a reimbursement basis.

**Companies**

6. Many companies have reached out to us in support of the Year of Climate Action, with over 110 firms including DBS, SembCorp, CDL and Ricoh making Climate Action SG pledges. Many of our SMEs have also pledged. These companies recognise it is possible to do good and do well at the same time. We hope more companies will voluntarily pledge and take climate action.

**Community**

7. MEWR will support community efforts to educate the public about climate change and encourage climate action. Grassroots organisations can apply for both the new Climate Action SG Grant and the existing 3P Partnership Fund from NEA for environmental programmes. We will be launching a bulb replacement programme for one- and two-room HDB households to encourage the use of energy efficient light bulbs to reduce energy use. NEA will also be organising an Energy Savings Challenge this year to raise awareness about energy efficiency and conservation.

8. Community engagement in climate action is a challenging long-term journey that goes beyond 2018, but we will stay the course to get every Singaporean on board.

### **C. Zero Waste Living**

9. Last year, I outlined Singapore's overall waste management strategy, and the 3 waste streams we are most concerned about; e-waste, food waste, and packaging waste.

#### **E-waste**

10. As Minister mentioned, we will focus on e-waste this year. Singapore generates about 60,000 tonnes of e-waste annually. That is like every person in Singapore throwing away 73 mobile phones every year! E-waste contains heavy metals and hazardous substances that can seriously harm the environment and public health if not properly handled. Some heavy metals can also be extracted from properly recovered e-waste and re-used, which is more sustainable than mining for virgin materials.

11. Dr Chia Shi-Lu asked about the e-waste recycling rate for businesses. As Dr Chia shared, based on the results of an e-waste study by NEA, currently residents place around 6% of their e-waste in e-recycling bins. We estimate the e-waste recycling rate by businesses to be higher, due to take-back arrangements that are usually in place between businesses, and manufacturers or importers. However, more needs to be done.

12. Mr Chairman, with your permission, I would like to show some slides please.

13. Dr Chia and Mr Louis Ng asked for an update on our national e-waste management system. MEWR will implement a mandatory e-waste management system by 2021 to ensure that electrical and electronic products are disposed of in an environmentally friendly way, and allow for safe recovery of useful resources. For a start, this system will cover 5 main categories of products, namely ICT equipment like mobile phones and computers, solar panels, batteries, lamps, and certain large household appliances like refrigerators, air-conditioners, washing machines and dryers. Together, these products make up close to 90% of e-waste in Singapore and generally pose more harm to the environment if not properly treated.

14. Our e-waste management system will adopt the Extended Producer Responsibility (EPR) approach, which is also implemented in other countries like Sweden and South Korea. NEA will set collection targets for manufacturers and importers to take back a proportion of the products they put on the market. They will be required to work with NEA-licensed Producer Responsibility Organisations (PROs), which will organise the collection, transport and proper treatment of e-waste, and help the manufacturers and importers achieve their targets.

15. For example, PROs will work with large electrical and electronic retailers to set up in-store e-waste collection points. All retailers must also provide free one-for-one take-back service for their products. Dr Chia asked about recycling larger e-waste items. Apart from the take-back service provided by retailers, Town Councils also provide bulky waste disposal services, which will ensure collected e-waste is properly recycled.

16. We will set collection targets in consultation with the industry and review them before implementing a penalty framework eventually. The EU started with an overall collection target of 4kg per capita in 2003. After 13 years, the target reached 45% of all electronic products sold on market by weight. We will study the practices in other countries to design a cost-effective system. By aggregating e-waste and enabling more efficient collection and processing, there will be greater value captured from e-waste, which is one of the more valuable waste streams. This will help offset the cost of operating the e-waste system.

17. We will consult relevant stakeholders to work out legislation and implementation details.

18. Some companies have already taken the initiative to implement voluntary e-waste management programmes. For instance, StarHub runs the RENEW programme in partnership with DHL and TES-AMM. I am pleased to see retailers like Courts, Gain City and Harvey Norman coming on board the RENEW programme. There will soon be e-waste collection bins in some of their outlets.

19. The mandatory e-waste system will help both the environment and the economy. EPR systems have generated new business opportunities and jobs in the e-waste management and recycling industries in other countries. In France, more than 3,000 e-waste recycling jobs were created since EPR was implemented in 2005. We will integrate and support smaller industry players so they can benefit from our national system, including karang guni men who provide collection services.

### **Food Waste**

20. Next, I will talk about food waste. I am glad that our food waste recycling rate has increased from 12% in 2012 to 16% in 2017, which is about 133,000 tonnes. We will continue to explore which food waste solution works best in Singapore. For example, around 90% of eligible stallholders participated in the food waste digester pilot at Ang Mo Kio Block 628 hawker centre, which processed around one tonne of food waste a day for the past 2 years. Food waste digesters have also been installed in 4 of our new

hawker centres. Digesters will be installed in 2 more hawker centres in Bedok this year, and in more hawker centres subsequently.

21. Ms Cheng Li Hui asked how food waste in military camps and Home Team premises is managed. To minimise food wastage, MINDEF and MHA use weekly forecasts of meals required to ensure that the right amount of food is prepared. NEA works with both Ministries on food waste management initiatives, such as with the Central Manpower Base on NEA's Food Wastage Reduction Outreach Programme.

22. Several army camps are also participating in NEA and PUB's food waste pilots, where source-segregated food waste is collected and transported to a demonstration facility at Ulu Pandan Water Reclamation Plant. There, food waste is co-digested with used water sludge to generate biogas.

### **Packaging Waste**

23. Finally, I will touch on packaging waste. Mr Daniel Goh asked about packaging waste produced by food delivery services. While NEA does not monitor this specifically, the total amount of packaging waste has remained fairly constant over the last few years, and makes up around a third of the total domestic waste in Singapore. The voluntary Singapore Packaging Agreement (SPA) has cumulatively reduced almost 39,000 tonnes of packaging waste since its inception in 2007. Building on this, we will put in place a mandatory reporting framework for packaging waste management by 2021.

### **Life-Cycle Assessment of Carrier Bags and Food Packaging**

24. Ms Cheng Li Hui and Mr Dennis Tan asked about our efforts to deal with plastic waste, and specifically whether we will impose a charge or ban on single-use plastic bags.

25. Unlike many of the countries that have imposed a ban or mandatory charge on plastic bags, we do not directly landfill our plastic disposables but incinerate them. Hence, we do not face the land and water pollution issues that plague those countries.

26. Plastic bags are also necessary for responsible and hygienic bagging of waste in our moist, tropical climate. Unbagged household waste attract more pests like cockroaches and rats, creating serious environmental and health problems.

27. A recently concluded life-cycle assessment (LCA) study on carrier bags and food packaging, commissioned by NEA, found that every type of disposable bag, not just plastic bags, but also bio-degradable bags and paper bags for example, impose different environmental impacts, whether it be carbon emissions, heavy water usage or significant land clearance. This is particularly so as we incinerate our waste and do not directly landfill. Hence, imposing a charge or ban on disposable plastic bags and substituting them with other types of disposable bags is unlikely to improve environmental outcomes. The study concluded that consumers can generally reduce

their environmental impact by using reusable bags and food containers instead of disposables.

28. In Singapore, a more sustainable approach is to tackle the excessive consumption of all types of disposables.

29. We will step up engagement with stakeholders to cut down the excessive use of plastic bags as well as disposables like single-use food containers. For example, Foodpanda is working on a trial where customers can opt-out of disposable cutleries when ordering food. Zero Waste Singapore also launched an innovative Bring Your Own (BYO) Singapore campaign last year to incentivise consumers to bring their own reusable bags or containers to eateries and supermarkets to earn discounts or free gifts.

30. We will continue to support such efforts while holistically tackling the broader issue upstream by reducing all types of packaging waste at source. By 2021, we will mandate that businesses report on the type and amount of packaging they put on the market and their plans for reduction. We will start industry consultations this year.

31. Mr Leon Perera also spoke about microplastics, an issue receiving increasing international attention, which we are working on closely with our international partners. To ensure that Singapore does not contribute to marine litter and microplastics, we have stringent and comprehensive regulations to control pollution and manage waste. We enforce strict anti-littering laws and incinerate our waste, and conduct clean ups of waterways and beaches to minimise marine litter.

32. Our island is also fully sewered and all used water is collected and treated to international standards before discharge. During used water treatment, microbeads, a form of microplastics, will be substantially removed as sludge and disposed of by incineration.

33. In addition, the Agri-Food and Veterinary Authority (AVA) conducts regular food safety tests on locally sourced and imported fish. During these tests, AVA monitors for chemical contaminants found in microplastics which may affect the safety of the fish for consumption. AVA will continue to monitor this issue and introduce appropriate food safety measures where necessary.

#### **D. Public Cleanliness**

34. We agree with Mr Lim Biow Chuan that it is important to keep Singapore clean and we couple education with enforcement measures, to tackle littering. In 2014, we doubled the maximum fine for littering offences under the Environmental Public Health Act (EPHA) to enhance deterrence. We have stepped up enforcement against littering over the years, issuing more than 32,000 tickets last year compared to around 26,000 in 2015.

35. I thank Mr Lim for his suggestion to impose mandatory Corrective Work Orders (CWO) on all littering offenders. Generally, more callous littering offenders would be more culpable and liable for stiffer penalties. CWO, which is issued by the Court, is meant for more severe cases like recalcitrant litterbugs, and it could be excessive to impose on all littering offenders.

36. Mr Lim may also wish to know that foreign workers convicted and fined more than \$2,000 or jailed for littering related offences may have their work passes revoked and banned from employment.

37. The Public Hygiene Council (PHC) has been working alongside the Singapore Kindness Movement (SKM), to promote the values of picking up after ourselves and keeping our environment clean.

38. It is not sustainable to keep intensifying enforcement against littering. Instead, everyone should take ownership of the cleanliness of their homes and communities. I hope everyone can join us in our efforts to keep Singapore clean and litter-free.

#### **E. Food Delivery Services**

39. Associate Professor Daniel Goh asked if we have plans to regulate new food delivery service providers like Foodpanda and UberEats, in the same manner as food caterers.

40. Unlike food caterers, food delivery service providers are not involved in the preparation of food. Food catering involves the advance preparation of large quantities of food at the premises of consumers, while food delivery service providers generally transport smaller quantities of food from various eateries to customers for immediate consumption. These service providers therefore do not pose the same level of risk as caterers.

41. Food delivery service providers do have the responsibility to ensure that delivered food is not contaminated during delivery, and that the interiors of their delivery vehicles are clean and free of pests. Failure to do so is an offence under the Environmental Public Health Act. If there is food poisoning arising from malpractice during delivery, such as if the delivery person mishandles or deliberately tampers with the food, the delivery person can also be charged for possessing food which is unclean or unfit for consumption.

42. Given these, we have no immediate plans to introduce additional regulations over food delivery services. We will however continue monitoring the industry closely, and if necessary, tighten food hygiene requirements to maintain high food safety standards.

#### **F. Hawker Centres**

43. Finally, I will speak about hawker centres. Chairman, many Singaporeans have told me that hawker centres and the food they offer are what they identify with and miss most when they are overseas. The Government has invested significantly in developing and enhancing hawker centres over the years to ensure that we and future generations can continue to enjoy our unique hawker culture.

### **Improving Hawker Centre Infrastructure**

44. To achieve this, hawker centres undergo cyclical repair and redecoration works about once every 7 years. In 2001, the government also started a \$420 million Hawker Centres Upgrading Programme (HUP) and upgraded more than 100 hawker centres by the end of the programme in 2013. We announced in 2015 that we will build 20 new hawker centres by 2027, and since then, 7 new hawker centres have opened, including three last year in Woodlands, Yishun and Jurong West and one in Pasir Ris this year. These naturally-ventilated centres have better layout with wider stall fronts, larger circulation spaces, family seating areas with lower tables for young children, and even spaces for performances and other community events.

45. The remaining new hawker centres will be built in areas like Sembawang, Sengkang, Punggol, Bukit Panjang North and Bukit Batok in the coming years. We will continue improving the design of our hawker centres as we develop new ones and renovate existing ones to meet the changing needs of Singaporeans.

### **New Management Models**

46. Besides hardware, we also continually seek new ideas to better manage our hawker centres. One way we are doing this is by implementing alternative management models for new hawker centres.

47. We have appointed socially-conscious operators to manage our new hawker centres, tapping on their experience managing other F&B operations to enhance the dining experience for patrons. They introduce new concepts and ideas and improve operational efficiency while ensuring affordability of food.

48. These operators must also monitor food prices at their centres to prevent unreasonable price hikes, and ensure hawkers offer at least a few affordable entry-level meals. In almost all the new centres, more than 90% of the stalls offer such meal options at \$3 or below.

### **Hawker Centre 3.0 Committee Recommendations**

49. We must also sustain the hawker trade by both attracting new entrants and supporting existing hawkers. The Government accepted the Hawker Centre 3.0 (HC 3.0) Committee's recommendations last year, which focused on addressing hawkers' manpower constraints, reducing their workload and improving productivity. Ms Cheng Li Hui and Mr Liang Eng Hwa asked about the progress of these recommendations. I am pleased to say that we have made significant progress.

50. We have opened up training opportunities and pathways for aspiring hawkers. NEA collaborated with the People's Association to successfully launch the first season of the Hawker Fare Series of culinary classes for close to 100 participants from May to August last year. The second season has already started this year. NEA and the Institute of Technical Education also jointly developed an "Introduction to Managing a Hawker Business" course, and more than 100 students participated in the inaugural class last year. 4 more classes will be held this year.

51. Two weeks ago, we launched the Incubation Stall Programme to give aspiring hawkers a chance to try out as a hawker. We have offered 13 incubation stalls in hawker centres across the island. 3 stalls have been taken up so far, with another 3 applications received.

52. The Government has set aside about \$90 million to enhance productivity in hawker centres through stall- and centre-level initiatives. This includes stall-level initiatives like the Hawkers' Productivity Grant (HPG), launched last year to promote greater use of kitchen automation equipment, and help hawkers overcome manpower constraints and reduce their workload through greater productivity. Hawkers can be reimbursed 80% of the qualifying cost of equipment, up to a sum of \$5,000, within 3 years. 58 hawkers have been awarded this Grant as of last month, such as Mr Tay Chen Boon, a 74-year old hawker who has been selling popiah at Block 93 Lorong 4 Toa Payoh for the past 45 years. His new continuous feed vegetable cutter saves him almost 2 hours of preparation time daily, as he does not have to chop vegetables by hand.

53. At the centre-level, the Government has funded initiatives like automated tray return systems (ATRS) and centralised dishwashing (CDW) services in existing hawker centres undergoing renovation. So far, we have introduced these initiatives to two existing hawker centres, working with the Hawkers' Associations. We intend to roll-out these systems in phases to up to 25 existing hawker centres over the next few years. We thank Mr Liang for expressing his support for these new initiatives at the upcoming Hawker Centre in Senja.

54. These centre-level initiatives allow hawkers to focus on preparing and cooking their food, saving them time spent collecting and washing crockery or employing someone to do so. They also do not have to invest in the crockery as these are provided by the centralised dishwashing vendor. Taken together, these savings should offset the fees they pay for centralised dishwashing services. The Government also co-funds up to 70% of the operating costs of the initiatives for two years to lower the initial adoption cost.

### **Tray Return**

55. There has been much public discussion about the rationale and merit of encouraging tray return. We started encouraging tray return in 2012, primarily to ease the work of cleaners so that they can concentrate on cleaning tables, allowing for faster turnover of the tables which will benefit patrons. This also benefits hawkers as faster

turnover means they can serve more patrons. Removing leftover food from the table addresses the bird nuisance issue and creates a cleaner, more hygienic dining environment. Returning trays with used crockery after meals is a small gesture of consideration for the next diner.

56. Some people have said encouraging tray return deprives cleaners of their job. That is not the case. Cleaners are not going to lose their jobs, just because we become more considerate and return our trays. Cleaning is not an easy job that attracts many, especially locals. Cleaning companies cannot hire enough cleaners and existing cleaners have difficulties coping with clearing crockery and cleaning the tables, particularly during peak hours. By returning our own trays, we allow cleaners to focus on cleaning tables, improving productivity and the quality of their jobs.

57. We are trying various ways to improve our tray return rates. At the same time, we piloted a project at Zion Riverside Food Centre and Adam Food Centre using behavioural “nudges” and visual cues to improve tray return rates.

58. Under this project, cleaners encourage patrons to clear their own trays after meals, and they wear aprons displaying a message reminding patrons to return their trays. There are also posters on the tables with similar messages. The results at both hawker centres have been encouraging. At Zion Riverside Food Centre, the tray return rate increased by about 20 percent. These initiatives benefited cleaners at these centres, like 65-year old Mdm Chin, a cleaner at Adam Food Centre who said she could concentrate on cleaning tables, making her job easier. NEA will roll out such initiatives to more hawker centres this year.

59. We have also piloted an ATRS with a deposit system at two of our existing hawker centres to “nudge” patrons to return their trays. We hope that over the longer term there will be no need to have such a system, after tray return becomes second nature. In the meantime, we also plan to introduce behavioural nudges and cues at these 2 hawker centres to further reinforce the message.

60. Mr Chairman, with your permission, I would like to say a few words in mandarin.

61. [In Mandarin] The Government has continually upgraded and improved hawker centres in terms of the design of the facilities, the way they are run and the approach to tendering stalls. This is done so that everyone can benefit – diners can enjoy affordable food, while stall holders have a clean working environment.

政府不断地翻新小贩中心的设计与设施，改良小贩中心营运和招标摊位的方式。这能让大家受益，食客可以享用实惠的小贩菜肴，而摊主也能拥有更清洁的工作环境。

62. We also introduced productivity initiatives such as CDW and ATRS to help the stallholders address their manpower issues and reduce their workload. They do not take away work from the cleaners, but actually makes their work easier so they can focus on

cleaning tables and improving their productivity. Diners also benefit as they can access clean tables quickly, and enjoy a more pleasant, hygienic dining experience.

政府也推出了自动化归还托盘系统和中央清洗碗碟设施等生产力措施，以帮助摊主解决人力方面的问题，减轻他们的工作量。

这些措施并不会取代清洁员工，反而使他们更能专注于清理餐桌，提高生产力。食客也因此获益，因为他们能更快地找到干净的餐桌，并在舒适卫生的环境里用餐。

63. All these initiatives ultimately benefit all Singaporeans – diners, cleaners as well as the stall holders.

所有的措施最终都能够让国人获益，包括食客、清洁员工和摊主。

### **Vibrancy of Hawker Centres**

64. Another recommendation of HC 3.0 relates to enhancing the vibrancy of our hawker centres as social spaces. NEA launched the ‘Vibrant Hawker Centres’ programme last June to encourage individuals, teams, organisations or institutions to organise regular activities at hawker centres. The response has been enthusiastic, and some 19 events have taken place across 12 hawker centres in 2017.

65. Hawker centres will continue to prosper as a key part of our social fabric, if everyone plays their part – hawkers, private operators, and patrons like you and I. Together, we can continue enjoying tasty local food in our beloved hawker centres for years to come.

### **Conclusion**

66. Chairman, to paraphrase the Minister of Finance’s words during the budget debate when he was referring to reserves, we are stewards of our environment, just like reserves, preserving and enhancing it for our ourselves and for future generations, just as our forefathers had done for us. Everyone can play a part and benefit from Climate Action. We hope that what we do collectively helps reverse the global tragedy of the commons, and ensures Singapore’s development remains on a sustainable path. No action is too small or inconsequential.

67. For a start, I hope that all Members of this House - besides Er. Lee Bee Wah and Associate Professor Faishal Ibrahim - will lead by example and take the Climate Action Pledge online, and encourage your friends, families and constituents to do so too. I will even send the QR code to your phone now if you wish, so that you can take the pledge. Together we can build a liveable and sustainable environment now and into the future!

## **A. INTRODUCTION**

1. Mr Chairman, may I have your permission to distribute a handout to the Members? May I also use slides to accompany my speech please?
2. Since our independence, Singapore has pursued sustainable development on a long-term basis, never compromising our environment for economic growth. Mr Erik Solheim, Executive Director of the UN Environment Programme, cited us as a model for other countries. Our pioneers cleaned up the Singapore River. They built sewers to improve sanitation. They resettled street vendors to hawker centres to clean up our streets. They built rubbish chutes to handle our waste efficiently. They planned carefully so that industries did not pollute our environment. Our pioneers had the foresight and gumption to plan long term even if critical measures were difficult and unpopular. Their steadfastness left us this liveable environment we enjoy today.
3. They laid the foundation for the next generation to build on. Our clean waterways allow us to harvest stormwater on a large scale. Our sewer networks join up through the Deep Tunnel Sewerage System (DTSS) to maximise NEWater production. Because we have always processed our sewage for safe discharge, NEWater was possible on a national scale and cheaper to produce. Our hawker centres have evolved into vibrant social spaces. Pneumatic systems will transform waste collection, where sanitation workers won't see our rubbish from end to end. We can continue to be proud of our living environment. I hosted 150 international environmental scientists and UN officials last month. Many have never been to Singapore. They were amazed by how Singapore can be an urban, clean and green city, all at the same time - and always looking new!
4. What our pioneers bequeathed us has put us in good stead to tackle a bigger upcoming challenge: climate change. This is an existential issue for our planet. Singapore is vulnerable, from rising sea levels to increasing rainfall intensities to longer dry spells. I agree with Er Dr Lee Bee Wah that we need to take climate action now, for the sake of our next generation. If the previous generation left us a clean and green city, we must make our legacy a sustainable city, as we pass on this treasured and precious land to our children.
5. At home, 2017 was the warmest non El-Nino year. We swung to the other extreme in the new year with a 'January Singapore winter' and intense rainfall. On 8th January, half the month's average rainfall fell over four hours in Singapore but little rain fell over Linggiu Reservoir. In February, high tides caused temporary flooding even without rain! With rising sea levels, we could experience more of such phenomena.
6. I would like to assure Mr Louis Ng that the Government is coordinated in tackling climate change. As climate change cuts across various disciplines, the Inter-Ministerial Committee on Climate Change chaired by DPM Teo, and supported by the National Climate Change Secretariat ensures Whole-of Government coordination. All public sector agencies are committed to taking climate action, in 2018 and beyond. Last

year, we launched the Public Sector Sustainability Plan, setting out longer-term targets to save electricity and water, and green our buildings. We will do more by expanding our targets to include waste reduction and solar energy adoption.

7. The Government however cannot deal with climate change alone. Everyone needs to join forces to reduce our carbon footprint. This is why Singapore designated 2018 as our Year of Climate Action. We want to embed in Singapore's DNA the instinct to care for the environment, like our national consciousness of conserving water. Because both are existential issues. This will ensure that Singapore remains the best liveable city for us and our children. And the best choice for companies to base their business here because we have successful climate action policy and active citizenry.

## **B. CLIMATE ACTION THROUGH ADAPTATION**

8. We must ensure our policies enable Singapore to tackle climate change as we prepare for the future. As a 17th Feb Economist article aptly puts it and I quote "It is not droughts that cause cities to run out of water, it is bad policy".

9. Climate action is taken on two fronts. First, adaptation, to cope with the impact of climate change. We have and will continue to invest billions of dollars in infrastructure such as raising our coastal roads, enhancing stormwater systems and diversifying our water supply. All these will take time and hence we have started early.

10. These are large and long-term investments that must be premised on science. Hence in 2013, we set up the Centre for Climate Research Singapore to deepen research capabilities on the weather and climate of Singapore and Southeast Asia.

### **Resilient Water Supply**

11. The Singapore Water Story is one where we strive for sustainability through long-term planning and investing ahead of our needs. This approach is more critical with climate change, where we need to grapple with both extremes of drought and flooding.

12. Last year, I spoke about Netherlands and Singapore, two countries with different water stories; Netherlands with too much water, and Singapore, with too little – and how we both take our situations seriously. This year, let me speak about Cape Town and Singapore, two cities with similar water stories which have taken very different paths.

13. As Mr Seah Kian Peng has said, since 2014, a 3-year drought has pushed Cape Town's water system to the brink. Its reservoirs stand at 26%. They are scrambling to build desalination plants. But these take time to build. Residents are bracing themselves for Day Zero, when their taps will be turned off and they are forced to queue for water rations.

14. For Singapore, there were concerns regarding Linggiu Reservoir, which supplements the flow of the Johor River, an important water source for both Singapore and Malaysia. Linggiu was full in 2014. But low rainfall, coupled with having to meet the abstraction needs of Malaysia and Singapore, depleted Linggiu to a historic low of 20% in October 2016. Saltwater intrusions and pollution required Linggiu to discharge frequently during such a critical period.

15. While the stock level has gradually improved to 63%, it took more than a year, mainly due to good rainfall and the completion of the Johor River Barrage. But the stock level can drop again quickly, and it has dropped in the last few weeks. Should Linggiu Reservoir fail, it will pose major problems for both Malaysia and Singapore. Water is both a sensitive and strategic issue for the two countries. This is why water is often discussed when our two PMs meet.

16. What Cape Town experienced is not a remote possibility for Singapore. We must not wait for a crisis to take action. Our forward planning ensured that in 2016, when Linggiu was at its lowest, we did not burden our people with water rationing when others had to. The faith of businesses in our water supply was not eroded. Fortunately, the weather turned. But the next dry weather event can come any time; and it could be even longer. We must be ready. We must never believe that our problems are over.

17. Over the years, we augmented our water supply with weather-resilient sources – NEWater and desalinated water. This year, our third desalination plant in Tuas will come on line. By 2020, we will have two more, taking the total to five. Mr Gan Thiam Poh asked about our used water plans. NEWater has allowed us to re-use water in an endless cycle and to keep the water within the system safe to drink.

18. Even with these investments, it does not mean that our water scarcity issue is resolved. It only allows us to stave off temporary water shortages. These sources are also energy intensive and we do not want to be too energy-reliant in our drive to be weather-resilient.

19. This is why PUB has always been exploring technologies to reduce energy consumption in desalination. There is promise in the use of electrochemical energy, waste heat and biomimicry. But it will take time to realise these benefits.

20. The climate challenge is not all negative. For example, a carbon-constrained framework has prompted NEA and PUB to take a different approach when expanding their capacities. They are looking at leveraging the inter-connectedness of water, energy and waste to yield the best outcomes for the smallest carbon footprint.

21. The upcoming DTSS Phase 2 is not just a superhighway to transport used water. It is a strategic infrastructure to boost our NEWater supply and enhance our water security.

22. But we are taking it one step further. By combining the Tuas Water Reclamation Plant (TWRP) at the end of the DTSS and the Integrated Waste

Management Facility (IWMF), the first in the world from ground up, we will employ the latest technology in combustion to synergise and maximise energy recovery. Effluent water from wastewater treatment will be used for cooling waste incineration equipment, reducing potable water demand. Through integration, we will save more than 200,000 tonnes of carbon emissions per year. This is equivalent to taking 42,500 cars off our roads. As an added benefit, when the DTSS is completed, we will have land savings of 214 football fields for future generations to use.

23. Water is entwined with our nation's survival and our everyday lives. It is not enough that the Government pumps billions of dollars into infrastructure to ensure supply. Policies to manage demand are as important. The right pricing policy is needed to ensure good management of this precious resource.

24. We saw how subsidised water price led to high consumption in Cape Town, despite clear warnings of impending water crisis. Pricing is hence critical to manage both production and consumption. It must allow for long-term investments and reflect the scarcity value of water. These principles shape our pricing policy, where we peg our water price to its Long-run Marginal Cost, or LRMC in short. This has been our consistent policy. The LRMC is not a theoretical price – we will actually have to pay when we spend on infrastructure. Hence, we cannot subject the price of water to market distortions. There are commercial sensitivities to the specifics of our pricing. By not revealing them, we ensure market competitiveness and the best possible bids in tenders. Beyond market sensitivities, water is a matter of national security.

### **Water Conservation**

25. We must pay equal attention to water conservation. Prior to the drought, Cape Town was using 225 litres of water per person a day. They are now struggling to cut back to 50 litres. I am encouraged by the drop in Singapore's household water consumption from 148 litres in 2016 to 143 litres per person per day in 2017. I hope that this trend can continue.

26. I said last year that with the permanent additional U-Save rebates, 1 and 2-roomers will not see an increase in water bills even after the full price revision. At this lower consumption rate, many 3-roomers will also not see an increase when the rebates are applied. Water bills after the full price revision will still be within 1% of household incomes.

27. The lower consumption however, is not solely due to the water price. Our water conservation efforts like the mandatory water efficiency labelling scheme are bearing fruit.

28. Er Dr Lee Bee Wah, Mr Seah Kian Peng and Mr Png Eng Huat asked about water conservation efforts.

29. Our water conservation efforts are yielding results because Singaporeans have a national consciousness to conserve water. As part of PUB's comprehensive outreach

programme, many schools are inculcating this consciousness in our children through education and water rationing exercises. Similarly, Government agencies have committed to improve water efficiency by 5.1%, or 900,000 cubic metres a year, by 2020 under the Public Sector Sustainability Plan.

30. PUB started the water closet replacement project last year to help needy families save water with more efficient fittings. 1,100 households have already benefited, and saw a 10% reduction in their water bills on average. This builds on HDB's Home Improvement Programme, where participating households can replace their fittings with water-efficient ones. PUB will continue to engage other eligible households.

31. Mr Pritam Singh raised some suggestions on encouraging the take-up of water-efficient appliances, including offering rebates. According to PUB's latest household water consumption study, more than half of the water fittings and appliances used by households are water-efficient models. This high penetration indicates preference for water-efficient products, especially as the price difference between products of varying water efficiency ratings is insignificant. PUB will continue to work with suppliers and retailers to introduce more water-efficient products.

32. As part of the Smart Nation push, we will also use technology to encourage behavioural change towards water conservation and enhance operational productivity.

33. PUB will be embarking on the Smart Shower Programme. Up to 10,000 new homes will be equipped with smart shower devices under a demonstration project. These devices provide real-time feedback on actual water consumption during showers. An NUS pilot involving 500 households showed water savings of five litres per person per day on average.

34. Mr Gan Thiam Poh asked about the Automated Meter Reading (AMR) system. PUB has been conducting trials on AMR systems, to replace current meters that have to be read manually. AMR meters can be read remotely and provide higher-resolution water consumption data. Results have been encouraging. Let me give you one example.

35. Ms Jacqueline Chan's family participated in PUB's trial in June 2017. Through a mobile app, the Chan family can track and take steps to reduce their daily water usage. They have also saved about 8,000 litres of water after being alerted by their app to a leak in their water closet. We will explore how this system can be implemented nationwide.

36. The non-domestic sector must also play their part. Companies can tap on the Water Efficiency Fund and the Industrial Water Solutions Demonstration Fund to support water-saving efforts. PUB is collaborating with industry to use the data collected through the Water Efficiency Management Plans to develop sectorial water efficiency benchmarks and best practices. PUB has worked with the building sector (including offices, hotels and retail) to publish a best practices guide.

37. Growing and right-pricing our water supply go hand-in-hand with managing water demand. The sum of all that we do will prepare us for the future. For now, there is no need for national water rationing exercises. If we can get our policies right, we will avoid Day Zero.

### **Flood Resiliency**

38. With climate change, Singaporeans will experience more frequent, intense rain storms. Dr Chia Shi-Lu asked for an update on PUB's plans to mitigate flash floods.

39. I gave a comprehensive reply in this House on 5th February. PUB has set higher drainage standards since 2011 – up to 45% capacity increase – but our drains cannot be built to accommodate every extreme rainfall event. This would entail massive land take and much higher costs. We have thus adopted a holistic source-pathway-receptor approach.

40. These complement continuous island-wide drainage improvement works. The works at Stamford Diversion Canal, Stamford Detention Tank and Bukit Timah First Diversion Canal will be completed in 2018. Work will commence at another 22 locations this year, adding to existing works at 73 locations.

41. As flash floods cannot be completely eliminated, we will help members of the public better cope by providing timely situation updates, including SMS alerts about water levels. Those who wish to receive alerts from more than one water level sensor can write in to PUB.

### **Coastal Adaptation**

42. Mr Leon Perera asked about coastal protection. Over 70% of our coastline is protected by hard walls or stone embankments. To protect against rising sea levels, we raised minimum reclamation levels by one metre in 2011, to at least four metres above mean sea level. We will build Changi Airport Terminal 5 at 5.5 metres above mean sea level. To address Singapore's long-term protection needs, the Building and Construction Authority is conducting a Coastal Adaptation Study to recommend a national framework.

### **Vector Control**

43. Scientists also worry about pest and vector problems escalating with climate change. The concerted effort by all stakeholders in response to the 2016 Zika outbreak and our vector control actions contributed to the drop in number of dengue cases in 2017, almost five times lower than in 2016.

However, we also observed a significant increase in mosquitoes caught in our Gravitraps. We cannot become complacent. While we continue with premise inspections, everyone can play their part by practising the 5-Step Mozzie Wipe-out.

44. Climate change may worsen the spread of mosquito-borne diseases such as Zika and Chikungunya. We are studying how male Wolbachia-carrying Aedes

mosquitoes can be used to suppress the mosquito population. We will conduct further studies this year to strengthen our planning for an eventual suppression trial.

45. Climate change can also affect other vectors such as rodents and houseflies. I encourage all to do our part by practising good everyday habits such as disposing our food waste properly at home and returning our trays in hawker centres to prevent pests in our homes and communities.

### **C. CLIMATE ACTION THROUGH MITIGATION**

46. Besides climate adaptation, we also need to take mitigation action to reduce emissions of greenhouse gases (GHGs). One big focus is in energy efficiency for which we enhanced the Energy Conservation Act last year. We are using more solar energy. We have more green buildings with more stringent standards in energy efficiency.

47. Good transport policy will mitigate climate change. This is what the Car-lite policy will do. By 2030, 8 in 10 households will live within 10 minutes of a train station. We have frozen the growth of our car population starting last month. All these will reduce our fossil fuel use and carbon footprint.

48. Last year, I announced the new Vehicular Emissions Scheme to promote cleaner new vehicles. NEA enforces against smoky foreign vehicles at our checkpoints. We have tightened the turn-back limit since January this year. My Ministry is reviewing how to reduce vehicular pollution from older, more polluting vehicles. We will announce our recommendations in due course.

#### **Carbon Tax**

49. Our industries can do more to mitigate climate change. A KPMG study found that only 17% of local firms have carbon reduction targets.

50. The carbon tax is the latest component of our wide-ranging mitigation measures. Ms Cheng Li Hui asked whether the carbon tax is the most effective way to reduce emissions. Pricing will encourage companies to evaluate opportunities to switch to more energy efficient technologies and more sustainable processes. I spoke to Mr Jagadish, CEO of SSMC, a semiconductor solutions company recently. I was told that they are committed to a 30% reduction in GHG emissions in their process design. As more companies like SSMC reduce their carbon footprint, whether through improved processes or when designing new investments, they also improve the Singapore brand premium and reputation for green practices. Across the world, young people passionate about our planet will demand this as consumers. An NEA poll showed that close to 70% of the public was supportive of a carbon tax.

51. Mr Louis Ng asked how we decided on the starting tax rate of \$5 per tonne, which we intend to raise it to \$10 to \$15 by 2030. We aim to strike a balance between providing sufficient incentive for companies and Singaporeans to reduce their carbon

emissions, and giving them enough time to adjust. Our carbon tax will be applied uniformly without exemptions. Other overseas jurisdictions may have significant exemptions for particular sectors. This would lower the effective tax rate. Hence, our starting tax rate cannot be directly compared with those in other jurisdictions.

52. The carbon tax will apply to larger direct emitters – companies emitting 25 kilotonnes or more of GHG emissions a year. Around 40 companies which account for about 80% of Singapore’s GHG emissions will be affected.

53. We will introduce a fixed-price credits-based (FPCB) system where companies will purchase and surrender credits to pay the carbon tax. The FPCB system is akin to a carbon tax, but allows us and companies to build capability to operate in a linked market with other carbon pricing jurisdictions if we decide to do so.

54. Ms Cheng Li Hui asked about the tax revenue while Mr Louis Ng asked about Government’s support measures. The Minister for Finance has said he is prepared to spend more than what we collect in carbon tax in the first five years to support worthwhile projects. We will share more details later.

55. Er Dr Lee Bee Wah asked about the estimated impact of the carbon tax on households. We expect it to be small, at about 1% of total electricity and gas expenses on average. The additional U-Save rebates will help households adjust. My Ministry will also work with the community to help households reduce their energy consumption. SMS Dr Amy Khor will elaborate more.

56. Organisations and companies have begun leading change. The World Bank will stop financing upstream oil and gas projects from 2019. I’m happy that ExxonMobil, a major investor here and a leader in energy efficiency, and one of the companies affected by our carbon tax, has recently pledged to take climate action on MEWR’s webpage. I quote Mr Gan Seow Kee, Chairman and MD for ExxonMobil Asia Pacific that ExxonMobil “is committed to reducing greenhouse gas emissions in its operations, helping consumers reduce their emissions, and supporting research that leads to technology breakthroughs.” Many firms, including many of our SMEs, have made their climate action pledges on MEWR’s webpage. I’m glad we are taking this journey together.

#### **D. STRIVING TOWARDS A ZERO WASTE NATION**

57. I will now touch on waste. Striving towards a Zero Waste Nation is another key focus in this Year of Climate Action. We must reduce, reuse and recycle more. A McKinsey study showed that to make 1kg of fabric, 23kg of greenhouse gases is produced!

58. We are running out of space to store our waste. If we continue business as usual, we will need a new landfill the size of three Gardens by the Bay every 35 years. Waste does not magically disappear when we throw it down our rubbish chutes!

59. Ms Cheng Li Hui asked how Singaporeans and businesses can play a role in Singapore becoming a Zero Waste Nation. Everyone must play a part. The Government will lead in developing infrastructure and frameworks, including legislation where required. But Singaporeans and businesses must participate. Beyond legislation, our people, companies and civic organisations can demonstrate leadership with ground-up efforts.

60. In Singapore, we have closed the water loop and achieved the circular economy in our water sector. We should apply the circular economy to the waste sector.

61. The circular economy is also on the global agenda, where materials are re-used and re-cycled for as long as possible. As a CEO of an African NGO said: There is no such thing as waste, until it is wasted.

62. We will introduce the Extended Producer Responsibility (EPR) approach as a key strategy in waste and resource management. Traditionally, producers are only concerned about the design, manufacture and use of their products. The EPR approach extends their responsibility to include the proper recycling and disposal of their products at the end-of-life. Manufacturers and importers will take charge of the waste they had produced, rather than society bearing the costs. By doing so, businesses are also incentivised to design products that last longer and can be more easily recycled.

63. We will start with e-waste. SMS Dr Amy Khor will share more details on setting up a national e-waste management system using the EPR approach.

64. As we strive to be a Zero Waste Nation, we will turn brown into gold – as we engage in urban mining; as we recover treasure from trash; as we grow and transform a vibrant environmental services industry with good jobs for Singaporeans. And most important of all, as we build a sustainable and liveable home for our children.

65. Mr Chairman, in Malay please.

66. Langkah-langkah yang diambil dalam mengharungi perubahan iklim terbahagi kepada dua bahagian. Pertama ialah penyesuaian supaya mampu mengatasi kesan akibat perubahan iklim. Kami akan terus melabur berbilion dolar dalam prasarana seperti menaikkan paras jalan-jalan raya yang berdekatan kawasan pantai, membina tembok-tembok laut, memperluas parit-parit dan mempelbagaikan bekalan air kita.

67. Selain penyesuaian terhadap iklim, kita juga perlu mengambil langkah-langkah bagi mengurangkan pengeluaran gas yang memanaskan suhu bumi. Kita sudah pun lebih banyak menggunakan tenaga suria. Banyak bangunan yang mesra alam dengan piawaian lebih ketat bagi kecekapan tenaga. Kami telah memperluas rangkaian khidmat pengangkutan awam dan membekukan jumlah pertumbuhan kereta.

68. Tahun lalu, kami telah mengumumkan Skim Menangani Pencemaran Asap Kenderaan yang baru bagi menggalak penggunaan kenderaan baru yang lebih mesra alam. Kementerian kami sedang menyemak bagaimana untuk mengurangkan pencemaran yang berpunca daripada kenderaan-kenderaan lebih tua yang

menghasilkan lebih banyak pencemaran. Kami akan mengemukakan saranan-saranan kami apabila tiba masanya.

69. Cukai karbon merupakan komponen terbaru di antara pelbagai langkah yang kami akan lakukan untuk mengurangkan pengeluaran gas rumah hijau. Ia meletakkan harga pada gas karbon untuk menggalak penggunaan teknologi-teknologi yang lebih cekap tenaga dan kurang mengeluarkan karbon. Amalan-amalan mesra alam harus menjadi sebahagian daripada jenama Singapura yang unggul.

#### **E. YEAR OF CLIMATE ACTION, HOME AND ABROAD**

70. Mr Chairman, in English. Prof Faishal asked what Singapore is doing on the regional and global front for climate action. UN Secretary-General Antonio Guterres has identified the fight against climate change as one of the top priorities for the UN and for the international community. Singapore strongly supports this.

71. In July, I will lead a delegation to the UN, where Singapore will undertake our first Voluntary National Review of the Sustainable Development Goals.

72. We will use our ASEAN Chairmanship to galvanise support for climate action. Singapore will convene a Special ASEAN Ministerial Meeting on Climate Action on 10 July 2018, and a back-to-back expanded meeting with ASEAN and Ministers from China, Japan, Korea and the UNFCCC COP President and President-designate Fiji and Poland. These will take place in conjunction with the Singapore International Water Week – CleanEnviro Summit Singapore – World Cities Summit joint event. We will share experiences and reaffirm the region’s commitment to climate action and the Paris Agreement.

73. We will continue to plug ourselves into the global movement on climate change, and work with partners to shape the international agenda. As the saying goes, “If we are not at the table, we will be on the menu”. To get a seat at the table, we must be credible. This means that Singapore must fulfil our international obligations and show leadership on climate action. Already we’ve been noticed. Christiana Figueres, the former Executive of UNFCCC said in an article published locally in Singapore in BT: “Fortunately, Singapore is attuned to this urgent turning point. It’s “Year of Climate Action”, backed by concrete steps in the domestic policy sphere, is the kind of leadership the region needs.”

#### **F. CONCLUSION**

74. Let me conclude. To succeed in our climate action endeavour, Government’s efforts alone will not be enough. All Singaporeans have a critical role to play. We do not want to mandate everything. Instead Singaporeans must feel empowered to take climate action. This is akin to our Water Story which was not just the effort of the

Government, but that of generations of Singaporeans who partnered us for the greater good.

75. This is why we have designated 2018 as the Year of Climate Action. It is the start of our journey to raise the level of national consciousness to fight climate change. We will pass this consciousness from generation to generation. This will ensure our children do not end up facing a climate change crisis - higher sea levels, frequent swings between intense weather or pestilence. They should never have to face a water crisis like Cape Town.

76. I accompanied President Halimah for the launch of the Singapore World Water Day last Saturday. What struck me most was when two little girls, Alyssa and Abby, asked 'What if this was our last drop?' Indeed, we must never let our children ask this, or "Why is our air so polluted? Or why is our sea level rising?". Our children are the reason why we need to take climate action. Now.

77. Taking climate action now is how we shall pass to our children a Singapore that is a liveable city ever more, a city where thriving businesses have low carbon footprints, and a city with environmental solutions that are well sought after. We can do this, together. Thank you.

78. I now hand over to the SMS Dr Amy Khor.

Mr Amol Gupte

Head of ASEAN and CEO

Citi Singapore

Mr Vikram Subrahmanyam

Head of Operations and Technology

Citi Asia Pacific

Distinguished Guests,

Ladies and Gentlemen,

Good evening. Let me wish all the ladies here a belated happy International Women's Day. I am pleased to join you today to show my support for two issues that are close to my heart – gender equality and sustainability.

### **Progress Made in Gender Equality**

2. The United Nations Sustainable Development Goal, or SDG, 5 aims to achieve gender equality and empower all women and girls. One of the targets under SDG 5 aims to ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

3. Singapore has made significant progress in terms of female participation in politics. Most recently, Madam President Halimah Binte Yacob, became the 8<sup>th</sup> President of Singapore, and our first female President, joining about 20 other female Heads of State and Heads of Government worldwide. In fact, Ms Sheikh Hasina Wazaed, the Bangladeshi Prime Minister, met the President yesterday, and you could see that she was extremely pleased and proud to meet a fellow Head of State who is a female. Having been in politics for a while now, I am heartened that female representation in Parliament has increased to 23% over the years. We now have two female Ministers in our Cabinet. Similar progress has been made in the economic sphere. A 2018 survey by consultancy firm Grant Thornton showed that 78 per cent of local businesses now have at least one woman in C-suite jobs, a marked improvement over last year's 64 per cent result. The same study also showed that in Singapore, the proportion of senior business roles held by women increased from 26 per cent last year to 30 per cent this year.

4. Nevertheless, we must not let up in our efforts. After all there is a Chinese saying, “women hold up half the sky”. The Family and Work Report 2017 by the Ministry of Family and Social Development showed that gender roles and division of labour continue to exist and shape how families manage family and work responsibilities. It noted that married working women contribute more towards care-giving and household chores while married working men contribute more towards household finance.

5. Institutions and companies increasingly recognise the value of gender diversity, which enables them to take on board diverse views and perspectives. This is critical for making better decisions in a world that is increasingly volatile, uncertain, complex and ambiguous, or VUCA. As we celebrate International Women’s Day and reiterate our commitment to gender equality and the advancement of women, I urge organisations to continue to work towards increasing female representation in the senior management team to benefit from the diversity of views and experience of these women leaders.

6. Women are as capable as men in taking on various C-Suite positions. In line with this evening’s theme of “Driving Progress in Sustainability, a good example would be the relatively new role of Chief Sustainability Officer, or CSO. As firms increasingly appreciate the importance of addressing sustainability issues which are of concern to their customers and shareholders, we are seeing more companies with CSO roles and many women taking up this role. I am indeed encouraged that many women are heading sustainability efforts in Singapore, including Esther An, Chief Sustainability Officer at City Developments Limited, Janet Neo, Head Corporate Sustainability at Fuji Xerox Asia Pacific, Winnie Tan, Head of Community Engagement & Sustainability, Corporate Affairs in Singapore and ASEAN & South Asia at Standard Chartered Bank, Dr Lee Hui Mien, Vice-President for Sustainable Solutions at Mandai Park Developments, and Karen Lee, Sustainability Lead in Asia at Interface, just to name a few. Just in case you think I am gender-biased, we do have Sustainability Officers who are in management positions, for example Mr Kevin Teng, Executive Director of Sustainability from Marina Bay Sands, and Mr Chia Boon Chong, Director, Group Sustainability from Singtel.

7. I am heartened by the efforts of progressive firms such as Citi Singapore which has proactively worked towards gender diversity in their management team and organised today’s event to celebrate International Women’s Day. Indeed, Citi has been progressive, as this is the first International Women’s Day celebration I have attended which is organised by a bank. I encourage other companies to similarly tap on the diversity of thought and experience which women can bring to their organisations.

### **Sustainability and Climate Action**

8. Let me also commend Citi Singapore for their support of Singapore’s Year of Climate Action. Citi Singapore is the 150<sup>th</sup> company which have taken their pledge for climate action. As many of you are aware, Singapore has designated 2018 as the Year of Climate Action to raise national consciousness around the need to take individual and collective action to fight climate change and build a more sustainable Singapore, while fulfilling our international commitment to cut emissions intensity by 36 per cent from 2005 levels.

9. Climate change is real and its effects can be devastating. 2017 is the warmest year on record, among all those years without El Niño conditions. In 2017, the world also witnessed various extreme events, among them hurricanes Harvey, Maria and Irma. As climate change intensifies in the coming years, these intense weather patterns will occur more frequently.

10. The government will regulate where necessary to reduce our greenhouse gas emissions, such as implementing a carbon tax on large emitters from 2019. However, the government cannot do it alone. Everyone has to play a part in reducing our carbon footprint. Climate action engagement with business organisations is especially important, given that the industry, buildings and transport sectors account for over 90 per cent of our greenhouse gas emissions.

### **Role of Financial Institutions**

11. Financial institutions play a key role in our efforts to engage businesses in climate action. Beyond the integration of green practices into business operations, banks like Citi Singapore play an important role in furthering green financing, a global trend which is seeing global banks pledge billions in the fight against climate change. According to the UN Environment Programme's green finance progress report, globally, sustainable assets under management have increased by about 25% from 2014 to 2016. A report on Green Finance Opportunities in ASEAN initiated by the United Nations Environment Programme last year estimated that there is US\$3 trillion in green finance opportunities in the region from 2016 to 2030 in the areas of energy efficiency, renewable energy as well as agriculture and land use. There is also increasing demand from institutional and consumer clients for green loans and green investment funds.

12. As with gender equality, the pursuit for green and responsible financing is a work in progress. I urge all financial institutions to continuously explore more ways to integrate Environmental, Social and Governance, or ESG, practices into the organisation's core decision-making processes, develop different kinds of green finance products and foster the growth of a green asset class in the region. Every business should set clear goals for reducing their carbon footprint, such as by using more renewable energy.

13. I am pleased to note that Citi globally is already making significant commitments in climate action, including the goal of becoming 100% powered or be carbon neutral by renewable energy by 2020, and your public commitment on the \$100 billion Environmental Finance Goal over 10 years from 2014 to 2023. I am also encouraged that Citi Singapore has submitted your organisational Climate Action pledge and made the organisation's climate goals public, as well as encouraging your clients to do so. These goals and efforts not only support Citi's global commitments and aspirations, but also demonstrate the willingness of companies in the financial sector to take urgent action in face of the existential threat of climate change.

14. Individually, each one of us must also believe in climate action. I therefore urge all of you to join the fight against climate change, right now. Join the more than 39,000

organisations and individuals by taking out your phone, typing in [climateaction.sg/pledge](https://climateaction.sg/pledge) and making your individual or corporate Climate Action pledge now.

## **Conclusion**

15. While much progress has been made in the drive for gender equality and sustainability, we have the potential to drive further changes by working together. I look forward to joining the panel discussion later to explore how we can do so with you.

Thank you.

Mr Wilson Ang

Executive Director of Global Compact Network Singapore

Mr Khor Chern Chuen  
Managing Director, Singapore, SAP Asia Pte Ltd

Youth Delegation for the GCNS Youth Forum 2018

Ladies and Gentlemen

Good evening. It is my pleasure to meet such a large group of youths from various countries for dinner. Before I start, I think it is important to acknowledge that youths play a very big role today.

2 In fact, youths feature very heavily in legends that we tell to our children in the Malay community which I represent. There was this story of Hang Nadim, which is very interesting as it is connected to Singapore. Back then, the shore of Singapore was assaulted by swordfish, and the council had suggested to the king for a group of men to line up along the shore to form a barrier with their leg, which would solve the problem. Hang Nadim thought it was a ridiculous idea, and suggested to plant banana trunks instead. The king thought it was a brilliant idea and implemented it. However, the council felt insulted, and persuaded the king to get rid of him, lest he grow up to be smarter and take over the throne. Hang Nadim was then chained up and thrown into the sea.

3 In our legends, you will find such stories of how children and youths have come up with effective solutions and proposals. Thus, I am happy that Global Compact Network Singapore (GCNS) has organised this youth forum, which brings people from the ASEAN region together. This is a platform for us to exchange ideas and inform each other of what we are doing in our respective countries with respect to sustainability.

### **NEED FOR CLIMATE ACTION**

4 Climate action is listed as SDG 13, which is one of the SDGs the world has pledged to take up. It shows the existential challenge that we have on our hands. Recently, there was an article that showed the disappearing coastline of Florida. These are tell-tale signs of what could happen.

5 We are witnessing the effects of climate change all over the world. There is a difference between climate change that is predicted for the end of the century, compared to the extreme weather we have seen today. For example, there were only a matter of weeks between hurricane Harvey and Irma. Hurricanes arise due to the heating of the sea, which would then cool after the hurricane. Hurricanes are nature's way of cooling the sea. However, these hurricanes came on the heels of each other. In fact, another one came along shortly after, bringing it to a total of 3 hurricanes in a matter of weeks. This kind of phenomenon should not be happening for hurricanes.

6 Other changes could include rises in the daily mean temperatures. Already in Singapore, we are seeing warmer days and warm nights than we did 10 years ago. These will intensify at the end of the century if we do nothing to reduce climate change.

7 In Singapore, to the credit to our pioneers, we have decided to address that when we planned to urbanise our city. Back then, our Singapore river looked like an open sewer and human waste was collected in bucket sewage systems. They were also throwing rubbish anywhere in the streets. When we started our journey of urbanisation, our pioneers had the foresight to understand the paradigm that is not carried out in many parts of urbanisation today – that development did not have to compromise on the environment.

8 When Dr Winsemius, the economic advisor for Singapore from Netherlands, was told by Mr Lee Kuan Yew that he wanted to clean up the Singapore river, he said that it would waste too much effort and money. I met his son some months ago, who told me that his father was right on everything except this. Mr Lee had even invited him to catch a fish at our Singapore River after the clean-up. Dr Winsemius also managed to catch a fish, and joked that that it was planted there by Mr Lee! I hope that you would have time

to see our Singapore river. We have now barraged the river to make it one of our reservoirs. We not only drink from, but use it to manage the flood system in our city and provide recreation for everyone.

9 Our NEWater plants currently supply up to 40 per cent of our water needs! For our waste collection, we have used a rubbish chute system. From this, we will implement something revolutionary, and create a pneumatic waste system. When someone throws waste down the chute, it will get transported into a central system, where it will be compacted, or separated into recyclables and non-recyclables, and processed. People in the janitorial service will not even see the waste!

## **YEAR OF CLIMATE ACTION**

10 Our environmental efforts do not stop here. We have designated 2018 as the Year of Climate Action. We have the obligation and duty to follow in the footsteps of our pioneers, and leave a sustainable and liveable city for the next generation. The next generation is already facing climate changes, with rising sea levels, intense rain and yet, lesser rainfall. In 2017, we had received around 2000mm of rainfall, which was 6 per cent below our usual average of approximately 2,166mm of rainfall. However, when there was rain, it was so intense that it led to flooding.

11 My Ministry has been actively engaging the different sectors, and encouraging them to take action. Many organisations have signed up. We have asked everybody in Singapore to visit our webpage to read and take the climate action pledge. Over the last one and half months, I am happy to say that there have been 40,000 pledges, including companies such as ExxonMobil and telecom companies. These companies recognise the importance of taking action today for a better tomorrow. In our Year of Climate Action, we are committing for Singapore to continue as a sustainable and liveable city. That is our vision for the years to come.

## **ROLE OF ASEAN and the +3 COUNTRIES**

12 Today, I am heartened to see the active participation of friends from the ASEAN and the +3 countries at this forum on the SDGs. When it comes to the environment, we must take care of ourselves. We have to work together to combat climate change. We only have one planet.

13 The role of the ASEAN and the +3 countries in tackling climate change is a critical one. ASEAN is going to be the fastest growing region in the world. In 2016, our region's GDP was reported to be around US\$2.6 trillion. Indonesia alone is growing at 6-7% per year. This means that in less than 10 years, it will be double the economy today. It is thus important for your generation to demand that as we progress, we do it responsibly. This does not only benefit the generation today, but the future ones as well.

14 I will be hosting in July a Special ASEAN Ministerial Meeting on Climate Action. We are bringing the ministers here to discuss this important and critical situation together, along with our key partners from China, Korea and Japan as well as the UNFCCC COP-23 and COP-24 Presidents from Fiji and Poland respectively.

## **ROLE OF YOUTHS**

15 However, you should not think that you must be ministers to make an impact. You can be like Hang Nadim, and make impactful suggestions. You can get people to buy only sustainable products, or inculcate habits that make wasteful consumption a thing of the past. Youths have the power to demand change. And the change that you want to see tomorrow starts today.

16 You should not wait until it is too late. I hope that you go back and think of your roles as models and multipliers. Simple climate actions will go a long way.

## **Conclusion**

17 Let me leave you with another story. In Singapore, we are trying to reduce our consumption of water. It had been reduced from 148 litres per day in 2016, to 143 litres per day in 2017. This is something we are

very serious about. It is not just about increasing supply, but about managing demand. This is why no action is too small. Collectively, it can have a big impact.

18 Last year, we raised the price of water by 30%. This is because we had to start producing water through desalination and NEWater plants which are costly. The price increase has led to a reduction of consumption of water.

19 This can happen everywhere in the world. I hope that the youths will go back and advocate to live sustainably, to ensure the next generation can have a sustainable future together.

Thank you.

Ms Cheryl Chan,  
MP and Advisor for Fengshan SMC

Ms Tan Lee Jee,  
Senior Director, PAP Community Foundation,

Ms Alice Chan,  
Executive Principal for PCF Sparkletots Preschools North East District 3,

Parents,

Boys and girls,

Good morning. I am happy to be here at Our Tampines Hub to celebrate Singapore World Water Day with you.

2. World Water Day is celebrated all over the world on 22 March. This is an event which is marked by the United Nations to remind the whole world of the importance of water and to not take water for granted. In Singapore, we celebrate Singapore World Water Day throughout the month of March to educate the public on the importance of this precious resource.

### **Impacts of Climate Change on Singapore**

3. Ladies and gentlemen, the important of water is also connected with the climate challenge that we are facing today. Singapore has increasingly been suffering from less rain, and variable weather. Remember, in February, we had a very heavy rain and there were some flash floods around Singapore. At the same time, the Johor River did not flow well from the Linggiu Reservoir. About 50km from here, rain did not fall. Water is always an issue for us, and more so, when we do not have the kind weather that we had for decades in the past. This is because of climate change.

4. Every one of us can play a part to fight climate change, and take climate action. One of the ways we can take climate action is by conserving water.

### **Encouraging the Young to Conserve Water**

5. I am happy to see children, families and staff from PCF Sparkletots North-East 3 District sharing and promoting the importance of water conservation. It is important to inculcate good water conservation habits in our young. If you ask the children what does “Make Every Drop Count” mean, they might know what it means. But if you help them to practise water conserving practices, like taking shorter showers and brushing their teeth with a mug, these habits will stay with them for the rest of their lives.

6. The 16 Sparkletots preschools gathered here today have put together a series of initiatives like a water rationing exercises and door-to-door visits to share water-saving

tips. These are all important initiatives to inculcate a very important Singaporean consciousness, which is to save water. Just now you saw the students from Tampines West Blk 890A and Tampines West Blk 151 perform a dance. While it is just a dance, it also engrains in them the practices and the importance of saving water. Thank you Sparkletots for putting this event together, and letting our children be aware of water conservation from a very young age. I commend Sparkletots for your efforts.

### **Act Together, Start Today**

7. Ladies and gentlemen, there is one thing that I would like to ask all of you to do, and that is to take the 'I Save' pledge before you leave Our Tampines Hub today. There are five simple steps that all of us can do to save water.

8. Lastly, 2018 is also the Year of Climate Action. Whether you are young or a senior, please go to the MEWR page and understand what you can do apart from saving water to fight the climate challenge. Together, this is the way, our forefathers, the generation of Mr Lee Kuan Yew, left us with a wonderful environment. People from all over the world are in amazement of how Singapore can be such an urban built-up place, and yet, be clean, green and hygienic. So if there is what that generation left for us, then I hope that this generation will leave for our children and their children a Singapore which is safe from climate change. On that note, let us make every drop count. Take action against climate change. Thank you again to PCF Sparkletots North East District 3 for organising this event.

Thank you.

Ms Sara Cheng

Chief Executive Officer, Fuji Xerox Singapore

Ladies and Gentlemen,

Good morning to you. I am happy to be here at Fuji Xerox's DocuWorld Business Conference and launch the Fuji Xerox Singapore Sustainability Report.

2. I do not usually come to endorse any company, but I thought Fuji Xerox is way ahead in realizing our vision of a zero waste Singapore where we want to make sure that everything that we consume does not go wasted. An African counterpart once said, "There is no such thing as waste until it is wasted." As the world transits to a low-carbon economy, it is timely to have conferences like this, whether to pursue business interest or to look for solutions. It is a way to affirm our commitment to sustainability, and the best way to stay competitive.

### **Carbon Pricing Bill**

3. Yesterday, the Singapore Government just passed the Carbon Pricing Act. This means that from 2019, about 40 of the largest emitters will be paying \$5 per tonne of carbon dioxide emitted. We are the first country in our region which has priced an externality for carbon emissions. In the past, companies emitted carbon dioxide freely, and did not pay for the clean-up or consequences, such as sea level rise, intense rain and more floods.

4. At the same time, we will ensure that the tax collected will be used to transform our industry ahead of others, so that we will be ready to compete in a low-carbon economy.

### **The Need for Climate Action**

5. Climate change is not science fiction. We can already see and feel the impact of climate change across the world. In the first quarter of 2018 alone, Sydney experienced a

heatwave of 47 degrees Celsius, Cape Town is readying itself for Day Zero when taps will be shut off, and Singapore experienced flash floods in January due to intense rainfall. Yet, no rain fell over reservoirs just 50 to 60 kilometres away from us in Johore. As climate change intensifies, we will see more of these phenomena frequently. We have to prevent these from happening so that as much as our predecessors and forefathers left us with a clean, green, hygienic city for us to enjoy, we must leave a sustainable world and economy for our children here and all over the world.

6. Therefore, urgent global climate action is needed. This is why Singapore designated 2018 as the Year of Climate Action. We have also pledged to support the UN 2030 Sustainable Development Goals, in particular SDG 13 which calls for action to tackle climate change.

7. Climate change is not a responsibility that lies solely with the government. Everyone has a part to play in mitigating climate change, be it individuals, companies, or organisations. I commend Fuji Xerox for organising DocuWorld in support of the Year of Climate Action and be part of the solution to the existential threat posed by climate change. If all of us do not pitch in, there may not be a Singapore to live in one to two centuries from now.

### **Fuji Xerox's Commitment to UN SDGs**

8. Today, Fuji Xerox Singapore will be launching its sustainability report and reaffirming its Climate Action commitment. The sustainability efforts by Fuji Xerox Singapore is an example for other companies to emulate, especially in the area of waste management and recycling. It is about pollution and sustainability, but the long term impact of what Fuji Xerox is doing is closely related to climate action. Fuji Xerox has set an ambitious zero landfill policy. It integrates recycling practices throughout the entire value chain to produce zero waste and pollution by reusing as many parts as possible, and it is something that companies should emulate. I am heartened that Fuji Xerox has achieved a 99.5 per cent recycling rate.

9. Fuji Xerox Singapore's sustainability efforts goes beyond contributing towards the SDG13: Climate Action. Fuji Xerox Singapore has made significant strides in SDG17: Partnerships for the Goals by promoting cross-sectorial climate action collaboration. I commend Fuji Xerox Singapore for reaching out to over 200 companies through your "Go Green" workshops to share their environmental best practices and discuss what other organisations are doing to reduce their carbon footprint using your Green Technologies Solutions and Strategies.

10. When I launched the Year of Climate Action on 26 January, Fuji Xerox Singapore did a similar launch with their employees on the same day. They followed up with an employee engagement campaign since early March to rally employees to make individual climate action pledges. I encourage other organisations to follow Fuji Xerox Singapore's lead, to make their commitment towards climate action via the online pledges which has garnered about 50,000 organisational and individual pledges to date.

### **SMEs are Well-Poised to Make the Transition a Low Carbon Economy**

11. I was told that there are many SME owners amongst us today who are also concerned about sustainability. SMEs are at the heart of our economy, accounting for nearly half of Singapore's GDP. In fact, SMEs are well poised to make this transition as compared to larger corporations, with your ability to change course and seize opportunities quickly. We need to have SMEs come to the fore, adopting a mindset that embraces change positively. When we pass the Carbon Pricing Act, it is the start of the race to become a low-carbon economy. Like I said in my concluding speech at Parliament yesterday, you ignore this at your own peril.

12. Technology is a great enabler for SMEs to facilitate this transition. In this Year of Climate Action, I would like to encourage SMEs to look into reducing their carbon footprint by improving your energy and water efficiency. Think carbon – think how much carbon footprint you have reduced in your business processes. The National Environment Agency has a voluntary Energy Efficiency National Partnership, programme which aims to support companies in their energy efficiency efforts through learning network

activities as well as provision of energy efficiency-related resources and recognition. NEA also administers an Energy Efficiency Fund which supports industrial companies to design resource efficient facilities, conduct energy assessments to identify energy efficiency measures, and adopt energy efficient equipment or technologies. The Employment and Employability Institute, or e2i, administers a training grant under the Singapore Certified Energy Manager programme, which aims to develop local expertise and capability in professional energy management. Ultimately, the proper implementation of energy efficiency projects and good energy management reduces energy consumption and operating costs for companies, and will have a direct impact on economic profitability and business results.

13. The rapid advancement of technology has made sustainable solutions available today, and many of our climate change challenges we face today are really opportunities. Through this DocuWorld Business Conference, I hope that SME owners will not only be exposed to the technological solutions and initiatives which will make your business better and more efficient while bringing about cost savings, but also convince you of the business case for sustainability. How fast we can make the transition towards a low-carbon economy will depend on how fast we are willing to invest and change for this future.

## **Conclusion**

14. Each individual is an agent for change. We have to propagate this message to our family, friends, and business partners to make your climate action pledge. Join us to make Singapore the best liveable and sustainable city to live, and for businesses, the best place to do business in, because you will then have the reputation for doing business in a country where climate action policy works. Take out your mobile phone, go to [climateaction.sg/pledge](http://climateaction.sg/pledge), check the action boxes at the pledge page and then submit.

15. Let us take action today, for a sustainable Singapore. Thank you.

Ms Suiniaty Basirun, Chairperson, Singapore Chemical Industry Council (SCIC)

SCIC Board Members

Distinguished Guests

Ladies and Gentleman

1. Good evening. I am happy to join you at the Singapore Chemical Industry Council Limited (SCIC)'s annual dinner, and the Responsible Care Awards 2017.

### **SCIC and the Industry**

2. The chemical industry is a key pillar of the Singapore economy. In 2016, it accounted for about 25% or S\$66 billion of the country's total manufacturing output. The industry's growth has also spurred the development of supporting sectors such as logistics, energy and utilities, engineering and construction.

3. Over the years, SCIC has played an important role in advancing the interests of the industry. Its network of 170 companies, comprising MNCs and SMEs, provide opportunities and resources for members to grow their capabilities and contribute to society.

4. A hallmark of the industry is the continuous pursuit of sustainable development – a key focus for my ministry. Together with the NEA and PUB, we work closely with SCIC and its members to promote and implement initiatives in energy, environment and water sustainability. SCIC also supports the biennial Singapore International Water Week -CleanEnviro Summit Singapore-World Cities Summit joint event, which will take place from 8 to 12 July this year.

### **Responsible Care Awards**

5. Since its inception in 2001, the Responsible Care Awards have recognised companies that are committed to practising and implementing the 7 Responsible Care Codes of Management Practices – namely Community Awareness & Emergency Response, Distribution, Employee Health and Safety, Pollution Prevention, Process Safety, Product Stewardship and Security.

6. Indeed, companies that handle chemicals and hazardous substances must always ensure that safety procedures are in place and strictly adhered to. PUB recently fined a printing company for illegally discharging toxic industrial used water into the public sewerage system. In fact, 17 other companies were also convicted of illegal discharge offences from November 2017 to February 2018. I can understand the furore over the incidences, given the severity of the matter. We must always be on guard against such irresponsible actions, as they put our health and the environment at serious risk.

7. Today we present the award to 30 deserving companies. I congratulate all the winners, and hope that your commitment towards safety, health and environmental management will inspire others to do likewise.

### **2018 – Year of Climate Action**

8. Tonight's awards presentation takes place in an important year; 2018 is our Year of Climate Action to raise the level of national consciousness around the need to take climate action for a sustainable Singapore.

9. Climate change poses an existential challenge for Singapore. We must take action now, for the sake of our future generations.

10. Although Singapore contributes only a small amount (0.11%) of carbon emissions worldwide, we will do our part as a responsible global citizen to fight climate change. Our government has put in place a comprehensive Climate Action Plan that maps out various long-term adaptation and mitigation measures.

We have also launched the Public Sector Sustainability Plan to conserve electricity and water, reduce waste and adopt green technologies.

11. But these measures alone are not sufficient. Fighting climate change is a collective responsibility. We will need the strong support from businesses, communities and individuals.

12. Internationally, we will use our ASEAN Chairmanship to galvanise support for climate action. Singapore will host a Special ASEAN Ministerial Meeting on Climate Action (SAMCA) on 10 July, and a back-to-back expanded meeting with ASEAN and Ministers from China, Japan, South Korea and the respective President (Fiji) and President-Designate (Poland) of the Conference of the Parties of the United Nations Framework Convention on Climate Change. These sessions will take place in conjunction with the Singapore International Water Week -CleanEnviro Summit Singapore-World Cities Summit joint event which I mentioned earlier. Through these platforms, we want to send a strong signal to the international community that Asia remains fully committed to the global fight against climate change.

### **Carbon Tax – The way forward**

13. On Tuesday, Parliament passed the Carbon Pricing Act, which gives effect to the carbon tax which will be implemented from 2019.

14. The introduction of a carbon tax, as part of a wider suite of mitigation measures, is necessary to facilitate Singapore's transition to a low-carbon economy, and achieve our nation's goals under the Paris Agreement. It will provide a uniform and economy-wide signal to incentivise emissions reductions and energy efficiency improvements, and encourage investments in clean technology.

15. Countries and investors around the world are moving forward on climate-smart investments. Under the Climate Action 100+ Initiative, 256 investors managing US\$28 trillion in assets have committed to work with companies to reduce emissions. To maintain our competitive edge in the global economy, I encourage all businesses to embrace opportunities in low-carbon growth.

16. Through our industry consultation sessions, many of you have expressed support for the carbon tax as a step in the right direction for environment sustainability. At the same time, I have also heard your concerns about its impact on competitiveness.

17. As Finance Minister Heng Swee Keat mentioned in the Budget speech, to support our companies in this transformation, the Government is prepared to spend more than the estimated S\$ 1 billion in carbon tax revenue that will be collected in the first 5 years, on worthwhile carbon abatement projects. Existing funding schemes, such as the Productivity Grant (Energy Efficiency) and the Energy Efficiency Fund will be enhanced.

### **Organisations taking the lead**

18. I am happy to note that organisations have already begun leading change. Home-grown company City Developments (CDL), as part of its 2030 blueprint, aims to raise its carbon emissions intensity reduction target from 25 percent to 38 percent by 2030 against 2007 levels. It has also pledged to reduce its total waste disposed by 50 percent from 2016 levels, and to ensure that half of its construction materials are derived from recycled content or low-carbon sources.

19. Last October, I witnessed the opening of ExxonMobil's third co-generation plant in Singapore. The facility will translate to a 4 to 5% energy efficiency improvement in EM's operations, reduce carbon dioxide emissions by 265 kilo-tonnes and save S\$14 million annually.

20. I encourage all companies, big or small, to think of what you can do to make your operations more sustainable. Every positive action goes a long way towards reducing our carbon footprint.

### **Pledging for Climate Action**

21. You can also start your journey of climate action by making a pledge on ClimateAction.sg, if you haven't already done so. To date, we have collected about 50,000 pledges. But we need everyone's support and commitment to fighting climate change. Please take out your mobile phone, key in climateaction.sg, check the boxes and make a pledge. You can also make an organisational pledge and join the more than 160 organisations who had already done so.

22. Together we can create a sustainable future and make Singapore the best liveable city for our people and future generations. Thank you, and have an enjoyable evening.

**Mr Desmond Choo, Mayor of North East CDC**

**Parents**

**Girls and boys**

**Introduction**

1. Good afternoon. I am very happy to be here for the North East CDC JOE Day, which stands for “Just One Earth”. I understand that NECDC organises this family carnival every year for pre-schoolers and their families, to spread the message of how simple it can be to care for the environment.

2. Today, NECDC is also celebrating the finale of the North East ECO Kids programme.

**About the North East Eco Kids Programme & JOE Day**

3. I understand the students underwent a series of experiential, hands-on workshops to learn about the 3Rs - Reduce, Reuse, Recycle. They also learnt to keep Singapore clean and green. I would like to challenge everyone here help pick up litter and throw it away, to ensure that this place is litter-free after the event. Besides keeping our homes clean, we also need to keep our environment clean.

4. We also want to thank the partners, Tzu Chi Foundation and POSB. They have worked closely with the NECDC and the National Environmental Agency (NEA).

5. The North East ECO Kids programme was started seven years ago, and has reached out to more than 2,000 pre-schoolers from 75 preschools. I also hear that more pre-schools and organisations are interested to join this programme.

6. Well done to NECDC for organising this programme. Let us all give them a big round of applause.

**About Just One Earth (JOE) Day**

7. Today is also Earth Hour 2018, which makes today’s theme – “Natural Joe” especially relevant.

8. “Natural Joe” focuses on three messages. These messages apply not just to the children, but the parents as well. The three messages are: Food waste reduction, climate action, and anti-littering.

**Food Waste Reduction**

9. First, the amount of food waste generated in Singapore has increased by about 40 per cent over the last 10 years. Every week, an average Singapore home throws away 2.5kg of food waste. That is a lot of food, especially when many people around the world are going hungry. I would like to encourage the children to remind your parents to only order what you can eat, and not to over-order, over-buy, or over-cook.

**Climate Change**

10. Second, we are vulnerable to the impact of climate change. In recent years, Singapore has experienced intense rainfall and flash floods. At the start of this year, we had experienced colder temperatures, while last year was the hottest year on record, without El Nino.

11. These are evidence of climate change, which affects everyone. We need to play our part to tackle climate change.

12. In order to encourage grassroots organisations, NGOs and interest groups to organise more activities to raise awareness of climate change, I had announced the Climate Action SG Grant two weeks ago. Organisations can apply to this grant from 1 April to the end of the year to organise climate action initiatives. Each group will be eligible for up to \$5,000 during this period for their various projects, on a reimbursement basis.

13. I would like to challenge the parents here to form an interest group and organise an activity for climate action. They can apply to NEA for the grant. It would be wonderful if the children could work together with the parents to organise such initiatives.

14. Another way to tackle climate change can be to buy energy efficient appliances. Energy efficient models of refrigerators account for about three quarter of total sales in 2016. The Mandatory Energy Labelling Scheme (MELS), which was introduced in 2008, has helped consumers like you and me to choose more energy efficient appliances such as air-conditioners, refrigerators, clothes dryers, televisions and general purpose lamps. I would like to encourage the children here to ask their parents to buy appliances with more ticks, which indicate they are more energy efficient.

15. NEA will be consulting the industry and public on a proposal to expand the coverage of MELS to more lamps. The proposal will help households select more efficient lamp types and further reduce their energy consumption, which would lead to savings on the energy bill.

#### Anti-littering

16. Third, we need to involve everyone in the anti-littering effort. As I had mentioned, we need to keep not just our homes, but the surroundings clean as well. In 2016, NEA issued more than 31,000 fines for littering, nearly 20% more than in 2015. Parents and children should remind each other not to litter.

#### Conclusion

17. I would like to say that NECDC has done very well in organising environmental programmes. I encourage everyone to participate in them, which helps to inculcate green practices as well as values such as graciousness and care for the environment.

18. I would like to challenge everyone to pledge your commitment for climate action at the pledge tree. You can also go to our website to make the Climate Action pledge. To date, we have garnered about 50,000 pledges.

19. Lastly, I would like to ask all the boys and girls to be eco-champions!

Thank you, and have a wonderful day.

Mr Steve O'Neil, CEO, REC

Mr Yu Tat Ming, CEO, PacificLight Energy

Mr Edwin Khew, Chairman, Sustainable Energy Association of Singapore

Ladies and Gentlemen,

1. Good afternoon. It was a wonderful opportunity to have met Mr Steve O'Neil at the Sustainable Energy Association Singapore (SEAS) dialogue session. One thing led to another and I am very happy to be here at REC. Thank you for inviting me to the launch of the REC Tuas Solar Rooftop. It is my pleasure to witness the launch of this cross-sectorial project in the presence of representatives from REC, PacificLight Energy, and colleagues from the Economic Development Board.

### **Development of the Clean Energy Sector**

2. Singapore has come a long way in the development of our clean energy sector. In 2006, the SEAS was founded after Singapore signed the Kyoto Protocol. In 2007, we identified clean energy as a major growth area for our economy as well as being instrumental in mitigating climate change. Research institutes were set up to support companies in technologies and innovation, including the Solar Energy Research Institute of Singapore, or SERIS. As Mr O'Neil has said, it is no coincidence that such organisations are about the same age.

3. These early initiatives provided the foundation for multinational companies in the clean energy sector to set up their regional and global headquarters in Singapore. We are glad that REC made the decision to do so in 2008, and REC's Integrated Solar Manufacturing Complex was officially opened by PM Lee in 2010. Since then, over 30 million high-quality solar panels have been made at this factory, and installed worldwide.

4. REC has grown from strength to strength in the past decade and is one of the pioneers in our fast-growing clean energy sector today. The success of such companies here has contributed to the recognition of Singapore as the leading clean technology hub in Asia in the areas of renewable energy, smart grids, and green buildings. We have turned our limited land area and high urban density into our strength, by positioning ourselves as a living lab where companies can develop, test and commercialise innovative urban solutions in a real-life setting. Along with the sharp decline in solar system costs, solar PV installations in Singapore has grown from 1.9MWp in 2009 to 143.3MWp in 2017. We are heartened by this strong growth and aim to increase solar PV deployment in Singapore to 350MWp by 2020 and 1GWp beyond 2020.

### **Year of Climate Action**

5 Indeed, the switch to cleaner forms of energy is important in our fight against climate change. We can already see and feel the impact of climate change in Singapore. 2017 was the warmest year on record, among the years not influenced by El Niño conditions. In January this year, we experienced flash floods due to intense rainfall. In my house visits to residents, I increasingly hear complains about the rains splashing into the doors of homes despite the fact that the corridors are getting wider. This shows us the intensity of the rainfall in recent years. Globally, the world suffered various extreme events, among them Hurricanes Harvey, Maria and Irma. Such intense weather patterns are projected to occur more frequently in the future. Urgent action is needed if we wish to mitigate these effects.

6. In support of Sustainable Development Goal 13 on Climate Action and as part of our efforts to meet our obligation under the Paris Agreement, my Ministry designated 2018 as the Year of Climate Action. Through this, we aim to raise national awareness of the impact of climate change and the urgency to take action. In the corporate sector, we want to see more companies “think and speak carbon”, to reduce their carbon footprint. For the general public, we want to see all Singaporeans taking action today for a sustainable future, and to understand the powerful cumulative effects of seemingly small actions. What we found from our surveys is that many people do not take actions because they do not think their actions are important enough to mitigate climate change. It is important that we get everybody to realise that every action counts.

7. As a first step, we are encouraging organisations, educational institutions and individuals to make a climate action pledge. As Mr Steve O’Neil shared earlier, REC was one of the first few companies to make their climate action pledge, and a very tangible and significant one. I am glad they went one step further to encourage their employees to make their personal pledges for climate action. I commend REC for taking the lead and championing climate action through tangible actions. If you have not already done so, I urge all of you present today to go online, make your pledge, and take climate action.

### **REC Tuas Factory Power Purchase Agreement**

8. I am heartened to be here at the launch of REC’s latest effort – the REC Tuas Solar Rooftop – and to witness the signing of a Power Purchase Agreement (PPA) between REC and PacificLight Energy. The Tuas Solar Rooftop is set to be one of Singapore’s largest rooftop solar installations, mitigating 28,000 tonnes of carbon dioxide emissions over 20 years and contributing to our goal to transit to a low-carbon economy. Through this mutually beneficial collaboration, PacificLight Energy will receive a boost to their solar energy portfolio, while REC will be able to partially power their operations on clean energy by converting their rooftop into a power plant. This collaboration serves as a good example for companies that are looking to drive or adopt renewable energy in Singapore. I urge more companies to actively look at how they too can harness and adopt clean energy for their operations and/or even contribute to the Grid.

### **Conclusion**

9. Each organisation and individual is an agent for change. We need to propagate this message to our network of partners, families and friends to take action today for a sustainable future. As we witness the signing of the Agreement between REC and PacificLight Energy today, I encourage everyone to think about what we can do to contribute to the Year of Climate Action, as individuals, organisations and part of the larger community. The possibilities are endless, and that we are limited only by our imagination.

Thank you.

Mr Loh Chin Hua, CEO, Keppel Corporation and Executive Chairman, Keppel Land  
Mr Tan Swee Yiow, CEO, Keppel REIT Management and President, Singapore Green Building Council

Ladies and Gentleman,

1 Good evening. It is a pleasure to see so many people attending this event. It shows that many of us are passionate about environmental issues, including plastic waste and its pollution of our waters.

### **REDUCING PLASTIC WASTE & TACKLING MARINE POLLUTION**

2 The key to a plastic-free ocean lies in implementing policies to ensure that plastics are used judiciously and disposed of properly so that they do not end up in our seas and oceans. The documentary which you will be watching later will show that a plastic ocean has detrimental impact on our environment and marine biodiversity.

3 To curb plastic waste, we tackle the excessive consumption of all types of disposables, not just single-use plastic bags. For instance, we do not allow disposable crockeries in our new hawker centres for dine-in. By 2021, we will make it mandatory for businesses to report on their packaging waste and their waste reduction plans. Retailers including supermarkets could be required to report on the amount of plastic bags used and their reduction plans.

4 Furthermore, plastic waste, if not disposed of properly, will end up in our waters. As a small island city state surrounded by water, Singapore pays close attention to the proper disposal of waste. We are well-known for our strict anti-littering laws. In addition, we have developed waterway clean-up measures, and put in place an integrated waste collection and management system, so that we can minimise waste at source and ensure proper waste recycling and disposal. We also regulate all discharge of trade effluent such as oil, chemicals, sewage, or other polluting substances to the watercourses from land-based sources to prevent pollution.

### **MULTI-SECTORAL COLLABORATION IS A KEY SOLUTION**

5 Nevertheless, these initiatives form only part of the solution. Government efforts alone can neither curb excessive plastic usage nor ensure that our waters are free from plastics. We also need strong involvement from the People, Public and Private, or 3P, to bring about a plastic-free ocean, and address the larger issue of climate change.

6 I am heartened that corporate organisations have also played their part in raising awareness for environmental causes. This evening's event is possible because of the efforts of Keppel Land and Keppel REIT Management, working in close partnership with Singapore Green Building Council and National Parks Board to raise public awareness of the detrimental impact of improper disposal of plastics into the sea. These organisations recognise their responsibility to make Singapore the best liveable city for us and our children.

### **YEAR OF CLIMATE ACTION**

7 As you are aware, Singapore has designated this year as the Year of Climate Action. I am glad that organisations, educational institutions, and individuals recognise this. I am pleased to report that we have received over 130,000 climate action pledges since January 2018. Keppel Corporation, as well as its subsidiaries, Keppel Land and Keppel REIT Management, and Singapore Green Building Council have done their part by making their climate action pledges. Tonight, the organisers have arranged for a mass pledging

session for all of us, and it is my hope that more people can make their climate action pledge.

8 To effectively address climate and environmental challenges, we need everybody to make lifestyle changes. It does not have to be very complicated. Lifestyle changes can be very simple. For instance, refusing that plastic bag when you do not need one, or using your own lunchbox when ordering takeaway. Support is available to motivate you along the way. One such support network is a Facebook group called Journey to Zero Waste Life in Singapore. I understand that they have more than 7,000 members, and they are very willing to provide resources and words of encouragement for you to work towards a zero-waste lifestyle. With persistence and commitment, these changes will become second nature, and your actions will in turn inspire others to do the same.

9 I would like to reiterate the point that the problem is not plastic. The problem we have to tackle is how to change human behaviour. How can we encourage people to take responsibility for the environment? Judicious use and proper disposal will help us address some of the problems depicted in this documentary.

Thank you.

Friends and Partners

Ladies and Gentlemen

1 Thank you very much for joining us this evening for MEWR's Appreciation Dinner. This is the second year that the Ministry is holding such a gathering. It is our way to thank everyone of you who have contributed to a functioning MEWR, PUB and NEA. Your valuable inputs are always sought after as we believe in thinking outside of the box.

### **Year of Climate Action**

2 As you all know, Singapore signed the Paris Agreement in 2015. By 2030, we will be reducing emissions intensity by 36 per cent from 2005 levels. We have also designated 2018 to be the Year of Climate Action and are probably the first and only country to do so. We have seized the opportunity with this initiative to tell the world that we are very serious about climate action and climate change. In the space of 4 months, more than 140,000 pledges have been made on our websites. We also have sites for educational institutions and organisations to make their pledges. 140 schools have made their pledges and this constitutes around half of the number of schools in Singapore. The carbon tax was passed this year and it will affect about 40 companies which emit 80% of the greenhouse gases. Among these companies, about 40% have made a climate action pledge. I am very happy that they will come on board this journey. At the end of the day, we want to ensure that Singapore is not just a liveable, sustainable, green and clean country. It also serves as a 'stamp of certification' for the companies to ensure them that they are operating in a country where climate action policy actually works.

3 We have been focusing on youths to bring them on board, to be proactive in taking climate action. During the Singapore Youth Conference in April, we have asked them to create a ripple effect among their friends and to take a small step for climate action, including creating awareness and influencing others to take climate action. I am happy to see that the effect of this is to see many schools, including preschools coming on board the journey. Preschoolers have been writing their pledges on pledge cards which they can then keep and remember their pledges.

4 Corporates have been active in pledging for climate action. Natsteel Holdings Pte Ltd has pledged to reduce their carbon dioxide emissions by 2% by the end of this year through energy efficiency measures. Companies are also recognising their responsibility to influence their partners and suppliers. Ricoh Asia Pacific has been actively asking organisations and individuals to pledge through their green workshops, which they conduct every year on Eco Action Day.

5 SMS launched a Climate Action SG Alliance to broaden and make our call for climate action more effective. The group comprises 18 active individuals ranging from green groups and the corporate sector, with SMS as their Advisor, to provide the link back to government thinking and policy. The Alliance will discuss and formulate plans to engage the public in a more effective way. The first meeting kicked off earlier this month where

it was discussed that the Alliance would look at synergising ideas and initiatives from each individual and fire the public imagination. At the same time, we are also giving them \$5,000 funding to organise ground-up initiatives on climate change so that they can raise awareness among the community and take action during this climate action journey.

### **International Engagement**

6 I would also like to share that we have been very active on the international front, not just at the regional level but also at the United Nations. As UN Secretary General Antonio Guterres said at the Boao Forum on 10 April 2018, 2018 is a year of climate change and he would like countries around the world to take climate change seriously. We have been ahead of ourselves by starting the Year of Climate Action and will continue to support him.

7 In July this year, I will be going to UN to present on Singapore's report on UN's Sustainable Development Goals. In particular, goal number 13 of the 17 Sustainable Development Goals calls for urgent climate action to combat climate change and its impacts. I am happy to show them that we are really ahead. As we know that we are vulnerable, we are willing to spend money to adapt ourselves to the ultimate changes that will be affecting our country at the end of this century.

8 Earlier this month, I met my counterparts in European Union (EU), Belgium and Poland not just to strengthen our cooperation but to tell them about our story. I shared with them about how we have been very serious in our sustainability journey and the actions we have undertaken to adapt our infrastructure and put in place legislations to reduce the emissions of greenhouse gases. Many of them were very impressed that Singaporeans agree to the carbon tax imposed because in Europe, it has been a battle for them.

9 As ASEAN Chair, we will also be convening a Special ASEAN Ministerial Meeting on Climate Action (SAMCA) in July. As you do your part for MEWR, you are not just doing something for Singapore. Your actions put us in better standing with our international audience. They would not only see what we are capable of, but they would also have heard our story and our story will continue to be told.

### **Looking Ahead**

10 Looking ahead, there are many things that we have to do to put our legislations in action. Among them are the Energy Conservation Act and the Carbon Tax. The Carbon Tax will only kick in during 2019 for the measurements, verification and reporting. In 2020, we will start collecting the tax. The tax is not meant to bolster our standing or social spending. It will instead be used for co-funding energy efficient transformation of companies to reduce emissions.

11 We have also introduced a new Vehicular Emissions Scheme to promote cleaner vehicles. Initially, we started with lorries, buses and diesel vehicles. Recently, we

announced that we will take away pre-Euro motorcycles in the space of the next 5 to 10 years. For those who give up the motorcycles in the next 5 years, they will get \$3,500. Those who do not will need to pass a more stringent standard, after which they will need to give up the use of their motorcycles after 10 years.

12 These are things that are not easy to do. I hope you will help us to sell the message to your friends and colleagues about the measures we are putting in. There may not be pushbacks right now but there might be later on when the measures take place, particularly for the carbon tax.

13 Ladies and gentlemen, we will continue to work on new policy initiatives. In future, we will have more things to do and more policies to sell. We will need your thinking around how to do this best and how to make it effective for Singapore and Singaporeans. We thank you for your contributions on the effectiveness and the good standing we had with our partners around the world.

Thank you very much.

Mayor Dr Teo Ho Pin

Ladies and gentlemen

1. Thank you for joining us at this afternoon's launch of Energy-Saving Challenge 2018.
2. During last year's inaugural Energy-Saving Challenge, around 7,000 households collectively saved a total of 330,000 kWh of electricity – enough to power 1,000 three-room flats for more than a month. The reduction in carbon emissions from the energy saved during that period was equivalent to 256 cars being taken off the roads.
3. It was a commendable effort, and I hope we can do even better this year.
4. Climate change poses an existential challenge for Singapore. Today we are already experiencing the impact of climate change in dry spells and more intense rainfall. As a low-lying island city state, our country is also vulnerable to rising sea levels.
5. This is why we designated 2018 as the Year of Climate Action — to raise the level of national consciousness on the need to take climate action for a sustainable Singapore. Fighting climate change is the collective responsibility of every business, community and individual. And as the saying goes: “Nobody can do everything, but everyone can do something” - every effort counts and all of us can play a part.
6. Simple daily actions – like switching off your appliances after use, setting the air-conditioner at 25°C, and choosing energy efficient appliances with more ticks – can go a long way in helping to reduce our carbon footprint.
7. I'm heartened that there is an increasing number of ground efforts to raise awareness of climate change. The Community Development Councils (CDCs) and Grassroots 2 Organisations, together with their partners, have introduced various energy efficiency programmes for residents and students. There are also many community activities in North West, which Mayor Dr Teo mentioned earlier, on energy-saving, water conservation and food waste reduction. Students Ambassadors from North West will encourage their families to be part of North West district's pledge and commitment to Climate Action. Young or old, everyone has an important part to play in taking Climate Action.
8. My ministry has also started a Climate Action Pledge where you can commit to taking simple steps to reduce your carbon footprint. To date, more than 143,000 pledges have been collected. I encourage you to take out your mobile phones now and go to [www.climateaction.sg](http://www.climateaction.sg) to make your Climate Action pledge. Energy-Saving Challenge 2018
9. This year's Energy Saving Challenge will continue to encourage households to practice simple energy-saving habits, and at the same time, emphasise how these positive

actions will reduce our carbon footprint. Besides saving electricity and doing their part for the environment, households will also save money and stand to win attractive prizes.

10. From May to August, residents can participate in various activities at the libraries, HDB shopping malls and integrated community hubs like Heartbeat@ Bedok, Kampung Admiralty and Our Tampines Hub, to learn about energy efficiency and climate action.

11. I look forward to your participation and support for these activities. Together, let us build a sustainable future and make Singapore the best home for our people and future generations.

Thank you.

Dr. Bambang Brodjonegoro, Minister of National Development Planning, Indonesia  
Ms Loren Legarda, Senator, Philippines  
Prof Simon Tay, Chairman, Singapore Institute of International Affairs

Distinguished guests

Ladies and gentlemen

1. Good morning to everyone. I am pleased to join you at the 5th Singapore Dialogue on Sustainable World Resources. To our friends from overseas, I hope you are enjoying your stay in Singapore.

### **FROM ‘GROW NOW, CLEAN UP LATER’ TO ‘GREEN GROWTH’**

2. For many decades, economic growth was about “growing now, cleaning up later”, relying on unbridled exploitation of natural resources and rampant industrialisation. This has resulted in widespread environment degradation, including deforestation, air pollution and acute water scarcity. Unsustainable production and consumption are exacerbating the global threat of climate change. The extreme storms and floods that have brought devastation to our region are a foretaste of things to come, if we do not change our habits and the way we live.

3. Fortunately, we have already begun moving away from the “grow now, clean up later” approach. The costs of such a short-sighted approach are very high for both the current and future generations. Many nations have come to embrace the tenets of sustainable development encapsulated in the 17 UN Sustainable Developments Goals. These include climate action, sustainable cities and communities, and responsible consumption and production. And with this paradigm shift, we have started viewing “green growth” as integral to, and not separate from, long-term economic development. Green growth is the foundation of real and sustainable prosperity.

### **SINGAPORE’S GREEN GROWTH JOURNEY**

4. In Singapore, the integration of sustainability in long-term economic growth has been a cornerstone of our development path since independence. Over the past five decades, Singapore has taken a pragmatic and long-term view of environmental governance and resilience.

5. We turned our water vulnerability into a strength through sound policy and the application of science and technology. Our Global Hydrohub, comprising more than 180 companies, is one of the densest concentrations of water companies globally. In 2015, the water sector contributed \$2.25 billion to Singapore’s GDP and 14,000 jobs. We have rejuvenated our waterways by integrating green and blue spaces for homes and businesses as well as for recreation.

6. In the area of energy, we have developed Singapore into a solar hub for the region with

over 50 local and international companies across the value-chain. The Economic Development Board (EDB) and Housing Development Board (HDB) have been leading the SolarNova programme, as part of our aim to generate 1 gigawatt-peak of solar energy beyond 2020. PUB is deploying floating solar photovoltaic (PV) systems on two of our reservoirs, to make our water treatment process greener and less dependent on fossil fuels. And the largest microgrids platform in the tropics is being operated by the Renewable Energy Integration Demonstrator – Singapore (REIDS).

7. As part of Singapore’s ‘Car-lite’ vision, the public transport network will be enhanced significantly so that 8 in 10 homes will be within 10 minutes’ walk from a train station. We have implemented a “zero-growth” policy on private vehicles, and facilitated the roll out of an Electric Vehicle Car-Sharing service that will have 2,000 charging points island-wide by 2020. These efforts will reduce our carbon footprint, enhance air quality, and promote a liveable city.

8. We have also put in place a series of measures to increase Singapore’s climate resilience. These include protecting our coasts, diversifying our food and water supply, and investing in weather-independent technologies such as vertical farming.

9. In short, Singapore today enjoys the dividends of our early investment in green growth and environmental resilience. These dividends have been in the form of a clean, safe and liveable Singapore which attractstalent and investment; the creation of jobs and business opportunities in our economy; and a more vibrant and cohesive society.

10. These dividends are not a product of chance. They have been the result of three factors, namely policies, partnerships and passion.

### Policies

11. First, policies. We will continue to implement long-term policies that promote green growth without creating market distortions or an unequal playing field.

12. Next year, Singapore will join early movers to place a price on carbon emissions, and will be the first in ASEAN to do so. The carbon tax sends a clear signal to major emitters on the need to reduce carbon emissions and encourages them to invest in energy efficient technologies. At the same time, the Government will spend more than the carbon tax collected in the initial years, to support green growth projects that deliver emissions reductions.

13. As growth needs to be financed, Singapore has also been developing our financial sector to catalyse green finance locally and in the region. Last year, the Monetary Authority of Singapore launched the Green Bond Grant Scheme to kick-start the development of a green bond market in Singapore. Since then, there has been an increase in the number of green bonds being issued in Singapore.

14. In April 2017, City Developments Limited raised \$100 million through green bonds

to finance its investments in energy saving and efficient infrastructures. Both the DBS Group and Manulife Financial also issued green bonds worth \$685 million and \$500 million respectively. The Singapore Stock Exchange has also made progress in attracting green bond listings, attracting over 20 local and international listings amounting to almost \$15 billion in recent years.

15. With the launch of ASEAN Green Bonds Standards in November 2017, MAS will also recognise it as a qualifying standard under the Green Bond Grant Scheme. These would help raise the estimated US\$3 trillion required in ASEAN for green investments by 2030.

16. This year, we will also begin seeing the reports of sustainability reporting requirements for SGX listed companies.

17. In the area of waste and resource management, our vision is to achieve the circular economy, to enable Singapore to keep resources in use for as long as possible, before recovering and extracting the maximum value from them at the end of life. We are focusing on three key waste streams - E-waste, plastics and food waste. With the support of industry, and more importantly, the people of Singapore, whose participation in recycling efforts will be crucial, we will put in our best efforts to spur green growth in the waste industry, just as we have done for water.

### Partnerships

18. Second, forging partnerships. Countries in our region are close and important partners. The theme for Singapore's Chairmanship of ASEAN is resilience and innovation. Among our key priorities is the establishment of the ASEAN Smart Cities Network and the need to address climate change. The ASEAN Smart Cities Network will contribute to the UN SDGs by providing a platform for collaboration and capacity building among ASEAN cities to achieve smart and sustainable urban development. The Network will unleash new potential green growth areas by generating "network effects" that make technologies more valuable as more people use them, and by providing start-ups with access to broader ASEAN markets.

19. Singapore will host a Special ASEAN Ministerial Meeting on Climate Action (SAMCA) in July in conjunction with the Urban Sustainability Week. An expanded meeting will bring together ASEAN, China, Japan, Republic of Korea, and the UNFCCC COP current President and President-designate Fiji and Poland. These meetings will provide our region the opportunity to demonstrate our commitment to the Paris Agreement and take collective action in the fight against climate change.

20. In July, Singapore will also participate in the Voluntary National Review at the UN High Level Political Forum on our implementation of the UN SDGs in Singapore. Our participation will allow Singapore to learn from and collaborate with other countries on implementing the SDGs.

21. Innovative and resilient partnerships must flourish at all levels – not just among governments, but also corporations, NGOs, and citizen groups. On the business front, the Southeast Asia Alliance for Sustainable Palm Oil (SASPO) continues to gather momentum. Earlier this year, 10 major brands such as Crystal Jade, TungLok Group and F&N committed to joining the Alliance – bringing the total number to 81 brands and over 200 F&B outlets. This sends a strong signal that businesses in Singapore are committed to sustainable production practices across their operations in different territories.

### Passion

22. Finally, to unleash the potential for green growth, we must have a critical mass of people who are passionate about the environment. A group of people who dream about creating a cleaner and greener world, and possess the creativity and tenacity to turn their dreams into reality.

23. Dreamers like Joline Tang who was trained in accountancy but switched tracks by setting up the Sustainability Project. Joline believes that businesses are tools for motivating people to transform their lifestyle. So she set up a business to promote sustainable living through a range of products that are high quality and affordable. Her motto: “never ever underestimate your power to make a change”.

24. To inspire more people and galvanise action, we have designated 2018 as our Year of Climate Action (YOCA). Since the launch of YOCA, we have received many inspiring stories from our “climate action champions” and pledges from people to take action. We hope more citizens, businesses and NGOs will come forward to pledge action to reduce carbon emissions and fight climate change. We will also host the 5th ASEAN Plus Three Youth Environment Forum in June whose theme will be Imagine, Create, Change. The Forum will encourage youths in ASEAN to exchange ideas on environmental sustainability with the aim of implementing what they had learnt in their own countries.

### **CONCLUSION**

25. Let me conclude. As we look to the future, it is clear that green growth is the only sustainable path for development. It is the key that can unlock continuing prosperity and well-being for the current and future generations.

26. I would like to thank the Singapore Institute of International Affairs for organising this annual event that brings together passionate stakeholders in forging partnerships for a sustainable future.

27. I look forward to lively and constructive discussions.

Thank you.

Mayor Desmond Choo  
Senior Parliamentary Secretary and Adviser Sun Xueling  
Ladies and gentlemen

Good morning everyone.

2 Thank you for joining us today for the launch of the National Dengue Prevention Campaign 2018. This is an annual campaign organised by the National Environment Agency (NEA). It marks our continued commitment to generate awareness of the dangers of dengue, and garner public support for our efforts to eliminate mosquito breeding and fight dengue.

### **Dengue situation**

3 We may be at the North-Eastern tip of Singapore today. But many of you would have heard in the news that there was recently a dengue cluster in the West.

4 Since we were notified of the Jurong West cluster on 3<sup>rd</sup> April, we have deployed 140 NEA officers to the area to step up inspections and outreach efforts. They have carried out multiple rounds of checks to find and destroy mosquito breeding, both in the day and in the evenings, as well as on weekends. MOH and NEA are also investigating the reasons that may have contributed to the severe cases in the cluster. New cases are still being reported in the Jurong West cluster but at a slower pace, and the cluster remains open. We need to be vigilant and take the necessary precautions to protect ourselves and our loved ones.

### **Community must stay vigilant**

5 We are greatly saddened to have lost three lives from the cluster to dengue this year. My condolences to their families. The Jurong West cluster is a sobering reminder of how dengue can strike fast, and can be deadly. While the number of dengue cases in Singapore is low overall, the mosquito population is growing. NEA's Gravitrap surveillance system detected 22 per cent more *Aedes aegypti* mosquitoes in the first three months of this year, compared to the previous three months. We must be extra vigilant, especially since we are approaching the traditional peak dengue season. Climate change may worsen the spread of dengue, as higher temperatures and increased rainfall encourage the breeding of mosquitoes.

6 The NEA, on its part, will keep up their inspection and outreach efforts. We are also studying the Wolbachia technology with the eventual aim of reducing the number of *Aedes aegypti* mosquitoes in Singapore.

7 But these measures alone are not sufficient. We need everyone to take action. For the Jurong West cluster, 70 per cent of the breeding were found in residential premises, in flower bowls, flower vases, fountain, pails, and dish drying trays. Some of these breeding spots even recorded up to 200 larvae each!

## **Do the Mozzie Wipeout**

8 My call to everyone is to keep our environment, and our homes free of stagnant water and mosquito breeding. Practise the 5-step Mozzie Wipeout regularly. One misconception in particular is that mosquitoes will not breed in clean water. That is not true. In fact, the water may look clean, but any stagnant water can attract mosquitoes to breed.

9 If you are showing symptoms suggestive of dengue, or simply feeling unwell, please also see a doctor. It is important that we do not take this lightly. Early diagnosis can help to ensure that our condition is monitored and appropriate medical attention can be given as necessary.

10 By taking these steps, you are not only taking care of yourself. You are also helping to protect your family and friends from getting infected. Together, we can keep dengue, and mosquito-borne diseases, under control.

11 Thank you.

Mr Kazuhisa Goto, Managing Director, Ricoh Asia Pacific Pte Ltd,

Ms Jessica Cheam, Managing Editor, Eco-Business,

Ladies & Gentlemen,

A very good morning to everyone. It is my pleasure to once again join you on Eco Action Day.

### **Singapore's Commitment to Sustainable Development Goal 9 of the 2030 Agenda**

2 This year's Eco Action Day Industry Roundtable focuses on the United Nations Sustainable Development Goal, SDG 9, which is to build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation. Private companies and the industry sector are instrumental in determining climate action outcomes, and we hope to use this platform to discuss how businesses can innovate to achieve SDG 9 by the United Nations' target year of 2030, and build our collective vision of what Singapore will look like when we reach this goal.

3 As a small island city-state with few natural resources, sustainable development has been a cornerstone of Singapore's economic progress since independence. Our investments in the 3I's, Industry, Infrastructure and Innovation, over the years have made us one of the world's safest, most efficient and prosperous cities. Because of our lack of natural resources, what we have done is to turn our environment into an asset. What brings us even greater pride is that our rapid economic development has not been at the expense of our environment. Despite competing demands for funding in the early days of independence, Singapore made a conscious decision to invest in green growth and environmental resilience. We spent S\$1.8 billion on sewerage and used water treatment infrastructure in the 1970s and 1980s. We preserved natural areas, built parks and gardens, and cleaned up our Singapore River, even though the last cost us \$300 million and took a decade. It was never a case of pursuing growth at all costs and dealing with the cleaning up afterwards.

4 The reality of climate change means it is imperative for us to do more. Singapore has designated 2018 as the Year of Climate Action. Through this, we want to raise national consciousness around the need to take individual and collective action to fight climate change. One of the key climate action measures the government is taking is the implementation of a carbon tax in 2019. We will also seek to achieve the circular economy in the waste industry by minimising

waste and extracting greater value from waste as we work towards becoming a Zero Waste Nation.

5 There are rich resources in the waste we throw away, and there is potential for us to turn our country into an urban mine if we can extract them. To further our zero waste efforts, the Government has set aside \$45 million for the Closing the Waste Loop (CTWL) research funding initiative. This will help us develop solutions to extract value and resources from key waste and residue streams such plastics, food, electrical and electronic products, and incineration ash. Over the next few years, we will introduce the Extended Producer Responsibility (EPR) approach as a key strategy in waste and resource management. We have announced that we will be EPR for electrical and electronic waste in 2021.

6 Beyond domestic efforts in promoting sustainability, we are galvanising regional action as ASEAN Chair 2018, and actively participating in global platforms to further progress on the Paris Agreement. We will participate in the Voluntary National Review at the United Nations High-Level Political Forum on Sustainable Development this year. We hope the sharing of our experiences will help bring the world closer to the 2030 Agenda for Sustainable Development.

### **Adopting Technological Innovation in Mitigating Climate Change**

7 While the government will continue our efforts to provide a conducive framework for businesses to flourish and incentivise sustainable practices, our success in mitigating climate change very much hinges on businesses making their industries more environmentally-friendly.

8 As the international economy increasingly embraces a low-carbon circular economy, technological innovation and sustainability will be at the heart of this transition. The Government will support local industries in their adoption of technological advancement by encouraging research and development, supporting collaborations with other countries and providing funding schemes to encourage greater adoption of technology and innovation. Many companies are already transforming their business models to be more sustainable and taking concrete actions to lessen their environmental impact.

9 Ricoh, our host for today's event, is one example. It has taken steps to close the loop on its manufacturing process and reduce the amount of resources needed for its products. I commend Ricoh for taking steps to be carbon neutral by 2030. Last year, Ricoh introduced new recyclable eco packaging for its copiers that was stronger, lighter and more durable than the previous material. As a result, Ricoh has saved 91.2 tonnes of materials and 154 tons of carbon emissions annually. Ricoh also uses scrap metal from electric furnace steel sheets to make multi-function printers and biomass-based plastic as an

alternative to the petroleum variety. It designs its products so that they can easily be recycled. In fact, 87% of Ricoh products are made of recycled parts.

## **Beating Plastic Pollution**

10 As the theme for World Environment Day this year is “Beat Plastic Pollution”, I would like to highlight the commendable efforts by Dell, which has representatives with us today. They have similarly turned waste into a resource by launching an ocean plastic supply chain. The ocean plastics are collected and mixed with other recycled high-density polyethylene, or HDPE plastics, and then used in packaging.

11 What is also interesting about Dell’s ocean plastic recycling programme is that it is open to all businesses, even its competitors. By partnering with The Lonely Whale Foundation, *Next Wave* is an open-source, cross-industry initiative that brings leading technology and consumer-focused companies together into an ocean bound supply chain. Such inclusive and innovative partnerships are key to achieving a clean, green, and sustainable Singapore, and fulfilling our SDGs by 2030.

12 On our part, the Government will continue our efforts to prevent plastic waste from ending up in our waters with our waterways clean-up measures and integrated waste management and collection system. We will step up engagement with stakeholders and businesses to cut down the excessive use of plastic bags and disposables like single-use food containers. We are also working to reduce plastics and packaging waste at source. By 2021, we will make it mandatory for businesses to report on their packaging waste and their waste reduction plans. Retailers including supermarkets could be required to report the amount of plastic bags they use and plans for reduction.

## **Conclusion**

13 I started my speech by highlighting that economic growth and sustainable practices are complementary, and I would like to close with this message. Achieving the SDGs is not only good for the environment, it is good for the economy and beneficial for businesses. By creating solutions to tackle the SDGs, businesses in Asia could potentially tap into the US\$5 trillion worth of business opportunities, according to the 2017 *Better Business, Better World* report. How businesses in developed economies such as Singapore innovate to make their industries more sustainable, resilient and inclusive is key as we strive to meet our environmental goals. I am sure many of us have other innovative and

sustainable case studies to share, and I look forward to learning more about them during the discussion later.

14 Let us all commit to making meaningful changes today. Eco Action Day 2018 calls for organisations and individuals to pledge green actions that they will undertake to mitigate climate change. Each pledge collected by Ricoh contributes to the climate action pledges that we are collecting nationally, and signifies our collective commitment. We have gathered nearly 170,000 pledges from organisations, educational institutions and individuals, but we can do more in encouraging individual and collective actions. I urge companies which have not done so to make your organisational pledges, and for companies which have done so, to encourage your partners to do the same.

Thank you.

Distinguished Guests  
Ladies and Gentlemen

A very good evening to all of you. I hope you will enjoy our revamped Sustainable Singapore Gallery (SSG), which tells the story of Singapore's sustainability journey.

### **Our Sustainability Story**

2 Inside the Gallery, you will see a little porcelain figurine of a man, his grandson, and their dog out on a fishing trip. The figurine was presented to Dutch economist Dr Albert Winsemius after he lost a wager that the Singapore River could once again sustain life. Dr Winsemius was Chief Economic Advisor to the Singapore Government, and knew Prime Minister Mr Lee Kuan Yew well. They agreed on many things and we implemented most of Dr Winsemius' recommendations. But when Dr Winsemius recommended covering up the polluted Singapore River to turn it into a sewer, Mr Lee Kuan Yew objected and instead promised Dr Winsemius that he would one day catch a fish in the Singapore River. During his final visit to Singapore in 1993, he did catch a "Garoupa" (Grouper), and said he was never happier to lose a wager.

3 The clean-up of the Singapore River took us a decade and cost \$300 million. The successful completion showed that despite the difficulties showed Singapore's determination to grow our economy whilst protecting our environment. Sustainable development is and has been the cornerstone of our policymaking since our independence. In my Ministry's Addenda to the President's Address last month, we made a commitment to continue building on this legacy of a sustainable Singapore, balancing environmental protection and economic growth.

### **Year of Climate Action**

4 The opening of this Gallery in Singapore's Year of Climate Action could not be more timely. As part of our campaign to raise national awareness of climate change, we have launched a Climate Action Pledge for individuals and organisations to commit to taking climate action. Because, the government cannot tackle Climate Change alone. I'm therefore happy with the response thus far. Today, we have garnered close to 170,000 pledges. If you have not already taken the pledge, you can do so today at Zones A and F of the Gallery.

5 Beyond Government-led efforts, we are greatly encouraged to see that non-governmental organisations are taking concrete steps towards a sustainable Singapore. At the Climate Action Carnival downstairs, Singtel has brought along the ReCYCLE bins from their e-waste recycling programme — an important part of our plans to become a Zero Waste Nation. Earthlink NTU has a booth

showcasing their carbon footprint research project, which involved giving more than 200 NTU student volunteers a device to estimate their average carbon footprint. The data collected will be used to guide campaigns to reduce the students' carbon footprint.

6 Children from Sunflower Preschool at Punggol Field Walk have been working with Coral RC to use solar panels to generate electricity to run fountains and sprinklers, and build ponds and fountains using recycled materials. These are commendable efforts to inculcate environmentally-friendly habits in the young, so that they grow up to become environmental advocates.

7 But no country can mitigate climate change alone. Singapore is actively contributing to international climate change negotiations, and regional and global efforts on sustainable development. In July, we will be holding the Singapore International Water Week, CleanEnviro Summit Singapore, World Cities Summit, and the Partners for the Environment forum, to drive conversations on sustainable development. As ASEAN Chair, Singapore will host a Special ASEAN Ministerial Meeting on Climate Action and an expanded meeting to bring together ASEAN, China, Japan, Republic of Korea, the UNFCCC COP current President and President-designate Fiji and Poland and the UNFCCC Executive Secretary. These meetings will enable our region to demonstrate commitment to the Paris Agreement. Singapore is also undertaking our first Voluntary National Review of the UN Sustainable Development Goals. This is an opportunity for Singapore to learn from and collaborate with other countries in the implementation of the Sustainable Development Goals.

## **Conclusion**

8 The SSG is situated here in the Marina Barrage, an iconic feature of Singapore's sustainability story. The Barrage celebrates its 10th anniversary this year. To celebrate this milestone, PUB has planned a series of activities that will culminate in a three-day carnival in the last week of October. We hope to see you here again.

9 To conclude, I hope that the SSG will generate conversations and ideas on sustainability, and inspire visitors to make sustainable choices in their lifestyles. Just as our past decisions gave us the clean environment we enjoy today, our decisions today will affect the future living environment of our children and their children. Let us work together keep Singapore a sustainable and vibrant home. Thank you.

Ms Jessica Cheam, Managing Editor of Eco-Business

Ladies and Gentlemen

1. Good afternoon. Let me begin by congratulating Jessica and Fraser on their successful trip to the Antarctica, and for sharing their experience with us through this documentary. When used well, a bold image and film can provoke deep reflection and help drive across climate change issues and messages far more effectively than words. I will keep my remarks brief.

### **Climate Change & Sustainable Development**

2. Climate change is a global challenge. We have seen its impact on countries around the world, manifested for example in extreme weather conditions, from droughts to floods caused by intense rainfall. Singapore is especially vulnerable. As a low-lying island, we are most vulnerable.

3. This is why we have put in place long-term plans to adapt to, and mitigate the impact of climate change. Changi Airport Terminal 5 will be built 5.5m above the mean sea level. Significant investments have been made in other infrastructure such as raising the height of coastal roads, building seawalls, and widening drains. We are supporting solar deployment, expanding public transport, freezing the growth of our car population and implementing a carbon tax from 2019. We are also working to reduce waste and extract greater value from waste as a resource to achieve our vision of a circular economy.

### **Year of Climate Action**

4. However, the government cannot tackle climate change alone. We need industry, households and individuals to play active roles. This is why we designated 2018 as the Year of Climate Action — to raise awareness on climate change, and to spur collective action.

5. We have received good response and support from many organisations, who have helped to spread climate action messages. Let me share a few examples.

- o In February this year, Eco-Business organised the *Unlocking Capital for Sustainability* conference, which I attended. The conference gathered senior business leaders, policymakers and innovators to discuss sustainable finance in Singapore and the region.
- o Last week, Ricoh Asia Pacific organised its 12<sup>th</sup> Eco Action Day Industry Roundtable, bringing together corporate representatives and Corporate Social Responsibility (CSR) experts to discuss how Sustainable Development Goal (SDG) 9 can be tackled in the Singapore context.
- o The Tzu Chi Foundation will be leveraging their monthly recycling drives to conduct public education on the different types of climate action that individuals can take.

6. We have also collected close to 170,000 Climate Action pledges from individuals, schools and organisations. This is an encouraging number and we hope that more will come on board to pledge their support. If you have not made your Climate Action pledge, may I encourage you to go to [www.climateaction.sg](http://www.climateaction.sg) to do so. By making a pledge, we make a public declaration of our readiness to take climate action and to be a positive influence to inspire others to do likewise.

### **Conclusion**

7. Every positive step, no matter how small, will contribute to a sustainable future for Singapore, and we must recognise that no one can do this alone. I encourage everyone to continue to do your part for climate action, for us and our future generations.

8. Thank you.



Delegates

Ladies and Gentlemen

1. Good morning. I am happy to join all of you at today's conference.

#### Climate Change and Sustainable Development

2. Singapore has always designed our policies with sustainability in mind. Our founding leaders ensured that economic growth did not come at the expense of our environment. We have switched to natural gas which is cleaner, to generate most of our electricity; our city is immersed in greenery, which was by design; and we are strengthening the resilience of our water supply. All these means that we have built a solid foundation to continue being a sustainable city.

3. One of the greatest challenge that every nation has to meet is the threat of climate change. All nations have to pursue a green and sustainable growth policy. Singapore is doing our part in the global fight against climate change. Under our Climate Action Plan, we are investing in solar energy, developing more sustainable buildings, and expanding our public transport network so that 8 in 10 homes will be within walking distance from a train station. From 2019, we will implement a carbon tax to enhance energy and reduce emissions. But the Government cannot do this alone. This is why, to galvanise collective action against climate change, we designated 2018 as the Year of Climate Action and called on individuals, households and organisations in various sectors to take action together with us.

#### Role of Financial Sector

4. The financial sector, with its potential to influence decision-making and support policy makers, plays a key role in promoting climate action. Let me give three examples of how this is being done.

#### *Positive moves in sustainable finance*

5. First, there are positive moves being made in sustainable finance. Banks have been working with companies to support projects that promote sustainability. For instance, UOB provided S\$15 million financing to Sunseap Group for a series of solar projects in Singapore. OCBC announced in March this year that its newly set up “#OCBCCares Fund” will fund six ground-up proposals that address environmental sustainability issues in Singapore.

6. Regional and global asset owners are increasingly requiring asset managers to have strong Environmental, Social and Governance (ESG) credentials, and Singapore's asset management industry has been stepping up efforts in this area. Since March 2017, the Investment Management Association of Singapore (IMAS) has collaborated with the

World Wildlife Fund (WWF) to build industry capacity, through masterclasses on ESG and sustainable investing.

7. We are also seeing the growth of a community of impact-first investors in Singapore. For these investors, “doing well” is synonymous with “doing good”. Garden Impact Investments (GII), a Singapore-based company, invests in South East Asian businesses that create jobs and provide services and products for the poor and marginalised. In addition to the financial returns, each investment is monitored for their measurable social and environmental impact. I hope to see such investments gather momentum.

8. On the insurance front, there is ongoing collaboration between MAS and the industry to build a sustainable insurance ecosystem. MAS is working with insurers to anchor ESG research, modelling capabilities and underwriting teams here in Singapore, and catalyse the development of innovative ESG products such as insurance cover for energy efficient infrastructure and renewables. MAS is also looking to partner research institutes such as the Institute of Catastrophe Risk Management and the Earth Observatory of Singapore to factor long-term climate and environmental risks into risk models.

9. Singapore will implement the carbon tax and the first payment will be in 2020. This is not a fiscal measure to fund government expenditure. The Finance Minister has made a commitment that the expected revenue of close to S\$1 billion in the first five years will be used to help industries improve energy efficiency and reduce emissions. This is also an opportunity for the private sector to participate in co-funding industries’ transformation process.

#### *Leveraging on digital technologies as key enablers*

10. The second way the financial sector is playing a key role in promoting climate action is by leveraging digital technologies as key enablers. Let me share two examples of this in action:

- o Using Big Data, ING is working with the Building and Construction Authority (BCA) and the Singapore Green Building Council (SGBC) to introduce its Real Estate Finance Sustainability App in Singapore. The App helps commercial real estate owners move towards a sustainable portfolio by collating data such as predicted annual savings on cost, CO2 reduction, and cost recovery time, to generate insights into the profitability of green real estate investment opportunities.

- o In April this year, DBS participated in the blockchain marketplace platform demonstration for the transaction of renewable energy certificates (REC) by Singapore Power Group. This helps corporates achieve their sustainability goals by ensuring that the electricity they consume comes from renewable sources, and makes it easier for REC buyers to purchase their green credits.

#### *Mainstreaming sustainable finance in Singapore and the region*

11. The third way the financial sector is playing a key role in climate action is by mainstreaming sustainable finance in Singapore and the region. The green financing space presents an opportunity for Singapore to develop in tandem with regional and global trends. ASEAN has developed a common set of Green Bond Standards, and we have seen some success in the use of these Standards. Singapore-based Sindicatum Renewable Energy Company Pte. Limited issued the first international ASEAN green bond in January 2018. This was a 2.5 billion Indian Rupee green bond in 5- and 7-year tranches. The proceeds will be used to finance renewable energy projects in India.

12. There is scope for the green bond space to grow, and I understand that the International Finance Corporation under the World Bank Group will be holding its Green Bond Conference on 7 June. I look forward to seeing more initiatives that will advance the green bond agenda in this region. Working with Partners

13. While the initiatives I talked about hold promise, more needs to be done to develop the long-term sustainable finance agenda. It is thus important to work with partners who are key to the transition process, for example, regional development institutions and multilateral organisations like the World Bank Group, the International Finance Corporation, Asian Development Bank, and the Asian Infrastructure Investment Bank.

14. NGOs play an important role too. I am pleased that the WWF will be creating the Asia Sustainable Finance Initiative (ASFI) in Singapore, which is supported by MAS. ASFI will look to align a diverse base of stakeholders, and focus on linking sustainable finance activities, with tangible and measurable real-economy sustainable development outcomes in Singapore and the Asia Pacific region. Singapore is happy to host the ASFI as we continue to play a part in being the sustainable financing hub for the region.

### Conclusion

15. Let me conclude. Climate change is an important global issue, which requires long-term efforts from all sectors. The financial sector can play a key role in promoting climate action by helping investors realise that there is tangible value in sustainable development. I urge everyone here to play a part in advancing the role of sustainable finance.

16. I wish all of you a fruitful Conference.

Thank you.

Ms Isabelle Louis

Deputy Regional Director for Asia and the Pacific, United Nations Environment

Mr Kwek Eik Sheng

Group Chief Strategy Officer, City Developments Limited

Ms Esther An

Chief Sustainability Officer, City Developments Limited

Mr Tony Gourlay

Chief Executive, Global Initiatives

Distinguished Guests,

Ladies and gentlemen,

Good morning to one and all, and a Happy World Environment Day! I am happy to be here for the launch of the #BeatPlasticPollution Art installation 2018, in support of World Environment Day 2018.

### **World Environment Day**

2 The theme for this year's World Environment Day is "Beat Plastic Pollution". It is a timely reminder for us to make changes in our daily lives to tackle the issue of excessive plastic consumption. We all know that plastics do have their valuable uses. For instance, in Singapore, plastic bags are used to bag our rubbish for good public hygiene. However, as societies embrace the convenience that is afforded by plastic, we are seeing excessive consumption of single-use disposable plastics. Our plastic recycling rate still remained low at 6%. Therefore, we need to step up efforts to reduce plastic consumption.

3 To curb plastic waste, we need to tackle the excessive consumption of all types of disposables. For example, we do not allow disposable crockeries in our new hawker

centres for dine-in. By 2021, we will make it mandatory for businesses to report on their packaging waste and to share their waste reduction plans. Retailers, including supermarkets, may be required to report the amount of plastic bags they use and their packaging waste reduction plans. I am glad to see companies already taking the initiative to reduce plastic waste on their own accord. This week, we just read about the Millennium Hotels and Resorts (MHR) group's pledge to eliminate single-use plastics from all of its local hotels by June next year. Hilton has also pledged to eliminate the use of plastic straws from all their managed properties by the end of this year.

### **Year of Climate Action**

4 To rally national consciousness around the need to take individual and collective action to fight climate change for a sustainable Singapore, we launched the Year of Climate Action in January 2018. The first thing you can do is to take a climate action pledge.

5 I encourage all of you to take out your mobile phones, go to [www.climateaction.sg/pledge](http://www.climateaction.sg/pledge) and make your pledge now. The pledge contains simple actions which you can adopt as habits in your everyday life. For instance, refuse plastic straws, use reusable bags, and recycle right. Collectively, these simple actions will make an impact on our environment. Help us to achieve sustainable development and make an impact on climate change. Your pledge represents your determination to make a change and difference to our climate, and brings us closer to a plastic-lite future.

6 I also want to commend City Developments Limited and Global Initiatives for answering the United Nations Environment's call to beat plastic pollution with this event. The art installation is made possible by the collective efforts of passionate individuals, many of whom are here today.

### **Conclusion**

7 The key to beating plastic pollution is about reducing excessive use of all kinds of single-use plastic and ensure their proper disposal. Recycle and reduce as much as possible to keep plastic as a resource in our economy loop for as long as possible, as part of our circular economy model.

Thank you and have a Happy World Environment Day!

Ladies and Gentleman

1. Good afternoon.

### **TOWARDS A CIRCULAR ECONOMY**

2. Today is World Environment Day — a day designated by the United Nations to promote awareness and action for the protection of our environment.

3. In Singapore, sustainable development – the protecting of our environment whilst growing our economy – has been the key tenet of our nation building efforts since independence. Singapore was one of the first countries, in 1972, to form a ministry dedicated to sustaining a high quality environment for its people. We spent S\$1.8 billion on sewerage and used water treatment infrastructure in the 1970s and 1980s, and cleaned up our Singapore River over a decade. Pursuing growth at all costs has never been the Singapore way.

4. In my Ministry's Addenda to the President's Address last month, we reaffirmed our commitment to build a smart, green and liveable home for Singaporeans. One of our key plans is to foster a zero waste culture in Singapore. This is aligned with Sustainable Development Goal (SDG) 12 of the UN 2030 Development Agenda, on Responsible Consumption and Production. SDG 12 aims to substantially reduce waste generation through prevention and the 3Rs -- reduction, recycling and reuse. Singapore will work towards extracting greater value from waste as a resource, so as to achieve our vision of a circular economy. To achieve our goal, we will need to instill a culture of 3Rs among businesses, communities and individuals.

5. Today's event is a meaningful step towards strengthening e-waste management, a key focus for my Ministry and the National Environment Agency.

### **NATIONAL E-WASTE MANAGEMENT SYSTEM**

6. There are many reasons why we should be concerned about e-waste. Increasing affluence, rapid technological advancements, and shorter product replacement periods have led to an increase in the amount of e-waste generated. E-waste also contains heavy metals and hazardous substances that can harm the environment and public health if not properly handled.

7. There are also good economic reasons why we should invest in an e-waste management system. Precious metals can be extracted from e-waste and re-used. Given that Singapore generates 60,000 tonnes of e-waste annually, there is potential for us to turn e-waste into a significant resource. But only 6 per cent of e-waste is recycled through e-waste recycling bins. And 60 per cent of the general public does not know or is unsure of how to recycle e-waste.

8. This is why we will be introducing a national e-waste management system by 2021 that make it easy for the public to recycle e-waste. This mandatory system will be based on the principles of Extended Producer Responsibility, or EPR, and will help to ensure that e-waste is recycled properly. Support from the public and industry will be crucial to ensuring the successful implementation of the system.

### **RENEW PROGRAMME AND PARTICIPATING RETAILERS**

9. There is much that members of the public, businesses and organisations can do to tackle e-waste. The RENEW programme is an example of how ground-up efforts can make a difference. Spearheaded by StarHub, DHL and TES, the RENEW programme is Singapore's largest voluntary e-waste collection and recycling programme. Since its implementation in 2012, RENEW has collected over 240 tonnes of e-waste.

10. The signing of the MOU today is a milestone in the development of the RENEW programme. Best Denki, Courts, Gain City and Harvey Norman have come on-board this programme, and will be adding 20 recycling bins across their outlets island-wide. This will make it more convenient for the public to recycle their e-waste. I am heartened to see our major retailers giving their strong support to this initiative.

11. With more e-waste recycling bins available now, I encourage the community to make use of these facilities to properly dispose of their e-waste. We will be looking to add even more recycling bins in the future. I also look forward to more retailers coming on board the RENEW programme.

## **CONCLUSION**

12. Our concerted efforts to manage e-waste will not just bring us closer to our vision of a circular economy, they also contribute to our efforts in the Year of Climate Action to reduce our carbon footprint. Let each RENEW bin convey the message that e-waste must be managed responsibly, so that we can safeguard our environment for our future generations.

13. I congratulate all RENEW partners, and wish them every success in this initiative.

14. Thank you.

Mr Lim Peng Hun, Deputy Principal (Academic), Singapore Polytechnic;

Ms Melissa Tan, Chairman, Waste Management & Recycling Association of Singapore;

Distinguished Guests

Ladies and Gentlemen

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### **Introduction**

1. Good morning. I am pleased to be here today to witness the signing of an MOU between Singapore Polytechnic and the Waste Management and Recycling Association of Singapore on a new Chemical Management and Workplace Safety Programme.

### **Challenges in Waste Management**

2. Over the years, the waste management industry has played a key role in transforming Singapore into a clean, liveable and sustainable city. But with population growth and increasing consumption, we are faced with new challenges to manage our complex waste streams safely, effectively and efficiently.

3. Last year, Singapore generated about 7.8 million tonnes of waste, a seven-fold increase from 40 years ago. At this rate, our only landfill at Pulau Semakau will be completely filled in less than 20 years.

4. For Singapore to achieve our vision of becoming a Zero Waste Nation, we will have to adopt a circular economy model, where we minimise the waste generated and maximise the value and resources that we can extract from key waste streams.

### **Becoming a Zero Waste Nation – Through legislation, technology and education**

5. The Government is taking the lead by putting in place the right infrastructure and policies. One example is the introduction of the Extended Producer Responsibility (EPR) approach in the management of e-waste, which we announced in March this year. The EPR approach extends Producers' responsibilities to the proper end-of-life treatment for the electrical and electronic products that they put on the Singapore market.

6. But beyond legislation, we must instil a strong culture of waste minimisation and get our people to practise the 3Rs – reduce, reuse and recycle – and make it a way of life.

7. And it is critical that we continue to look for ways to harness technology and upgrade our skills to manage our waste.

### **Environment Services Industry Transformation Map**

8. Last year, the Ministry of the Environment and Water Resources, and the National Environment Agency launched the Environmental Services Industry Transformation Map (or ES ITM) to drive innovation and technology adoption, raise productivity, upskill our workforce and help companies venture overseas. It is projected that by 2025, some 30,000 workers will benefit from higher value-added jobs in the cleaning and waste management industry.

### **WMRAS-SP Partnership to Tackle Industry Issues**

9. But the Government cannot spearhead this transformation alone. A successful industry transformation requires deep partnerships between the Government and key stakeholders such as companies, education and training providers, and business associations.

10. I am glad that many partners are with us on this journey. The signing of the MOU between Singapore Polytechnic (SP) and WMRAS today is an excellent example. They will jointly develop and deliver a new Chemical Management and Workplace Safety Programme that will be part of SP's suite of courses for the workforce. It will be specially tailored for professionals in waste management and recycling companies. The programme will upgrade our workforce's capabilities in managing hazardous chemical waste to improve workplace safety, and is expected to benefit some 100 companies every year.

11. WMRAS will work with SP to provide experienced industry expert practitioners to conduct the course, while SP provides the technological content as well as relevant pedagogy suited to the workforce. This programme provides not only training for workers but also an opportunity for SP, WMRAS and companies to co-create solutions for the industry.

12. In addition to training and technology development, this collaboration also hopes to see WMRAS tapping on SP's expertise to provide its member companies with technical consultancy services, and to jointly explore Collaborative Industry Projects with SMEs.

### **Conclusion**

13. I congratulate WMRAS and SP on this collaboration. It marks the beginning of what I believe will be a fruitful partnership between WMRAS and SP to develop the environmental services industry. More importantly, it will help to create a more liveable and sustainable Singapore for our people.

14. Thank you.

Distinguished

Guests,

Ladies

and

Gentlemen,

Good morning

### *Introduction*

1. It is my pleasure to welcome you to the ASEAN Dengue Day Workshop. Today's gathering of global policymakers and scientific and public health professionals is a strong demonstration of our collective commitment to fight dengue and other mosquito-borne diseases.

### *Impact of Climate Change on Dengue*

2. A recent World Health Organization report gives a sobering estimate of 390 million dengue infections a year. The report assessed that 3.9 billion people, in 128 countries, are at risk of dengue infection. Here in South-east Asia, dengue is endemic in all ASEAN countries. It is worrying that dengue has even spread north- and southwards to temperate zones. In the last 15 years, there have been uncharacteristic dengue outbreaks in Nepal, Guangzhou, Yunan, as well as Japan.

3. With global warming, we can expect the dengue situation to worsen. Higher temperatures mean more conducive conditions for the proliferation of the mosquito vector across larger land areas, and faster replication of the virus in mosquitoes. Moreover, Singapore's position as a global hub heightens the risk of cross-border importation of other mosquito-borne diseases such zika, chikugunya, yellow fever as well as unknown diseases that may yet emerge in future.

### *Critical to Maintain Comprehensive Mosquito Control Strategy*

4. Hence, Singapore is determined to stay vigilant, and persevere with our holistic and rigorous vector control strategy. This comprises 4 key thrusts

a. First, effective surveillance;

b. Second, sustainable prevention and control to keep the mosquito population low;

c. Third, swift and robust outbreak management to break disease transmission; and

d. Last but not least, effective communication and outreach so that all stakeholders - every household, every building owner – take responsibility to prevent mosquito breeding.

5. With the strong involvement of the public and all stakeholders, Singapore has been successful in achieving a low incidence of dengue and other mosquito-borne diseases,

despite the challenges of our dense tropical urban setting. But we cannot be complacent. This is a never-ending war – a war where old enemies like dengue will gain strength with global warming, and where new enemies – new diseases – will continually emerge.

*New Weapons to Fight Dengue*

6. To keep winning this war, we must innovate, invest in new technology, and collaborate and share knowledge. We must keep the public continually alert to eliminate breeding ground all year round for the sake of their loved ones. Public campaigns on dengue prevention and vector control will be part of our lives as long as there is no effective vaccination against dengue.

7. On the vector control front, Singapore is studying the Wolbachia technology as one of the new tools against Aedes-borne diseases. The National Environment Agency completed the Phase 1 field study of the Wolbachia technology last year. We have since commenced a Phase 2 study to further improve our release methodologies and tactics.

8. We are heartened to have international experts gathered here today to share your knowledge and expertise – the scientific advancements, the success stories, and the challenges faced in different ecological settings. We hope that this workshop will promote collaboration and accelerate the development of effective techniques and technologies that will benefit the world.

9. We are also thankful to the many partners and advisors who have assisted in Singapore's effort to control dengue. Professor Duane Gubler, our keynote speaker today, has been helping Singapore with his wealth of knowledge on mosquito-borne diseases, since 1972. IAEA, with its experience in the use of sterile insects for agriculture, has also given much support to Singapore and to many of us in this meeting, to accelerate our research on new mosquito control tools.

*Year of Climate Action*

10. Taking a step back, it is important to recognise that efforts to combat global warming will also translate to better control of dengue and other mosquito-borne diseases. In Singapore, other than the impact on mosquito-borne diseases, climate change poses significant challenges for us as an island city state. That is why Singapore declared 2018 as the Year of Climate Action– to raise public awareness of climate change and to call on individuals, households and industry to take climate action together.

*Conclusion*

11. Let me conclude by thanking all of you who have collaborated with us in our fight against mosquito-borne diseases. As temperatures climb around the globe, there is even greater urgency to step up our efforts to curb the spread of these diseases, and combat climate change. Let us strengthen existing partnerships and forge new ones, as we work closely together to advance our common cause.

Thank you.

Professor Lam Khin Yong, Vice-President (Research), Nanyang Technological University

Mr Li Zhen, Chairman, Guoxuan High-Tech Company Limited

Distinguished Guests,

Ladies and Gentlemen,

A very good morning to one and all. It is my pleasure to be here to open the Guoxuan-NTU Smart Energy Laboratory, and witness the signing of a new agreement between Guoxuan and NTU to develop new technologies to overcome battery-related challenges. I would like to take this opportunity to speak about the importance of innovation in climate action.

### **Embracing Green Mobility for Climate Action**

2. As a low-lying island, Singapore is vulnerable to the effects of climate change. Under the Paris Agreement, we have committed to reduce our Emissions Intensity by 36 per cent from 2005 levels by 2030. In 2014, our overall Greenhouse Gas (GHG) emissions totalled 50 million tonnes CO<sub>2</sub>-equivalent. Transport sectors accounted for 16 per cent of the emissions. Embracing green mobility has therefore been a key strategy in our plan to build a low-carbon and climate resilient Singapore.

3. We have introduced various initiatives to tackle vehicular emissions. Last year, the Ministry of Environment and Water Resources commissioned a study to identify cleaner vehicular technologies suitable for Singapore. We found electrification promising for many vehicle types.

4. In June 2016, LTA and EDB awarded Singapore's first EV car-sharing programme to BlueSG Pte Ltd. It is progressively deploying a 1,000-strong fleet of shared EVs and installing 2,000 charging points nation-wide by 2020. Up to 20 per cent of the charging points will be available for public use to lay the foundation for a national EV charging network to support EV proliferation moving forward. In fact, one of the charging station will be in one of the blocks in Jurong West, which is under my constituency. NTU, as part of the Smart Mobility Test Bed, as also seen trials of electric vehicles deployed within its campus.

### **Overcoming Technological Limitations Through Innovation**

5. However, the deployment of electric vehicles is not without its challenges. In January 2017, my Ministry conducted a pre-Committee of Supply consultation session on reducing air pollution from vehicular emissions. We engaged motor traders, fleet owners, and academic professionals on adopting green vehicles. The limitations of green alternative technologies were cited as a challenge. Specifically, some of the participants

cited the limited range of electric batteries as a challenge, and the draining of the batteries of electric buses from air conditioning the buses.

6. I am thus heartened that NTU and Guoxuan will be partnering to seek a breakthrough in overcoming the limited range of electric vehicles, focusing on the improved performance of electric vehicles, battery systems, and associated ecosystems for tropical cities. At the same time, it is equally important that these advances in technologies are commercially viable. Therefore, I look forward to the collaboration between Guoxuan and Integrated Facilities Services Consulting (IFSC) Pte Ltd on commercialising and commissioning the solar energy storage and management system technology in the Southeast Asian market.

### **Innovation in a Low-Carbon Economy**

7. As the world transitions to a low-carbon economy, companies need to transform and innovate for a low-carbon economy. The critical role of innovation in the adoption of electromobility is not unique. As part of the wider push to realise Sustainable Development Goal 9 of sustainable industry and infrastructure, the Government will work with companies to overcome the perceived high costs to innovation and drive widespread technology adoption. In the environmental service sector, \$45 million has been set aside for the Closing the Waste Loop (CTWL) research funding initiative to boost Singapore's research and development capabilities in developing solutions to extract value and resources from key waste and residue streams including plastics, food, electrical and electronic products, and incineration ash.

8. As many of you may be aware, Singapore has designated 2018 as the Year of Climate Action. This year, we hope that organisations, educational institutions and individuals can make a public commitment to climate action through the Climate Action Pledge. I commend NTU for making their organisational pledge earlier this year. I urge more companies to make their pledge on our climate action website, [www.climateaction.sg/pledge](http://www.climateaction.sg/pledge), to demonstrate their commitment to reduce their carbon footprint through innovative business practices. I am happy to hear that NTU's collaboration with Alibaba is going well and becoming increasingly productive. I hope that NTU will have similar experience with Guoxuan.

9. Together, we can put Singapore at the forefront of green technology adoption, making a significant positive impact on on climate action. Congratulations, and thank you.

Dr Lim Lan Yuan, Executive President, World Association of  
Valuation Organisations; President, Singapore Institute of  
Surveyors and Valuers

Sir David Tweedie, Chairman of IVSC Board of Trustees  
Presidents of Valuation Professional Organisations

Distinguished Guests

Ladies and Gentlemen

## Introduction

1. Good morning. I am happy to join you at the inaugural IVSC-WAVO Global Valuation Conference 2018. As the former Chairperson of the Singapore Institute of Surveyors and Valuers (SISV), I was involved in the early stages of the founding of the IVSC and WAVO, and am glad to see that both organisations have since grown from strength to strength.

2. The conference theme, “Valuation in the Globalised World”, is most apt. In today’s connected global markets, cross-region interaction and collaboration between valuation practitioners are par for the course. Knowledge and understanding of overseas valuation markets, cultures, and economies have become critical to operating effectively.

Positive Developments in the Valuation Landscape

3. The industry has made good progress in recent years. I will touch on five areas: first, the establishment and adoption of international standards; second, education and training; third, development of guidelines; fourth, synergies with other professions; and fifth, recognition and titles.

4. First, the release of the International Valuation Standards (IVS) in January 2017 by the IVSC was a milestone. The global adoption of the Standards, including by Singapore, was a move towards greater transparency, and development of the profession. I congratulate the IVSC and WAVO for their landmark signing of the Memorandum of Collaboration in November 2016, which was a major milestone between the two world bodies. I understand the training and education of valuers undertaken by WAVO helped to expand the reach of the IVS 2017 around the world.

5. Second, education and training. The field of valuation in Singapore has expanded to meet the needs of new and fast growing markets. Through education and training, practitioners have expanded their scope beyond real estate to include plant and equipment, intellectual property, financial instruments and businesses. I understand that the SISV has been organising courses, workshops and conferences on specialised valuation topics such as business valuation and IP valuation, and that there are increasing numbers of Singapore practitioners in these areas. In addition, WAVO has been the pillar in providing training and education on the IVS, and promoting best practices among valuation professionals around the world. This is an encouraging trend. It is important that standards of professionalism continue to be raised, for the industry to remain relevant and effective.

6. Third, the development of effective guidelines. Singapore is noted as a safe haven for capital market investments - investments by REITs, developers, institutions, property and sovereign funds have scaled up significantly over the past two decades. The market capitalisation of SREITs today has grown to more than S\$80 billion. The need for valuation work is expected to grow as new and fast developing markets bring new investment opportunities. To provide a sound framework to support this growth, the SISV has been collaborating with the Singapore Exchange to improve the Valuation

Reporting for REITs, Initial Public Offerings (IPOs) and Listed Companies.

7. Fourth, synergies with other professions. Valuers work closely with other finance professionals such as auditors, accountants and REITs managers, and it is essential that common terms are correctly defined and used. For instance, valuers are familiar with the concept of 'Market Value' while accountants and auditors may be more familiar with the term 'Fair Value'. This Conference, attended by representatives from various professions in the financial industry, will help to build mutual understanding. I am heartened to know that both the SISV and the Institute of Singapore Chartered Accountants (ISCA) are currently collaborating to release new valuation and auditing guidelines that will enhance reporting standards in Singapore.

8. Fifth, recognition and titles. Earlier, Executive President of WAVO, Dr Lim Lan Yuan, announced the launch of the WAVO World Recognised Valuer (WRV). This global recognition of the valuation profession will help to boost the profession and encourage appraisers and valuers around the world. I commend WAVO for launching this title and enhancing the recognition and status of valuers.

Challenges

Ahead

9. Having spoken on the positive developments in the valuation landscape, let me touch on some key challenges ahead, namely: international competition; technological disruption; and climate change.

10. First, international competition. Valuers face competition not just among the local valuation fraternity but also from international valuation organisations. However, this situation can be viewed as an opportunity too. I encourage local valuation entities to explore new business opportunities and collaborate abroad, and build capabilities to take on new markets.

11. Second, technological disruption. Many professions have come under threat with the rapid rise and evolution of technologies. For instance, blockchain technology, Artificial Intelligence (AI), and Augmented Reality are already making their impact felt in the real estate industry.

The valuation profession must rise to the challenge by raising their core competencies and see how technology can be best embraced to provide greater value to practitioners and clients.

12. Third, climate change. Singapore has designated 2018 the Year of Climate Action, to raise awareness of the urgency of this issue. The effects of climate change, such as rising sea levels and extreme weather, will affect the valuation of real estate investments, particularly those near flood-prone or coastal areas. The Wall Street Journal recently reported that properties closer to sea level in some areas of Miami were rising in value slower than those at higher elevations. It is crucial that practitioners factor in the impacts of climate change, and this is one area where technology can help – predictive modelling of climate change could help practitioners make better assessments and valuations.

Conclusion

13. To conclude, in this globalised world, practitioners must be flexible and embrace change to meet the demands of an ever-changing business environment. Challenges can be turned into opportunities. This Conference is an important platform to further develop competencies in the profession, and work towards the recognition of global standards.

14. I congratulate IVSC, WAVO and SISV for organising this Conference, and wish all delegates a fruitful time.

15. Thank you.

Ms. Yuko Nakahira, Managing Director, 3M Singapore

Distinguished guests

Ladies and gentlemen

I am happy to be here this afternoon. Today, we are not just celebrating the relocation and expansion of 3M Singapore's Headquarters and Customer Technical Centre (CTC), but also the launch of a rooftop solar farm at the 3M Tuas Plant.

2 This marks another milestone in the longstanding partnership between 3M and Singapore. 3M first set up its office in Singapore 52 years ago with eight employees. Today, it has 1,600 employees here, and two major manufacturing facilities in Woodlands and Tuas. 3M's expansion here signifies its continued commitment to Singapore.

## **INNOVATION A KEY DRIVER TO DEVELOPING SUSTAINABLE SOLUTIONS**

3 I am pleased that Singaporeans such as Dr Lim Boon Kiat and Mr Matthew Guo are at the forefront of driving innovations at 3M. They were part of a team that developed an advanced coating for exterior surfaces that reduces their ability to attract dust and dirt. Developed at 3M Singapore's Smart Urban Solutions Lab, which is housed within the 3M R&D Centre at Woodlands, this solution helps organisations to lower the frequency of maintenance by half. It also reduces water and cleaning costs by up to 20%. Such innovative solutions allow businesses to use less while accomplishing more, and contribute towards sustainable development goals.

4 The rooftop solar farm 3M has installed at its manufacturing facility in Tuas is another good effort towards sustainable development. The solar farm is part of 3M's efforts to increase its use of renewable energy to 25% of total electricity use. 3M's rooftop solar farm is one of Singapore's largest and can generate an average of 2,400 MWh of electricity annually. This is equivalent to electricity usage for 506 units of 4-room HDB flats. It will reduce carbon dioxide emissions by 1,139 metric tons a year. This initiative to utilise rooftop space - which would otherwise have been unused - to generate cleaner forms of energy to power its manufacturing facility is an example of how companies can maximise resources.

5 The switch to cleaner forms of energy will make our economy greener and grow our green economy at the same time. This is a key pillar in the

Sustainable Singapore Blueprint (SSB). The Government aims to increase solar penetration rates and raise the adoption of solar power in our energy system to 350 MWp (megawatt peak) by 2020. I am glad that companies in Singapore like 3M are adopting solar energy and contributing towards greater resource efficiency and a greener economy.

6 The switch to cleaner energy is also vital in our fight against climate change. Under the Climate Action Plan, the Government has outlined Singapore's strategies to build a low-carbon and climate-resilient Singapore. These include improving energy efficiency in all sectors of our economy, and investing in the development and deployment of low-carbon technologies like solar energy. To complement these policies, we introduced a carbon tax, which will come into effect in 2019. This will send a uniform, transparent price signal across the economy to incentivise emissions reduction.

7 Manufacturing remains a key pillar of our economy. We are committed to keeping it at 20% of our GDP over the medium to long term. The Government is prepared to spend more than the carbon tax revenue collected in the next five years to help companies to improve their energy efficiency and become more competitive. These efforts to move towards an energy efficient and low carbon growth economy will position us well for the future. I encourage companies to think outside the box and develop innovative ways to seize energy efficiency opportunities. Companies can also approach EDB, NEA and other relevant agencies for support to grow your businesses in a competitive and sustainable manner.

8 Climate action requires a collective effort. This is why my Ministry designated 2018 as the Year of Climate Action. We aim to raise national awareness on the impact of climate change and the urgency to take action in moving towards a low-carbon future. We are encouraged that more than 230,000 individuals and organisations have pledged to take climate action so far.

## **CONCLUSION**

9 Today, Singapore is an economically vibrant city that is clean, green and liveable. This is the result of integrated long-term planning, sound policies and effective implementation. Innovation is and will continue to be a key driver to developing sustainable solutions. I hope that 3M's spirit of continuous innovation will inspire your network of partners and the community to join in the movement towards a sustainable future. Congratulations to 3M, and I look forward to more breakthrough innovations and sustainable solutions for a sustainable and vibrant Singapore. Thank you.



Distinguished Guests  
Ladies and Gentlemen

## **Introduction**

1. I am pleased to join you this morning for the official opening of the Tuas Desalination Plant, or TDP.

## **Investing in a weather-resilient water supply system**

2. TDP is the latest milestone in Singapore's water story. Our fourth National Tap, desalination, did not come easy. The breakthrough was only possible because of our long-term planning, and commitment to research and innovation over many decades. While the concept of tapping on seawater existed in the 1970s, the membrane technology required was too expensive and unreliable then. It was more than two decades later in 1998 when our study showed that advancements in membrane technology had become financially and technically viable. Our efforts paid off in 2005 when we completed our first desalination plant – SingSpring Desalination Plant in Tuas. TDP is our third plant. It is also the first plant directly owned and operated by PUB. This will help PUB institutionalise the knowledge and processes gleaned from earlier desalination projects, and continue to retain competencies through hands-on direct operations.

3. Desalination, like NEWater, is a weather-resilient water source. It helps us better cope with the threat of climate change. Singapore is especially vulnerable as climate change will hit us on two extreme ends of the spectrum. More intense and frequent rainfall causes flash floods. On the other hand, prolonged droughts threaten water security. For a nation like Singapore where water is an existential issue, climate change will only exacerbate our challenges.

4. We have seen in other cities the dire consequences of not planning and investing for the long term. Cape Town in South Africa is not an isolated case. Sao Paulo, the largest city in Brazil, also suffered a major water crisis. It was hit by a severe drought from 2014 to 2017, which saw the stock level of its main reservoir fall below 4%. At one point, its 21 million inhabitants had less than 20 days of water. Water supplies were cut, business operations came to a standstill and violent protests erupted. This is a stark reminder not just of what climate change can do, but also how being ill-prepared can severely disrupt our lives.

## **Managing future water demand**

5. Our water needs will continue to grow in tandem with our economy and population, and further impact on our limited resources. By 2060, Singapore's water use is projected to double from today's 430 million gallons per day. We also need to be prepared for potential threats to our water supply system, like the extreme weather conditions. This requires continued commitment to long-term planning and investing ahead of our needs. Today, we are opening TDP. By 2020, we will have two more desalination plants at Marina East and Jurong Island.

6. Gradually but surely, we will continue to build up the capacity of our desalination and NEWater capacities, so that by 2060, NEWater and desalination can supply a combined 85% of our water needs then. Earlier this year, we began tunnelling works for Phase Two of the Deep Tunnel Sewerage System. This project will enhance our used water management, and boost NEWater production when completed in 2025.

7. We also need to continually expand and enhance our water supply network. We are laying more pipes to reach the population and industries in new growth nodes while maintaining and renewing existing water infrastructure. All these are heavy, but necessary investments, and they take time. We must make these investments ahead of time and demand, so that Singaporeans would not face the problems we saw in Cape Town and Sao Paulo. This is made possible by right-pricing water to reflect the long-run marginal cost of producing our next drop of water which is likely to come from NEWater and desalinated water.

8. Beyond expanding our water infrastructure and network, everyone needs to use water more efficiently. For households, I am heartened that the per capita water consumption has fallen to 143 litres per day in 2017. PUB is also working with industries to develop sectoral benchmarks and best practice guides to help improve water efficiency. I urge everyone to continue with their water conservation efforts.

### **Innovative features**

9. TDP showcases PUB's efforts in advancing research and innovation. Desalination is an especially energy-intensive water source and if we continue with business-as-usual, Singapore's desalination energy usage in 2060 will be four times that of today. We do not want to become energy-reliant in our quest to overcome water scarcity. We are exploring new technologies and the use of cleaner energy to make the desalination process more energy-efficient.

10. Where we are gathered right now is a site for PUB's R&D partners to test-bed new technologies under true-to-life conditions, without impacting the "live" operations of the plant. One such project is experimenting with electrochemical desalination technology. This technology has potential to halve the current energy use in desalination using reverse osmosis. The development of such low-energy desalination technologies needs to be accelerated. PUB's continual work with its R&D partners is therefore critical.

11. TDP is also the first desalination plant in Singapore to be fitted with solar panels. A 1.2 Mega-Watt-peak (MWp) solar Photovoltaic system will be installed on more than half of the plant's total roof surface area by the end of this year. This will meet all of the energy needs of the plant's administrative building, reducing its carbon footprint.

12. Lastly, TDP will employ the latest technologies and methods to improve operational efficiency and optimise energy use. In particular, it is the first desalination plant in Singapore to combine dissolved air floatation with ultrafiltration pre-treatment processes to treat seawater of varying quality.

## **Conclusion**

13. The 2013 World Resources Institute study ranked Singapore with the greatest risk of water stress in 2040. We cannot afford to be complacent. We must continue to plan and invest for the long-term. We also need to continually build up our water supply system, tapping on technology as an enabler. The future operating model for the water industry has to be one built on energy and carbon efficiency, resource recovery and process optimisation. I hope that our industry partners will continue to work with PUB to create innovative water solutions. I look forward to more of such projects in the future.

14. It is now my pleasure to declare the plant open. Thank you.

Excellencies,

Distinguished guests,

Ladies and gentlemen,

1 Good afternoon and a warm welcome to our friends and colleagues from ASEAN.

2 Singapore is happy to host the 6th Meeting of the Governors and Mayors of ASEAN Capitals (MGMAC). It is timely that the Office of the Mayors has chosen “Sustainable Environment” as the theme for MGMAC, to help spread awareness of the need for climate action and underline the importance of sustainable development.

### **CLIMATE ACTION AND SUSTAINABLE DEVELOPMENT**

3 We are already experiencing climate change impacts such as rising temperatures and devastating floods, with worse to come. According to a 2017 report by the Asian Development Bank, our region could enter into, I quote, “entirely new climate regimes”, including unprecedented heat extremes and more severe flooding. An assessment released by HSBC in March this year concluded that five of 10 countries that are most vulnerable to climate change are in South and Southeast Asia. There is urgency for ASEAN national, provincial and city governments to take climate action. At the same time, our countries must continue to address the evolving challenges of managing population growth and urbanisation, and promoting the long-term economic and social wellbeing of our people. In short, sustainable development.

### **SINGAPORE'S SUSTAINABLE DEVELOPMENT JOURNEY**

4 Since our independence, Singapore has pursued development on a sustainable basis. We were fortunate, because even as a fledgling nation, our pioneer leaders chose industrialisation and urbanisation to feed and house our growing population, but held on to the belief that we cannot sacrifice economic growth and environmental sustainability in the process. Over the years, we have worked hard to transform Singapore into a clean, liveable and sustainable city.

5 One area which has been transformed is the Singapore River. The clean-up of the River took us ten years. More than fifty years ago, thousands of Singaporeans were relocated from farms, factories, docks and warehouses that lined the Singapore River, where street-food stalls and factories were polluting the waters. In short, it was an open sewer. We were fortunate because our pioneer leaders not only wanted to balance progress for sustainable development, but also sought to fix problems that we inhabited. In particular, they wanted to clean up the Singapore River. In cleaning up the river, we also found an opportunity to create a new reservoir in the heart of the city. And by building a barrage across this new reservoir, we were also able to transform it into a flood control system, to help flood alleviation of our city area. The Marina Barrage offers the triple benefits of water supply, flood control and an attractive lifestyle destination. Some of you would have seen the Marina Barrage and the reservoir yesterday afternoon.

6 Even as we now enjoy a clean and green environment, Singapore faces urgent new challenges. For example, something that all of us are facing, climate change. Singapore's Climate Action Plan sets out to show what we need to do as a Government, and also what we need to do as a people of Singapore, so as to enforce and achieve climate change mitigation and adaptation. We are investing in solar, developing more sustainable buildings so that we do not consume more energy than we need. I hope that the temperature in this room is 25 degree Celsius or more, which is the ideal temperature for us to be in. The colder it gets, the more we put on, and we do not have to do that. We have also frozen the growth of the car population. In Singapore, if 6,000 cars are added on the roads, it is because 6,000 had come off the roads. We focus on public transport, and a car-lite policy, so that by 2030, eight out of 10 Singaporeans can walk to a train station within 10 minutes. This year, we also implemented the Vehicular Emissions Scheme to nudge car buyers to purchase cleaner new cars, and announced a policy to remove older, more pollutive motorcycles.

7 Singapore has passed the carbon tax act in 2018, for industries to start collecting and measuring their emissions in 2019, and pay a tax for the carbon emissions they produce from 2020 onwards. This will enhance energy and carbon efficiency, and more importantly, we hope to nudge and transform our industry to a low-carbon economy. We are also preparing our island for the effects of climate change. For instance,

Tuas Terminal, which will consolidate Singapore's port operations, will be built more than two metres higher than the highest water level recorded, in anticipation of rising sea levels.

## **INNOVATION FOR A SUSTAINABLE ENVIRONMENT**

8 While the effects of climate change are challenging and sobering, it is less costly to take pre-emptive action. There is also significant potential for entrepreneurship, R&D and creative problem-solving. We believe there are dividends to be reaped from early investment in environmental resilience and green growth.

9 Innovation is key. Singapore is harnessing smart technologies to enhance efficiency and optimise resources. For instance, in an upcoming major project, we will employ the latest technologies to maximise resource recovery by integrating a water reclamation plant and a waste management facility. We will save more than 200,000 tonnes of carbon emissions a year, and reduce potable water demand by using effluent water from wastewater treatment for cooling equipment.

10 To tap on the opportunities in the environmental sector, Singapore launched the Environmental Services Industry Transformation Map, or ES ITM, one of 23 industry transformation maps that were introduced last year. The ES ITM seeks to catalyse innovative solutions to address our environmental challenges as we build up the capabilities of the Environmental Services industry. We will encourage wider adoption of technology and help companies discover new ways of tackling environmental issues. We hope that the urban solutions that are developed will be useful, not just for ourselves, but also the region.

## **PARTNERSHIP FOR THE ENVIRONMENT**

11 The best laid plans would not come to fruition without the support of the public and our stakeholders. Singapore designated 2018 as the Year of Climate Action to focus on education, engagement and action, and galvanise support from the business community and public. We have year-long programmes to educate residents on environmental values so that green living becomes a natural part of our lifestyle.

12 Everyone, including our mayors and the community clubs, has been involved. Eco CC@North West, a community club, is an example of how both "hardware" and "software" are integrated to inculcate the culture of green living among residents. The community club is an old building that has been transformed into an experiential learning centre for sustainability, while its environmental programmes involve the community to inculcate a sense of ownership and pride.

## **INTERNATIONAL PARTNERSHIP**

13 Singapore is happy to share our experience in sustainable development with other countries. Under the Singapore Cooperation Programme (SCP), we have trained 120,000 officials from 170 countries in areas such as disaster management, education, health, and human resources management.

14 Countries in our region are close and important partners. ASEAN members and dialogue partners are working together to advance the ASEAN Plan of Action for Energy Cooperation 2016 to 2025. This will not only fight climate change, it has the added benefit of positioning our economies for green growth. The ASEAN Smart Cities Network will provide the platform for collaboration and capacity building among our cities to achieve smart and sustainable urban development.

15 As the ASEAN chair, Singapore will be hosting a Special ASEAN Ministerial Meeting on Climate Action (SAMCA) next week. There will be an expanded back-to-back meeting to engage China, Japan and South Korea. These meetings will provide our region with the opportunity to demonstrate our commitment to the Paris Agreement and to take collective climate action. This message of sustainable development will be reinforced in the programmes of the Singapore International Water Week, Clean Enviro Summit Singapore and World Cities Summit. I look forward to seeing you there.

## **CONCLUSION**

16 The signing of the Singapore Declaration today reaffirms ASEAN's commitment to building a sustainable environment and the 2030 Development Agenda. There is much that we can do to build resilience against environmental threats, but also to innovate and seize opportunities for green growth. By working together, we will become a more dynamic and connected community, and ensure that ASEAN

remains united and resilient. I look forward to our continued cooperation to create a more sustainable home for our future generations.

Thank you.

Distinguished Guests,

Ladies and Gentlemen,

A very good evening and welcome to Singapore. We are honoured to have you join us for the 10<sup>th</sup> edition of the Singapore International Water Week, or SIWW in short.

### **Singapore's Vision for Water**

2 I would like to start with a story that is closely tied to the beginnings of Singapore's vision for water. You may have already visited the Sustainable Singapore Gallery here at the Marina Barrage, which we reopened last month. At the Gallery, there is a porcelain figurine entitled the "Lost Wager", depicting a boy and his grandfather happily fishing on a boat.

3 There is a story behind it. The late Dr Albert Winsemius, Singapore's Chief Economic Advisor during Singapore's early years, believed that the heavily polluted Singapore River would never be able to sustain life, and should be turned into a closed sewer. However, Prime Minister Mr Lee Kuan Yew and our pioneer leaders had a different vision. They directed officials to embark on a decade-long effort in 1977 to clean up the river. Eventually in 1993, Dr Winsemius was able to catch a Grouper fish from the clean river water. The figurine was presented to Dr Winsemius, who said that he was never happier to lose a wager. When Dr Winsemius passed away, his family returned the figurine to Singapore as they felt this was where it should belong.

4 With the transformation of the Singapore River, Mr Lee Kuan Yew challenged us to create a freshwater reservoir in the heart of the city. The Marina Barrage where we stand today is the realisation of Mr Lee's vision. This year marks the 10<sup>th</sup> year anniversary of the Barrage.

5 These are just two milestones in Singapore's water story. With vision and human endeavour, Singapore has transformed our water vulnerability into strength and opportunity. We had to continually think beyond our constraints, and seek solutions ahead of challenges.

### **Singapore as a Global HydroHub**

6 We also knew that we can accomplish much more if we learned from one another. SIWW was started ten years ago, in 2008, for the global water industry to share best practices, showcase the latest technologies, and tap on business opportunities that have expanded with Singapore's development as a global hydrohub. I am heartened to see the event grow from strength to strength, and more water leaders and experts join us at this event each year.

### **Conclusion**

7 Existing challenges for water will persist, and new threats will emerge. More than ever, we need to leverage our combined expertise and resources to co-create solutions.

I had insightful discussions at the Amsterdam International Water Week in October last year. I hope SIWW participants will carry on their discussions in Amsterdam during its water week summit in November this year, so that we can continue to jointly chart the future for water.

8 I look forward to the exciting discussions at the SIWW. I wish all of you a pleasant evening. Thank you.

Mr Milton Ng, President of the Environmental Management Association of Singapore

Mr P. Palaniappan, Group CEO of the Training Masters Workforce Institute Pte Ltd

Distinguished Guests

Ladies and Gentlemen

A very good afternoon to all.

Thank you for inviting me to witness the signing of Letters of Intent between the National Environment Agency (NEA) and INCUBATE partners today, and the graduation of the inaugural batch of graduates under the EMAS LEAP Leadership Dual Diploma Programme. These are important steps in our journey to transform the Environmental Services Industry.

2. The Environmental Services Industry is facing challenges of an ageing workforce and low productivity. Many Environmental Services companies have told me about the difficulties you face in hiring workers. At the same time, there are rich opportunities to leverage technology and new ways of doing business as we join the rest of Singapore in transforming our economy. To attract a younger generation of workers, we must create better jobs that will give them a brighter future.

3. That is why we launched the Environmental Services Industry Transformation Map, or ES ITM in short, in December 2017. Through the ES ITM, we will support innovation by our companies and upskill our workforce. These include programmes to encourage wider adoption of technology in the sector, and to help local companies tap on overseas opportunities. The ES ITM is set to benefit 30,000 workers, across 1,700 environmental services companies by 2025.

4. A key objective of the ES ITM is to develop innovative solutions to address Singapore's environmental challenges, while building up the capabilities of the ES sector. For solutions to mature and scale, companies need space to testbed their ideas, so they can fail fast, learn fast, and adapt fast.

5. Last year, we set up the INCUBATE partnership as a platform to bring together the public and private sectors to prototype, pilot and profile ES solutions. As a flagship initiative of the ES ITM, premise owners such as property developers and hospitals opened their doors for aspiring companies to trial and curate novel solutions. We started with seven partners and already, there has been good progress in collaborative projects. For example, City Developments Limited (CDL) is trying out an integrated system of in-sink grinders with onsite

food waste digesters at one of CDL's serviced residences. This allows food waste in apartments to be conveniently collected through the sink, and turned into fertiliser.

6. We are also experimenting with new operating models that enhance productivity. For example, Pontiac Land Group is progressively replacing traditional headcount-based with outcome-based contracting to encourage cleaning companies to adopt technology and innovative deployment of their staff to raise manpower productivity.

7. I visited the Amsterdam RAI Exhibition and Convention Centre in May. They were using an outcome-based cleaning contract, where the KPIs were set based on reaction time to address feedback and cleaning standards. This gives the cleaning company flexibility to determine the appropriate manpower to meet the KPIs. For example, instead of having cleaners standby at every corner, they used a responder alert system to track, monitor and manage cleaning activities to reduce the deployment of cleaners. Despite hosting a major exhibition during my visit, I found the place generally clean and tidy. The cleaning outcomes were not compromised.

8. To promote the adoption of outcome-based contracts, NEA has been working with both public and private service buyers via one-to-one engagements to advise on their cleaning tenders, and how to measure and assess performance outcomes. Recently, they have also launched a Specifications Writing Course. I hope to see more companies come on board to spur this positive development of our cleaning industry.

9. This afternoon, I am pleased to announce that another eleven partners will be coming on board the INCUBATE programme. This includes our tertiary education institutions and integrated resorts. Their participation will allow us to start more trials later this year. But let us not stop here. NEA will continue to facilitate regular sharing sessions amongst INCUBATE partners so that ideas can cross-germinate and successes can be replicated across the industry. I hope to see more owners of premises join in these sessions to hear from peers and competitors alike, and eventually come on board as INCUBATE partners as well.

10. Today is also a special day for the pioneer batch of 22 graduates who will receive their diplomas from the EMAS LEAP (or the EMAS Lead, Energise & Accelerate Performance) Leadership Dual Diploma Programme. This programme was developed in 2016 by EMAS and the Training Masters Workforce Institute to equip cleaning supervisors with the skills to take on executive and managerial functions.

11. Each graduate embodies the spirit of the ES ITM. They have worked tirelessly to attain the diploma certification because they believe in the value of

upgrading themselves. This conviction has motivated them to press on – with many attending classes at night after work. My heartiest congratulations to each and every one of them and their families.

12. I hope that all of us, whether individuals or companies, will keep up this spirit that we celebrate today – of always striving to improve, innovate and overcome challenges, as we ride on the many and varied opportunities for growth in the Environmental Services sector. Thank you.

## **INTRODUCTION**

1 Good morning and welcome to the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) in Singapore. Your presence here today underscores ASEAN's commitment to meeting the challenges that climate change has put upon us, and also shows the world our resolve in meeting this challenge together.

2 Climate change is one of the most significant challenges of the 21st century. The ASEAN region, whose population centres lie along low-lying coasts and river plains, is highly vulnerable to sea level rise and climate extremes. In 2013, we witnessed the devastation brought about by Super Typhoon Haiyan, one of the strongest tropical cyclones ever recorded, when it swept through northern Southeast Asia. Over 6,000 lives were lost, with more than US\$10 billion worth of damages. But imagine some time before the end of this century, storms like this or even worse may hit places never known to be ravaged by severe winds or rains. That is what scientists are telling us can happen if we do nothing about climate change.

3 The impacts of climate change, including extreme weather events, threaten to undo our economic progress. A study by the Asian Development Bank estimates global flood losses of US\$52 billion per year by 2050, up from US\$6 billion in 2005. ASEAN Member States must therefore strengthen our climate resilience, while pursuing climate mitigation measures to tackle the root causes of climate change.

4 ASEAN has consistently supported global efforts to address climate change, including ratification of the Paris Agreement, and submission of Nationally Determined Contributions (NDCs). ASEAN is pursuing efforts to reduce energy intensity in the region by 20% from 2005 levels by 2020, and to increase the component of renewable energy mix by 23% by 2025. Let us continue the good work done at both the regional and national levels.

## **SAMCA AND THE TALANOA DIALOGUE**

5 2018 will be an important year for global climate discussions at the United Nations Framework Convention on Climate Change (UNFCCC). Parties are working towards finalising the Paris Agreement Work Programme to enable the full and effective implementation of the Paris Agreement.

6 Even though 178 parties have ratified the Paris Agreement, more work needs to be done to achieve the goal of keeping global average temperatures well below 2°C. The Talanoa Dialogue, under Fiji's initiative and leadership, was launched at the 23rd session of the Conference of the Parties (COP23) last year for Parties to take stock of the collective efforts under the Paris Agreement and to explore ways to increase the ambition of their NDCs by 2020. It is a year-long process involving Parties and non-party stakeholders, that will culminate in political discussions at the COP24 in Katowice, Poland, where leaders will detail their plans moving forward.

7 ASEAN can contribute and show that we are prepared to play our part in the global effort. Singapore, as Chair of ASEAN, and in line with our theme on resilience and innovation, has convened SAMCA as a platform for the region to demonstrate our commitment to climate action.

8 The back-to-back expanded meeting, or E-SAMCA will also allow ASEAN Member States to engage our regional partners China, Japan and the Republic of Korea, together with the current and incoming COP Presidencies Fiji and Poland as well as the Executive Secretary of the UNFCCC to consider how we can collectively as a region contribute to the international climate discussions.

9 During our SAMCA session, ASEAN Member States will have the opportunity to share our climate action plans. I am looking forward to the discussions. This is a timely opportunity for ASEAN to take stock of our current efforts and jointly chart our future ambitions. A summary of our discussions at the meetings today will be submitted as input to the Talanoa Dialogue.

## **SINGAPORE'S EFFORTS AND CLIMATE ACTION PACKAGE**

10 Singapore is committed to playing its part to support global efforts to address climate change. Even though Singapore's share of global emissions is only around 0.12 percent, we are taking ambitious steps to reduce our carbon emissions, including implementing a carbon tax from 2019. We also recognise the importance of regional and international cooperation on climate action.

11 Singapore is committed to supporting regional efforts to address climate change. We are pleased to announce the launch of a Climate Action Package (CAP) under the Singapore Cooperation Programme, which will commence in 2018 and run till 2020. Through the CAP, we will organise programmes to develop capacity in key areas such as disaster risk reduction, climate science, flood management and long-term mitigation and adaptation strategies. These courses will be refreshed on an annual basis, and the CAP reviewed prior to 2020. We hope that the CAP will be useful to ASEAN countries as they ramp up actions to address climate change.

12 Apart from capacity building, Singapore is also doing our part to enhance the region's resilience to climate change risks. To address the rising natural catastrophe protection gap in the region, Singapore is supporting the establishment of the Southeast Asia Disaster Risk Insurance Facility ("SEADRIF") which will be set up in Singapore by 2019. As ASEAN's first regional catastrophe risk pool, SEADRIF will provide immediate liquidity to cover emergency response costs in the aftermath of natural catastrophes, with an initial focus on flood risk exposures of Cambodia, Laos and Myanmar, and with the potential to expand in scope to other ASEAN countries and natural catastrophes in the future. An initiative like SEADRIF will play a significant role in strengthening the region's economic resilience to disaster risks and mitigating the adverse economic impacts of climate change.

13 We are also supporting efforts to improve the region's meteorological capabilities, which would in turn strengthen countries' own efforts in climate projections and adaptation planning. The Meteorological Service Singapore (MSS), as host of the ASEAN Specialised Meteorological Centre (ASMC), earlier announced in May that the ASMC will be investing S\$5 million (US\$3.67 million) in a 5-year regional capability development programme. The programme will include thematic workshops on the interpretation of climate change projections to formulate climate change adaptation planning, developing seasonal prediction products, as well as numerical weather prediction. This programme will benefit ASEAN countries through the sharing of technical knowledge and skills in weather and climate prediction.

14 Finally, Singapore is committed to helping ASEAN countries to advance our scientific understanding of tropical climate variability and change, and its associated impact on the Southeast Asian region. MSS and the Centre for Climate Research Singapore are committed to sharing their climate projections data and findings for the region with other ASEAN countries. We hope that this will deepen the region's understanding of climate science and help the region better prepare and plan for different climatic contingencies.

## **CONCLUSION**

15 To conclude, Singapore is committed to working with our fellow ASEAN countries to address the risks of climate change. We hope SAMCA will provide a platform for ASEAN to demonstrate our commitment and build regional momentum in advancing climate action. I look forward to a fruitful exchange.

Thank you.

Mr Tomasz Chruszczow, Special Envoy for Climate Change

Distinguished guests,

Ladies and gentlemen,

1 Good morning. Thank you for coming today.

### **Impact of climate change**

2 Climate change is a critical issue which impacts us all. Today, many countries are experiencing extreme weather conditions that have devastated lives and livelihoods. In Singapore, we have witnessed more intense rainfall. Many of you will recall the flash floods on Orchard Road. As a low-lying island, Singapore is also vulnerable to rising sea levels. Longer dry spells are also becoming a common occurrence.

### **Singapore's commitment to fighting climate change**

3 As a responsible global citizen, Singapore is doing our part to fight climate change. Our government has implemented a Climate Action Plan that maps out various adaptation and mitigation measures. We are investing in solar energy, developing more green buildings and expanding the public transport network while cutting private passenger car growth to zero. We will also implement a carbon tax in 2019, to encourage industrial energy efficiency and help transition our economy to a low-carbon future.

4 Singapore is not alone in our efforts. During the recent Petersberg Climate Dialogue in Berlin and Ministerial on Climate Action in Brussels, I had candid discussions with my counterparts on the challenges we face in implementing climate action measures, and how we can work towards implementing the Paris Agreement. Later today, Singapore is hosting the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and Expanded-SAMCA, which includes our key regional partners China, Japan and South Korea.

5 I am delighted that Mr Tomasz Chruszczow, Special Envoy for Climate Change, Poland's High Level Climate Champion, is able to join us today to share his thoughts on climate action.

### **Taking collective action**

6 In Singapore, we are very conscious that fighting climate change is everyone's responsibility. In this Year of Climate Action, we have seen many parties stepping forward to pledge their commitment to take action, and to encourage one another to do their part. Since the launch of Climate Action Year in January this year, over 234,000 climate action pledges have been made, and many of you gathered here today have either organized or participated in events to promote climate action.

7 No government can pursue sustainable development and tackle climate change on its own. This is why under Sustainable Development Goal (SDG) 17 focuses on Partnerships for delivering on the 2030 Development Agenda. Businesses and NGOs have an especially important role to play in advocating sustainability and climate action because of your domain expertise, influence and ability to reach out to different segments of society. I want to encourage all of you to continue with your efforts to mobilize society at large to take responsibility and to take climate action and live sustainably. It is a worthwhile and urgent cause that we must all take up.

8 Let me share with you some highlights for the Year of Climate Action so far. This is not exhaustive because many of you here have put in great effort and made significant impact.

- a) The Climate Action SG Alliance was formed in April this year. It is spearheaded by Jessica Cheam, Managing Editor of Eco-Business. With 17 influential members from the 3P sectors, the Alliance aims to raise public awareness on climate issues, and translate this awareness into action. Later, you will be hearing from Jessica on some projects that the Alliance plans to implement.

b) Our youths have been very passionate and active in championing climate action. To strengthen and sustain the engagement of youths, one initiative we are launching is to have a collaboration with the Singapore Scout Association to develop a new Climate Action Programme. Scouts will be able to earn their Bronze, Silver and Gold Climate Action Ambassador Badges, if they actively engage in learning about climate change, commit to taking climate action, and initiate projects to educate the public on climate change and advocate for climate action. We hope the programme will benefit many cohorts of Scouts, and that through this, they will become a multiplier force for change in the community.

c) The Singapore Environment Council has developed an EcoLifeSG mobile app, to enable users to track their carbon footprint. Organisations can track their monthly carbon emissions via a carbon journal, and see the direct correlation between operational costs and carbon emissions. The app has an interesting component for individuals. Users can “level-up” their Eco Avatar, just like in ‘Pokemon Go’, by reducing their carbon footprint. Challenges on transportation, energy usage, food consumption and waste generation help users to translate their daily actions into the carbon footprint generated. This helps them to monitor their environmental impact, one easy step at a time.

### **Keeping the climate action momentum going**

9 Tackling climate change is not a one-off campaign. It is an ongoing process that supports Singapore’s journey of sustainable development, because the future existence of our nation is at stake. At today’s forum, I encourage all of you to participate actively to share your experiences and generate ideas on what we can all do together to make Singapore the best liveable and sustainable city for generations to come. I wish you all a fruitful forum.

## **Introduction**

Good morning to all. Thank you Prof Seeram for the introduction. The theme for the session today is on policy and regulation. This is a good opportunity for policy makers like myself to share our perspective on the role of policy and regulation to safeguard the environment. I'm sure my other fellow panellists will have more to add on later.

## **Recognition of Need for Environmental Policies and Regulation**

2 Policy makers around the world are facing greater pressure to protect the environment and ensure good public health. There are a few reasons for this.

3 First, scientific advancement has improved our understanding of the impact of our actions on the environment. For example, modelling techniques allow us to understand the impact of climate change and economic analysis on the impact of air pollution on public health.

4 Second, there is a growing awareness among the global community of the consequences of not protecting the environment. So we see more ground up initiatives and lobbying for the government to do more. A good example is in the area of reducing the use of plastic disposables.

5 Third, there is an increasing global consensus on the need for collective action to address sustainability challenges that affect us all. For example, world leaders adopted the 2030 Agenda for Sustainable Development in 2015, followed shortly by the landmark Paris Agreement on climate action.

6 Many national, state and city governments are also putting in place comprehensive policies to manage emerging risks, and to safeguard the environment and public health.

7 Again for example, many jurisdictions require companies to undertake environmental impact assessments for major projects. The Extended Producer Responsibility (EPR) has been introduced in many countries to manage waste. As my minister has said earlier, Singapore is introducing the EPR in 2020.

8 More countries have also introduced carbon pricing systems to manage carbon emissions. And Singapore has just joined their ranks. We will be introducing a carbon tax in 2019.

## **Long-term, Integrated Approach Needed**

9 The next key point is the need for a long-term, integrated approach. Environmental sustainability and public health challenges have become more

complex and cross-cutting. Sustainable development, protection of the environment, such as having clean air, clean water and a quality living environment are increasingly challenging to attain, given rapid industrialisation, population growth and urbanisation. Climate change also poses a significant threat to humanity.

10 To manage these challenges, regulators need to take a long-term, holistic and integrated approach to planning and policy. Balanced policies are also needed to manage challenges and risks. Indeed, this is a global phenomenon.

11 I understand for example, as part of China's reforms, they formed the Ministry of Ecology and Environment to tackle environmental challenges holistically and achieve its vision of an "ecological civilisation".

12 In Singapore, we have always sought to balance economic development and environmental sustainability. As my minister has said, we do not believe that it is a zero sum game. Economic development does not have to be at the expense of the environment. In recent years, we have been targeting our policy measures to address three key areas:

13 First, to prepare Singapore for the low-carbon future, for example the introduction of a carbon tax along with measures to reduce carbon emissions in every economic sector. Singapore is committed to our Paris pledge, where we aim to reduce our emissions intensity by 36% from 2005 levels by 2030, and to stabilise our emissions with the aim of peaking around 2030.

14 Second, enabling Singapore to tap on the circular economy. We have set ourselves the target of improving our recycling rate to 70% by 2030 under the Sustainable Singapore Blueprint. We recently announced the introduction of EPR to manage our e-waste. Minister Masagos has also highlighted earlier some key thrusts of our policies under the upcoming Zero Waste Masterplan, and his vision of partnering our regional and international partners to achieve a global circular economy.

15 Third, enabling Singaporeans to continue to enjoy a high quality living environment, for example, by enhancing our vehicular emissions policies to ensure that we have clean air.

### **Consider Impact on Businesses and Stakeholders**

16 The final key point is about the need to consider the impact on businesses and stakeholders. Even as policymakers put policies in place, we must design interventions which minimise compliance costs, without compromising the environment or public health. To do this, we consult the industry and public actively. We also provide sufficient lead time and transitional support.

17 Sustainable practices also present new business opportunities for companies. Those who anticipate and incorporate sustainability as a core business pillar will gain a competitive advantage. Businesses are also finding value in integrating sustainability into their operations, as this is increasingly demanded by major markets and consumers, especially our younger generation.

## **Conclusion**

18 To summarise, even as there will be more policy changes to safeguard our environment, I want to encourage the industry to participate actively in the policy-making process. Give us feedback to design our policies better. And take advantage of the lead time and transitional support provided, and position yourselves well for the future. One example would be our public and industry consultations on the EPR.

19 I will now hand over to my other panellists, and look forward to hearing their views

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Excellencies,  
Distinguished Guests,  
Ladies and Gentlemen,

1 A warm welcome to the Clean Environment Leaders' Summit (CELS) 2018 which brings together government and industry leaders from around the world to discuss solutions to global environmental challenges.

2 A fundamental challenge for all nations today is how to develop sustainably. To do so, the global community must be guided by the United Nations' Sustainable Development Goals (UN SDGs), particularly SDG 12 on Responsible Consumption and Production and SDG 13 on Climate Action.

#### Circular economy and sustainable development in Singapore

3 As a small city state, Singapore has always been keenly aware of the need to balance economic development and environmental sustainability. Growing our economy consumes energy, water and other resources which we lack, and generates sewerage and solid waste that must be disposed of. Challenges for any country; but especially so for Singapore where resources and land are scarce. Our remaining Semakau Landfill will be filled up within years at our current rate of waste generation.

4 To overcome these challenges and continue to grow sustainably, Singapore must embrace the circular economy. This requires a shift from the 'use and throw' mentality, to one where resources are re-used for as long as possible. It can be done. In the water sector, we have closed the water loop by turning our used water into NEWater, and significantly enhanced our water resilience and sustainability.

5 We are now turning our attention to closing the waste loop. The Sustainable Singapore Blueprint outlines part of our strategy to become a Zero Waste Nation and achieve a 70% recycling rate by 2030. We will go further. Upstream – to encourage product design for ease of recycling, and a repair culture among consumers. And downstream – to maximise resource recovery from waste.

#### Opportunities from a global circular economy

6 The circular economy does not end at our borders. Today's manufacturing supply chains are global in nature. The same goes for "reverse supply chains" that handle the by-products from production and consumption. When China recently imposed quality standards on imported recyclable materials, cities from America to Australia faced disruption in their recycling operations. A study published in the scientific journal Science Advances, estimates that 111 million tonnes of displaced plastic will end up in landfills or incineration plants by 2030. Conversely, there are also reports of Chinese recycling companies setting up operations in the region, showing us how interconnected our global economy is.

7 There is an opportunity for us - government and industry leaders - to actively shape a global circular economy. One where clean and valuable recycled fractions can move freely across borders to support economic activity. This will unlock economies of scale to transform waste into feedstock for new products. This is good for the environment as we reduce both the extraction of virgin material and the amount of waste going into landfill. I have seen this in practice in Europe. For example, in Denmark, e-waste from neighbouring countries is disassembled, and recyclable fractions are sent on to other countries for further processing.

8 But there are challenges. After all, we have many international agreements to limit the movement of waste across borders. These agreements are critical – they make sure that no country ends up as a dumping ground for another's waste. But I believe we can achieve this objective, as well as our vision of a global circular economy.

9 This can be done through proper safeguards, such as common standards on the quality of material fractions that can be exported; complemented by effective enforcement of those standards. If we succeed, we will effectively turn our cities into urban mines that provide us with environmentally sustainable raw materials. These are lofty goals; but we can start small, by focusing on a limited number of higher value fractions, as part of bilateral or regional pilots.

10 I will next speak on how we will prepare Singapore to tap into the global circular economy. These ideas will go into our inaugural Zero Waste Masterplan to be released next year. We will actively engage stakeholders on the development of the Masterplan, as we navigate a path towards the circular economy.

#### Policies and regulations to support a circular economy

11 First, we will review our policies to encourage sustainable production and consumption, particularly in areas where the market fails to take into account environmental externalities. For example, we announced earlier this year that a mandatory system, based on Extended Producer Responsibility (EPR), will be introduced by 2021 to manage e-waste. By making producers responsible for the 'end-of-life' of their products, they will be incentivised to design products that are more easily recycled, or come up with innovative circular economy business models.

12 Moving forward, we will study the feasibility of extending EPR to plastic and packaging waste. We hope to bring about more sustainable use of packaging materials, including single-use plastic packaging, by businesses and consumers.

13 As a start, we will bring forward the introduction of a mandatory reporting framework for packaging data and waste reduction plans, from 2021 as earlier announced, to 2020. Businesses, such as brand owners, importers and large retailers including supermarkets, will need to start collecting data on the types and amounts of packaging they place on the market and submit plans for reduction. We will consult relevant stakeholders as we develop the operational plans to manage plastic and packaging waste in Singapore.

#### Transforming the Environmental Services Industry

14 Second, we will support our Environmental Services (ES) industry to seize opportunities in the future economy. The industry faces acute challenges, such as an ageing workforce and low productivity. But our water story shows us that vulnerability can be turned into strength and opportunity. We will rise above our constraints, transform, and seize opportunities for green growth. We launched the Environmental Services Industry Transformation Map (ES ITM) last year, and will push ahead with productivity, digitalisation and innovation. We will grow a vibrant ES sector with good jobs for Singaporeans.

15 As part of the ES ITM, NEA will help companies adopt and scale up commercially available technologies to improve efficiency and manpower productivity. With new capabilities and operating models, our companies will be in a stronger position to internationalise. NEA will provide more details in the later part of the year.

16 To help companies in the ES industry to digitalise, we are also launching the ES Industry Digital Plan (IDP). Jointly developed by IMDA and NEA, the ES IDP will guide digital technology adoption at each stage of their growth, boosting performance and productivity in their operations. The IDP also provides a Digital Roadmap (Training), developed in partnership with SSG and IHL partners, to chart the training of the industry's 78,000- strong workforce to apply digital skills in their work.

17 To support innovation, NEA will introduce a Regulatory Sandbox for environmental services, with applications opening from today. Regulations may sometimes hold back the adoption of new ideas in our fast evolving landscape. The Sandbox will enable innovative environmental services-related technologies and solutions to be tested in a safe environment with relaxed regulations. For example, if you have a proposal to safely treat general waste on-site and can find off-takers for the residual, we would welcome you to test your technology in our Sandbox.

#### Stepping up Research and Development

18 Third, we will step up Research and Development (R&D) to develop solutions. To spur the adoption of emerging Waste-to-Energy technologies, the National Environment Agency (NEA) and the Nanyang Technological University (NTU) are jointly developing a S\$40 million Waste-To-Energy Research Facility to support research, translation and test-bedding. Tuas Nexus, our integrated waste management and water reclamation facility will be a key beneficiary. Improvements in technology can also strengthen the economic case for the circular economy, such as by improving extraction methods and reducing recycling costs. Or

help us overcome land and manpower constraints, and run more effective operations. For example, the use of sensors to monitor refuse levels in bin centres allows waste to be collected only when storage capacity is nearly full. This reduces the workload of our collection crews, and also the carbon footprint from truck trips.

19 To support R&D in the ES industry, NEA launched a \$45 million Closing The Waste Loop (CTWL) initiative last year. To date, NEA has launched grant calls on managing plastic waste and reusing incineration ash. More grant calls will be made in the coming months. I look forward to the day when we have our very own NEWSand, created from incineration ash, just like how we have created NEWater from used water.

#### Building a National Consciousness on the Environment

20 One more ingredient is required for even the best policy, the best infrastructure and the best technology to work. That is the contribution from every resident and company to sustainable development. We must build a national consciousness on protecting the environment. This Year of Climate Action is a good time to ramp up our efforts.

21 Some businesses have taken the lead in sustainability, including the 13 Singapore Packaging Agreement signatories that we will be recognising today. To date, our signatories have cumulatively reduced about 46,000 tonnes of packaging waste, amounting to savings of more than \$100 million. I hope more companies will be inspired to embark on their own sustainability journey.

22 I would also like to encourage more ground-up initiatives like Green Nudge, a green group which encourages marathon participants to recycle their drinking cups, plastic bottles and banana peels, and Tzu Chi, a community organisation which holds regular recycling activities. These ground-up efforts play a crucial role in our nation's transformation towards a circular economy, by strengthening the values and norms that enable sustainability to take root.

#### Conclusion

23 To conclude, let me quote Mr Ban Ki Moon, former Secretary-General of the United Nations. He said, and I quote, "Sustainable development is the pathway to the future we want for all. It offers a framework to generate economic growth, achieve social justice, exercise environmental stewardship and strengthen governance." The Singapore story demonstrates that environmental sustainability and economic growth are not a zero sum game. As we write the next chapter, the circular economy will allow both to co-exist and reinforce each other.

24 I wish you stimulating and fruitful discussions at the CELS today.

Thank you.

Mr. Desmond Choo, Assistant Secretary-General, NTUC and Executive Secretary, Young NTUC

Distinguished Guests

Ladies and Gentlemen

Good afternoon. I am pleased to join you today for the Green Jobs Symposium @ CleanEnviro Summit Singapore (CESS) 2018. Today's symposium is specially organised by Young NTUC and the National Environment Agency (NEA) for youths like yourselves to be up close with industry experts. We hope you will take away new insights about the latest technology trends and job opportunities in the Environmental Services industry (or ES industry in short).

2 The ES industry today is vastly different from when I was your age. Back then, the industry was dominated by menial jobs, such as rubbish collectors and road sweepers. Actually if you go to the exhibition later and look at what is happening in the industry, you will realise that rubbish collectors and road sweepers can go hi-tech now, with autonomous road sweepers, driverless cars, and so on. Today, a diverse range of jobs are available in fields ranging from chemical and robotics engineering, to data analytics. In the area of data analytics for example, data analysts help conduct surveillance of rodent by producing heat maps of the critters' movements so that breeding sites can be identified easily. It is our vibrant ES industry that keeps Singapore clean, green and sustainable. For some of you who are from overseas, very often we get comments that Singapore is very clean. But, in Singapore, we often say, especially among those from the ES industry, that Singapore is a "cleaned" city. We want to be a clean city, and we hope to achieve that with the support of the ES industry.

3 Last year, NEA launched the ES Industry Transformation Map (or ES ITM) to prepare the industry for the future economy. One where manpower resources will be scarce. But also one where the youth of today can apply their digital knowledge and technical skills for greater effectiveness and productivity. This will enable the industry to not just meet Singapore's own needs, but also export our solutions all over the world.

4 The ES ITM will create higher value-added "green jobs" to attract younger entrants into this industry. We have seen progress. The proportion of PMETs in the industry has increased over the years, but there's much more scope to grow as the industry expands and turns to greater automation.

#### Transformation of the ES industry giving rise to new opportunities for the workforce

5 One way to achieve this is to play to the strengths of our youth, who are the digital generation. Technology can drastically reduce manpower requirements, and radically transform jobs. One example is the Pneumatic Waste Collection System (PWCS), which collects waste via air suction from individual buildings to central collection points. With this, the role of the traditional "garbage collector" is now performed by machines controlled by technicians, engineers and data analysts. In fact, some of these jobs can be performed offsite in air-conditioned offices. I encourage all of you to visit the Clean-Enviro-Summit-Singapore (CESS) exhibition later to see new technologies such as cleaning robots and autonomous scrubber and dryers.

6 A related area which we are focusing on is Research and Development (R&D). We will require more researchers and scientists – be it in the area of climate change where we need to better predict its effects, or in the area of treating our waste more efficiently. NEA has launched innovation grant calls under the Closing the Waste Loop (CTWL) and the Environmental Robotics Programme to find solutions to convert waste to resources, enhance resource efficiency, and deploy more autonomous cleaning vehicles. The reception from local companies and Institutes of Higher Learning (IHLs) have been positive. For example, Supersteam, a local company providing professional cleaning products and solutions, is working with Singapore University of Technology and Design (SUTD) to develop autonomous cleaning robots. We look forward to meeting their first cleaning robot later this year.

7 I hope I have given you a glimpse of the exciting prospects in the Environmental Services industry. Perhaps some of you can see a future for yourselves in this industry. Indeed, let me say that the ES industry is fundamental to our economy. We need to have a good quality, clean environment in order to attract more investments, so it is not a sunset industry. In fact, it is a growth industry, and as the nation develops, there will be many opportunities in this industry. I wish all of you a productive and fruitful symposium ahead. Thank you.

Distinguished guests,  
Ladies and gentlemen,

A very good morning to you. It is my pleasure to join you here at the “Active, Beautiful, Clean Waters – Towards Resilience, Liveability and Sustainability in Design” seminar.

2 First, let me thank the Institute of Engineers Singapore for co-organising this seminar with PUB for the past eight years. I would also like to thank the Singapore Institute of Architects and the Singapore Institute of Landscape Architects for their strong support.

### **Mainstreaming ABC Waters**

3 The Active, Beautiful, Clean Waters Programme, or ABC Waters Programme in short, was launched in 2006 with a vision to transform Singapore’s utilitarian drains, canals and reservoirs into clean and beautiful streams, rivers and lakes. Our philosophy is to beautify our waterways and integrate them with our urban landscape. Doing so enhances our living environment with community spaces that bring the public close to water. With this, our people learn to value and cherish our waterways, and become stewards of water.

4 Over the last 12 years, that vision has turned into reality. With the opening of five new sites by the end of the year, PUB itself would have completed 41 projects. Work on another five sites will have commenced by this year.

5 Perhaps more important to making ABC Waters ubiquitous is how our fellow public agencies and private developers have embraced the concept and incorporated ABC Waters design features in their developments. There are now 75 ABC Waters Certified projects by them. Together with the 36 projects implemented by PUB, there is now an ABC Waters project in almost every heartland.

6 Iconic projects include the Kallang River at Bishan-Ang Mo Kio Park, where we naturalised a concrete canal to turn it into a flood plain and integrated it with a neighbourhood park. Another example, Punggol Waterway, which runs alongside residential estates, is an aesthetic waterway that supports water-based activities. I believe that many of us enjoy taking walks and runs along the waterway. Paya Lebar Quarter, a private mixed-use development, incorporates ABC Waters design features within the catchment that allows stormwater runoff to be cleansed before it is discharged into the Geylang River.

7 These and other exemplary projects by public agencies and private developers have been included in the fourth edition of the ABC Waters Design Guidelines, which we are releasing today. Besides case examples, this latest edition also highlights how the industry in Singapore has started to innovate and design for resilience when managing stormwater runoff.

8 The Guidelines not only showcase our successes, but also prompt us to contemplate taking the ABC Waters vision even further. To do this, ABC Waters design features should be positioned as fundamental elements of urban planning, and not just a “good to have”. Features like rain gardens and bio-retention swales not only improve the water quality of rainwater runoff, it can also detain and slow down stormwater runoff, and form part of our holistic source-pathway-receptor approach to flood risk management. With climate change bringing more frequent intense rainfall, there is indeed benefit in ABC Waters design features being more widely adopted in Singapore.

9 To move in this direction, PUB is engaging public agencies and private developers early, at the planning and design stage, to explore the implementation of ABC Waters design features. Moving forward, HDB will incorporate such features to treat stormwater runoff from at least 25 per cent of the site area, in all new public housing developments.

10 Another way to propagate the ABC Waters concept is to teach it to our young. For example, rain gardens have been implemented in 13 schools by PUB to serve as teaching aids to demonstrate how natural materials, such as plants and soil media, can be used to cleanse stormwater runoff. Through this immersive and experiential approach, students learn the importance of keeping our environment and waters clean. We hope that more schools will come on board and build rain gardens in their premises.

### **Increasingly Innovative and Resilient Designs**

11 Even as we look at mainstreaming the ABC Waters concept, we cannot hope to replicate success just by using the same formulas.

12 That is why we must continue to encourage innovation, by improving competencies. We do this by building up the expertise of our industry professionals through the ABC Waters Professional Programme, and continued research and development.

13 We also work with institutions to incorporate ABC Waters design modules in tertiary curricula and collaborate with agencies such as NParks to organise workshops on the maintenance of ABC Waters design features. Personally, I think this is really important. It is one thing to create ABC Waters project design features; it is another thing to upkeep and maintain it so that it looks the same as when it was launched, particularly within the heartlands. So indeed, the training of relevant industry professionals is important.

14 I am encouraged to see more and more developers push the boundaries in design. Today, I will be presenting the ABC Waters Certification award to 13 projects that exemplify this. On top of that, we are introducing the new ABC Waters Certification (Gold) which recognises developers who go the extra mile, beyond the usual criteria for the ABC Waters certification. Projects must adopt ABC Waters design extensively and attain exceptionally high standards in managing stormwater runoff sustainably. The first two projects which have earned this accolade are the Learning Forest by NParks and Rivervale Shores at Sengkang by HDB. The Learning Forest features a comprehensive water treatment system consisting of vegetated swales, sedimentation basins and wetlands to treat about 55% of the stormwater runoff from the park. Rivervale Shores will incorporate rain gardens extensively to detain and treat about 50% of the precinct's runoff.

15 In closing, I would like to congratulate all developers on their ABC Waters Certification. I am certain that the seminar today will be an enriching one that allows all of you – developers, professionals, designers – to mingle and share ideas with one another.

16 Only with your support can we further our vision of a sustainable, resilient and liveable city. Thank you.

## **“Driving Change in Asia Pacific through Innovation”**

UNFCCC Executive Secretary Ms Patricia Espinosa

COP-23 Chief Negotiator Ambassador Luke Daunivalu

COP-24 President-Designate Mr Michal Kurtyka

Vice President, Knowledge Management, Asian Development Bank Mr Bambang Susantono

Distinguished Guests

Ladies and Gentlemen,

1 It is a pleasure to welcome you to Singapore, where we continue our dialogue, our engagement with each other on how we can move forward and come to a good blending zone in our negotiations towards the Paris Agreement Work Programme.

2 The need for collective action to tackle climate change has never been more urgent. Just this week, parts of Japan saw record rainfall, the highest since 1976 when the Japanese started keeping records. Efforts are underway to evacuate more than 8 million people. Sadly, the floods and landslides have claimed more than 150 lives and we convey our condolences to the families of the victims. Even as we extend our thoughts and prayers to the Japanese people, we are concerned that such climate-related disasters will occur with increasing intensity and scale. This is just a semblance of what climate change can do to people around the world.

3 Millions of people around the globe are already grappling with the impacts of climate change. Countries in the Asia Pacific are particularly vulnerable, being home to two-thirds of the world's poor. For example, Vietnamese rice farmers in the Mekong Delta are facing a threat to their livelihood as rising sea levels increase the salinity of inland rivers, destroying thousands of hectares of rice fields. A projected one metre rise in sea level by the end of the century could wipe out 40% of the Mekong Delta, which currently accounts for 50% of Vietnam's rice production. Singapore is of course, duly concerned. Climate change will have a strong detrimental impact on food security, which we are under-estimating.

4 In our inter-connected world, no one can escape the impact of climate change. Weather events in one part of the world will impact economies and societies elsewhere. Recall the disruption to global supply chains in products ranging from hard disks drives to cars caused by the 2011 flood in Thailand. Mass migration of climate refugees and conflict over climate-threatened natural

resources weaken global security. The integration and interdependence in today's globalised world magnifies the impact of climate disasters and even weather events, and extends it far beyond national boundaries.

5 In a speech which my Prime Minister Lee made at the Boao Forum in April, he spoke about the importance of strengthening the multilateral trading system and how countries needed to come together to keep the global system open and inclusive. Similarly, for an issue of the scale and magnitude of climate change, the global community must come together and work together. And governments cannot go about it alone either. No Government should isolate itself from the global community. Governments, civil society organisations, businesses and individuals across all nations are on the front line and must take urgent climate action.

6 The time to act is now. 2018 is a landmark year for climate action. We are due to conclude negotiations on the Paris Agreement Work Programme that will guide the implementation of the Paris Agreement. The year-long Talanoa Dialogue process is another key initiative to spur global climate action. The meetings in Singapore this week, including the events organised under the Asia Pacific Climate Week are all opportunities to accelerate the momentum of climate action.

7 I would like to focus on two thrusts that are key to driving change in the Asia-Pacific: *innovation* and *collaboration*.

### **Driving Change through Innovation**

8 First, innovation is an important enabler that will help us make the leap to a low carbon and climate-resilient future. For green innovation to flourish, governments must establish the correct policy environment. The setting of a carbon price for example, captures the external costs of greenhouse emissions and sends an important price signal to encourage emissions reduction and cleantech solutions.

9 Singapore will join the growing list of countries, including many in the Asia-Pacific region, which have introduced a carbon tax. We will implement an economy-wide carbon tax from 2019. We will start at a price of SGD5 per tonne of CO<sub>2</sub>-equivalent of greenhouse gas emissions for facilities that exceed 25 kilotonnes emission annually. This will cover 80% of our emitters. Our carbon tax will apply uniformly to all sectors, without exemption. This will maintain a transparent, fair, and consistent carbon price across the economy. The carbon tax complements our comprehensive mitigation measures across all sectors including industry, transport, buildings and power generation. It will help spur the development and adoption of innovative eco-friendly solutions. Indeed, the carbon tax is not intended as a fiscal measure of our Government for the first five

years but will be primarily used for innovations and transformation of the industries responsible for emissions.

10 Innovation can help overcome natural constraints even as it points us towards a greener future. For example, while Singapore is a land-scarce city with limited alternative energy options, we have been experimenting with a floating solar panel test-bed on Tengah Reservoir to increase the amount of renewable energy in our fuel mix, which already comprises mostly natural gas – the cleanest form of fossil fuel.

11 Globally, the scope for green innovation is tremendous. The World Bank estimates that climate-smart investments amounting to US\$23 trillion will be needed to meet the Paris commitments. That means US\$23 trillion in demand for clean energy, low-emissions transport and sustainable urban solutions.

### **Collaboration at All Levels**

12 This brings me to my second point, collaboration. As I have highlighted earlier, our response to climate change must be a global response. To realise the Paris Agreement and galvanise the investments required, all stakeholders at the national, regional and global levels must engage one another, cement partnerships, and collaborate climate action.

13 This is the crux of the Talanoa Dialogue, which aims to mobilise climate action through inclusive conversation. Singapore is doing our part to mobilise action and collaboration at all levels.

14 Nationally, we have designated 2018 as the Year of Climate Action to raise public awareness and spur climate action. To-date we have received more than 230,000 pledges from individuals, organisations and educational institutions to take action now to reduce their carbon footprint.

15 Regionally, Singapore, as ASEAN Chair, is working with fellow ASEAN countries to ensure that ASEAN remains resilient in addressing climate change, while growing forward-looking economies.

16 Yesterday, we convened the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and the Expanded-SAMCA, bringing together ASEAN Member States and our Plus Three partners (China, Japan and Republic of Korea) to galvanise regional climate action. This sends a strong signal of our continued joint commitment to achieving targets set under the Paris Agreement. A summary of our discussion will be submitted as input to the 2018 Talanoa Dialogue.

17 Internationally, we are also doing our part to support the efforts of fellow developing countries. Yesterday, I announced a Climate Action Package that will

develop capacity in the ASEAN region and support climate action efforts. And since 1992, we have worked with 120,000 officials from fellow developing countries to build capacity in key areas such as sustainable development under the Singapore Cooperation Programme (SCP).

## **Conclusion**

18 The meetings here this week complement the ongoing international climate change negotiations. To ensure that we achieve a meaningful outcome in Katowice, we need to first preserve the integrity of the Paris Agreement; second, provide the necessary assurances to encourage everyone to put their best foot forward; and third, push for a balanced, pragmatic and credible implementation package in Katowice. This will ensure the full and effective implementation of the Paris Agreement and maintain the global momentum on climate action.

19 Let me conclude. The impact of climate change respects no geographical or national boundaries. A global response is required, and the time for action is now. I wish all of you a fruitful meeting. Thank you.

Mr President,  
Excellencies, distinguished delegates,

1. The 2030 Agenda for Sustainable Development (2030 Agenda) represents a turning point for all nations and our planet. It provides a framework for national action and international partnership. As elected representatives, we have the responsibility to lead and take ownership of the 2030 Agenda and its 17 Sustainable Development Goals. We also have the responsibility to work in partnership with our people, businesses and members of the international community. Ultimately, the 2030 Agenda is about transforming our people's lives.

2. Singapore has always put its people at the centre of all its development policies. Our economic transformation is a story about uplifting our people's lives, by providing good education, health, housing, employment and a clean environment. We take a pragmatic approach to policy making and governance, focusing on outcomes, not ideology, to foster a harmonious, inclusive and prosperous society. Despite our constraints as both a Small Island Developing State and a highly urbanised and densely-populated city-state, Singapore pursued sustainable development as a necessity since our independence.

3. Three elements are key to Singapore's development approach.

4. **First**, Singapore has always balanced economic development with environmental protection and social inclusion. Even in the early years when we needed investments, our environment was not compromised. This year, we decided to implement an economy-wide carbon tax without exemption from 2019. This will accelerate innovation and energy efficiency, shifting our economy and society towards a sustainable, low-carbon future.

5. **Second**, we pursue a long-term, integrated approach to policy planning and implementation. Being one of the world's most water-stressed countries, we have worked hard and made heavy investments to ensure our water resilience and sustainability. Today, we have a diversified water supply – imported water, local catchments, desalination and recycled wastewater or NEWater.

6. **Third**, Singapore's policy formulation and implementation is underpinned by collaborative multi-stakeholder partnerships. Governments alone cannot tackle climate change and sustainability. Singapore has designated 2018 as the Year of Climate Action, to increase awareness and spur nationwide action. In six months, close to a quarter of a million Singaporeans, business corporations and Civil Society Organisations have pledged to take climate action and reduce their carbon footprint.

7. Singapore is also strongly committed to partner with and help other countries achieve the 2030 Agenda. As a fledgling nation, Singapore benefitted from UN agencies' technical advice. To pay it forward, we started the Singapore Cooperation Programme in

1992 to share our development experience with fellow developing countries; almost 120,000 officials have participated and benefitted.

8. Let me conclude. The goals of the 2030 Agenda represent the collective aspirations of our global community. Their unprecedented ambition and scale require our unwavering commitment. Singapore will continue to work with our friends and partners to help uplift the lives of people around the world in this noble enterprise.

Thank you.

1. Mr President, Excellencies and distinguished delegates, Singapore is a small island developing state (SIDS), with no natural resources. We are a highly urbanised and densely populated city. In many ways, our circumstances are unique. But the challenges we face are common to many other SIDS.



2. Singapore pursued sustainable development even before the term became fashionable. Since independence, we have tried balancing environmental considerations with economic development, believing that the two are complementary, not contradictory.

3. With the focus on improving our people's lives, the Government has built a clean and green Singapore, where our people can lead healthy and fulfilling lives, with good jobs, good education and adequate shelter for everyone.



### **Mr Lee Kuan Yew's Philosophy**

4. Our first Prime Minister, Mr Lee Kuan Yew, is the architect of Singapore's transformation. He focused on creating a "garden city", planted the first tree in 1963, which kick-started the annual Tree Planting Campaign. Today, we are building on the legacy of our pioneer leaders and transforming Singapore into a "City in a Garden".



### **Approach to sustainable development**

5. Singapore's approach to sustainable development has three elements: **First**, balancing economic development with environmental protection and social inclusion; **Second**, pursuing a long-term, integrated approach to policy planning and implementation; and **Third**, building collaborative multi-stakeholder partnerships to support policy formulation and implementation.

6. For Singapore, the 2030 Agenda for Sustainable Development (2030 Agenda) is a framework to benchmark government policies. The 17 Sustainable Development Goals (SDGs) are integrated into the Government's long-term agenda. This was articulated by our President Halimah Yacob at the opening of our Parliament in May.

7. We had used the Voluntary National Review (VNR) process to increase public engagement and awareness of the 2030 Agenda, and mobilised more than 30 ministries and agencies to prepare our VNR. Let me now touch on Singapore's progress in implementing the 6 SDGs in focus.



### **Closing the water loop: Four National Taps**

8. On SDG 6, the World Resources Institute ranks Singapore as the country most at risk of water stress by 2040. To ensure water resilience and sustainability, we have developed a robust and diversified water supply system called our Four National Taps – imported water, water from local catchments, desalinated water and recycled wastewater which we call NEWater. Over the years, we have enhanced our water sustainability by closing the water loop and collaborating with the private sector to develop and deploy new technologies.



## **Wastewater Superhighway**

9. Our national water recycling system collects and treats every drop of wastewater and transforms it into NEWater – Singapore’s ultra-clean, high-grade reclaimed water. We have built a wastewater superhighway, the Deep Tunnel Sewerage System, to collect and transport wastewater. The current tunnel, 48km long and linked to 60km of sewers, will be extended by 100km by 2025 to transport and turn more wastewater into NEWater for industrial use and domestic consumption.



## **Re-using water endlessly**

10. By reusing water endlessly, NEWater cushions our water supply against dry weather, enhancing Singapore’s water sustainability and resilience to shifting climatic patterns. Former UN Secretary-General Ban Ki-Moon called it the “elixir of life” when he visited Singapore in 2012. We are happy to share our water journey through our exhibition along the Vienna café and B1 lobby right here in the UN.



## **ABC Waters**

11. Besides providing clean drinking water, we want to bring Singaporeans close to water so they become stewards of water and our environment. Through the **Active, Beautiful, and Clean (ABC Waters)** programme, we are transforming Singapore's drains, canals and reservoirs into streams, rivers and lakes. This enriches our biodiversity and enhances our urban landscape with spaces for recreation and social bonding. This is our Bishan-Ang Mo Kio Park project, which used to be an old concrete canal. It is now a place where families gather and children play. We will implement 100 ABC Waters projects by 2030.



## **Reducing emissions across all sectors**

12. Now, I move on to SDG 7. As a member of the Alliance of Small Island States (AOSIS), Singapore has been a strong advocate of ambitious action against climate change. We pledged at the Paris Conference to reduce our emissions intensity by 36% from 2005 levels by 2030, and to stabilise our emissions with the aim of peaking around the same time. We will be one of the first Asian nations to implement a national carbon tax across all sectors without any exemption from 2019. This will incentivise emissions reduction and encourage companies to transit to a low-carbon future. Under our Climate Action Plan, we will increase energy efficiency and reduce the carbon footprint across all economic sectors.



## **Investing in clean energy**

13. Today, 95% of our electricity is generated from natural gas, the cleanest form of fossil fuel. We are also aggressively developing solar energy. Our goal is to increase solar photovoltaic deployment to 350 megawatt-peak by 2020, and to 1 gigawatt-peak beyond 2020. We have installed solar panels on the rooftops of public housing blocks and launched the world's largest floating solar PV test-bed. We are investing in breakthrough technologies, such as developing solar panels for integration into the building facade.



## **Closing the waste loop: Food waste**

14. Let me now touch on SDG 12. As a resource-constrained nation, Singapore's vision is to close the waste loop, just as we have closed the water loop. By practising the 3Rs:

**Reduce, Re-use and Recycle**, we aim to minimise waste and engage in urban mining by extracting valuable resources from waste.

15. We are tackling food waste as a priority. We have installed food waste digesters in schools, hotels, shopping malls and food centres to treat food waste on-site, turning them into fertiliser and non-potable water. We are piloting district-level food waste treatment, where food waste is collected and co-digested with used water sludge to produce biogas.



### **Closing the waste loop: E-waste**

16. Sustainable consumption and production require all stakeholders to participate. To develop a circular economy, Singapore will introduce the Extended Producer Responsibility (EPR) framework. Businesses will be responsible for their products at the end-of-life, ensuring their proper recycling and disposal. We will start by implementing the EPR framework for electronic waste and consider extending it to other waste streams, such as packaging.



### **Waste-Energy-Water Nexus: Harnessing Synergies**

17. A first in the world, Tuas Nexus will be the hallmark of our efforts to close the resource loops. Going beyond closing the water and waste loops, it will undertake wastewater treatment and solid waste management, all on one site to harness synergies from the waste-energy-water nexus. It will use the latest technology in combustion to maximise energy recovery. More than 200,000 tonnes of CO2 emissions can be avoided annually, the equivalent of taking 41,000 cars off the road.



### **Semakau Landfill**

18. Semakau is Singapore's last landfill. Even on a landfill, we are serious about nature and biodiversity. The thriving flora and fauna, such as this mangrove swamp, shows the ecosystem has been well-protected. Marine life and migratory birds are also making this island their home. New Scientist magazine dubbed the landfill "Garbage of Eden".



### **Integrated, inclusive and sustainable urban planning**

19. Moving on to SDG 11, to achieve a highly liveable, inclusive, and sustainable urban environment, integrated long-term planning is key. We are piloting enterprise districts, which bring together high-value industries with institutes of learning and a residential community. We have a 5-year Masterplan to integrate persons with disabilities into the workforce and society. Punggol New Town is home to Singapore's first eco-precinct for green building technologies, and the Punggol Digital District is built purposefully for the cybersecurity and digital media industries.



### **Well-loved hawker centres**

20. For a multi-racial and multi religious country like Singapore, the heart of sustainable development lies in social inclusion. Hawker centres are an integral part of Singaporeans' daily lives and are found across the island. Besides serving affordable and delicious dishes, they are places where Singaporeans, regardless of race, religion and social background, connect through our shared love for food. Food certainly unites Singaporeans.



### **Conserving biodiversity (Vertical greenery)**

21. Globally, Singapore ranks first in urban tree density. Green cover has increased to more than 40% since our Tree Planting Campaign started in 1963. To enhance greenery in our built environment, Singapore encourages developers to integrate rooftop and vertical greenery. Besides beautifying the city, these measures cool the urban microclimate and provide refuge for biodiversity.



### **Conserving biodiversity (Botanic Gardens)**

22. The Singapore Botanic Gardens is the first and only tropical botanic garden on UNESCO's World Heritage List. We have conserved primary and secondary rainforest right in the heart of our city. Scientists have made exciting discoveries – finding new species or rediscovering species thought lost. Today, Singapore has over 40,000 kinds of terrestrial and marine organisms, such as these others which have starred in a David Attenborough documentary about Singapore's wildlife.



### **Partnerships for sustainability**

23. Finally, on SDG 17, sustainable development in Singapore is a Whole-of-Nation effort based on collaborative multi-stakeholder partnerships. We declared 2018 as the Year of Climate Action to raise awareness and encourage action across the nation. In 6 months, close to a quarter of million Singaporeans, business corporations and Civil Society Organisations have pledged to save energy and water, practise recycling and fight climate change. On the podium with me today are representatives from the Singapore Environment Council, Ms Jen Teo, and Sustainable Living Lab, Mr Veerappan Swaminathan, who play critical roles in galvanising ground-up action.

24. Also present today are the youth winners, Frieda, Robin and Wei Han, of a video competition on creative ideas for sustainability which we organised as part of our VNR. Youths are leaders and champions of sustainable development.



### **International Partnerships**

25. Partnerships are key to sustainability. For a decade, Singapore has been hosting the World Cities Summit, Singapore International Water Week and Clean-Enviro Summit Singapore to share and co-create solutions for urban sustainability. The most recent edition was held last week, attracting 24,000 attendees from 110 countries.

26. Last week, as Chair of ASEAN, Singapore convened the Special ASEAN Ministerial Meeting on Climate Action, and together with key partners, reaffirmed our commitment to the Paris Agreement and regional action to tackle climate change. I also announced a special Climate Action Package to develop capacity in the region in this key area.



27. In this spirit, Singapore has been sharing our development experience with fellow developing countries through the Singapore Cooperation Programme. Since 1992, we have trained 120,000 officials. We also hosted around 1,000 youths in the UNLEASH Innovation Lab to co-create solutions for the 2030 Agenda.



### **Conclusion**

28. In conclusion, sustainable development means providing for the needs of the present without compromising the interests of future generations. A Chinese proverb says that “one generation plants the trees and the next generation enjoys the shade”. Beyond harvesting for ourselves, we must plant seeds and grow trees. We must empower our youths to take climate action to ensure our planet’s sustainability and resilience. Together, let’s work towards the shared goals of the 2030 Agenda.

Thank you.

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[Download Singapore's VNR Report here](#)

[Download VNR slides](#)

Dr. Richard Kwok,

Vice President of The Institution of Engineers, Singapore

Prof. Palani Balaya,

Chairman of the CMCEE 2018 Conference Committee

Plenary speakers and delegates

Distinguished guests

Ladies and gentlemen

1. Good morning. I am very happy to join you today. To our overseas friends, a very warm welcome to Singapore.

### **Sustainable Development**

2. According to the United Nations, the world's population is estimated to reach 9.8 billion by 2050. This will put greater strain on the earth's resources. Together with climate change, these global challenges will cause irreversible environmental degradation and threaten mankind if not properly managed.

3. Hence, it is imperative that all nations make sustainable development a key priority. Many nations are looking to energy-efficient, eco-friendly and green technologies to support long-term economic growth, and one such area is in advanced materials.

### **New Possibilities with Advanced Materials and Technologies**

4. Materials have played a pivotal role in human progress. We started off thousands of years ago by heating ore to get metal, moved on to refine iron into steel and, more recently, turned petroleum into plastic.

5. Today, we are on the brink of another revolution driven by developments in material science. Advanced materials, due to their superior properties and functionalities, are opening up new possibilities. For instance, we are seeing wearable electronics in the market that bend, stretch and conform to the human body. High-performance alloys are making aircrafts and automobiles stronger and lighter, increasing safety and fuel efficiency. Graphene, the material found in pencil lead, may soon allow doctors to

monitor a patient's blood flow without the use of machines. The possibilities and potential of advanced materials are immense.

### **CMCEE 2018 in Singapore**

6. It can be challenging for researchers, engineers and businesses to keep up with the rapid developments in advanced materials. It is therefore timely for The Institution of Engineers, Singapore (IES) to work with the National University of Singapore (NUS) to host CMCEE 2018 in Singapore. This conference provides a platform for the exchange of knowledge, findings and ideas amongst academia, industry and research institutions engaged in advanced materials research.

7. The conference will focus on ceramic materials, an important category of advanced materials that provides solutions to major energy and environmental challenges. It will enable ceramics experts and professionals from around the world to address key challenges in the research, development, engineering, manufacturing and application of ceramic materials.

### **R&D – Singapore's National Strategy**

8. Research, innovation, and enterprise form a critical part of Singapore's national strategy to develop a knowledge-based, innovation-driven economy and society. Over the last 25 years, investment in research and innovation has grown significantly and the government has committed to invest \$19 billion under our Research, Innovation and Enterprise 2020 (RIE2020) Plan to take Singapore to the next stage of development.

9. Our institutions have undertaken R&D in advanced materials for many years. For example, PUB, in conjunction with the industry, has conducted about 20 R&D projects on ceramic membranes, which have the potential to achieve better performance in water and used water treatment than conventional polymeric membranes. One example is the successful demonstration of the use of ceramic membranes at Choa Chu Kang Waterworks through a collaboration between PUB and Dutch company PWNT, and funded by the National Research Foundation. The waterwork is currently undergoing upgrading works. Once completed in end-2018, Choa Chu Kang Waterworks will have the largest installed capacity of ceramic membranes for surface water treatment in Southeast Asia.

10. NUS has also been developing new functional ceramics, electro-ceramic, and composite materials for next-generation energy generation and storage, electronics, and healthcare. Other institutions actively engaged in this area of R&D include the Nanyang Technological University (NTU), the Institute for Materials Research and Engineering (IMRE), the Institute for Chemical Engineering Science (ICES), and Singapore Polytechnic. In addition, industry players such as ST Kinetics, Morgan Ceramics, and Advanced Materials Technologies are also spearheading innovations in functional ceramics.

## **Conclusion**

11. The journey to sustainable development is not without challenges, but also presents many opportunities. Singapore has pursued sustainable development since our independence and will continue to look for new and innovative ways to ensure that our city remains liveable and sustainable.

12. I am happy to note that the IES will host the fourth World Engineers Summit (WES) in 2019, to facilitate exchange of best practices and ideas to drive sustainable urban development. Besides climate change mitigation and adaptation, WES 2019 will also focus on topics such as sustainable cities and communities, affordable and clean energy, innovation and infrastructure, clean water and environment, and energy policy.

13. I hope this event is a start to many partnerships that will improve lives, safeguard the planet and build a better, sustainable future for everyone. I wish everyone a fruitful conference.

Thank you.

Mr Phua Kia Wang  
Principal of Fuhua Primary School

Teachers, Students and Distinguished Guests,

Good afternoon,

I'm happy to be here at Fuhua Primary School. When I was in the Ministry of Education, I always make a point to visit the heartland schools. In many schools around the world, you are rich if you go to a private school and you are poor if you go to a public school. In Singapore, a public school, to many places in the world, is like a private school. The best resources are put in every school. The reason why I have always wanted to visit the heartland schools is because this is where I get to see the most passionate teachers making a difference to our students in the heartlands.

2. As a school recipient for the President's Award for the Environment 2013, Fuhua Primary School is the first primary school that was awarded the prestigious award from the President. The Fuhua Primary students that I met along the way just now are testament to the upliftment that the society has given, even when they come from the heartlands. I am happy to say that in Singapore, everyone matters and everyone is given the same resources wherever they come from.

### **YEAR OF CLIMATE ACTION**

3. Singapore has designated 2018 to be the Year of Climate Action. It is the first country in the world to declare a year for climate action. In order to challenge climate change, no country can do it alone. We have to do it together, whether it is the government, people or businesses.

4. If we do not know what climate change will be like, you can take the example from Japan recently. The rainfall falling over 4 days in Japan was equivalent to the rainfall falling in Singapore for half a year, resulting in massive floods and 200 deaths. In Singapore, eight of the 10 warmest years have all occurred in the 21st century. Even though we are feeling the intensity of the weather in Singapore, it is not climate change yet. It is what climate change may look like. Climate change will bring us more frequent and intense weather.

### **FUHUA PRIMARY SCHOOL'S CLIMATE ACTION EFFORTS**

5. Last week, I was in United Nations in New York to report on Singapore's voluntary national review on our achievement of the 17 Sustainable Development Goals (SDGs). It is important for us to leverage on multi-stakeholder partnerships, including schools. I am heartened that Fuhua Primary School has integrated six of 17 United Nations SDGs into its Environmental Education curriculum. In Singapore, we do not work alone in achieving the 17 SDGs. We get our partners ready and participate together to achieve the SDGs.

6. To educate students on the importance of saving water, the school implemented a rainwater harvesting system, a man-made constructed wetland that is integrated with a rain-catcher system, as well as an aquaponics system. Using water efficiently is part of the educational journey that all of us must go through.

7. As part of the school's Science and Math programme for Primary 3 to Primary 5 students, Fuhua Primary School has developed a Maker's Studio which is equipped with simple tools and recyclable materials for their students to ideate solutions and make prototypes. I was told that I would be visiting the Maker's Studio later and I look forward to seeing it.

### **NATIONAL PHOTOGRAPHY COMPETITION**

8. Fuhua Primary School has also been the host to the National Photography Competition which was first organised in 2011. This is one of the best ways to raise awareness about nature and the things around us.

9. Many of us do not realize that we are living in a very unique environment. I can empathise with Principal Mr Phua that we seemed to have shrunk what looks like a secondary forest but we have actually grown our green cover. In 1963 when Mr Lee Kuan Yew planted the first tree to mark tree planting day, we have grown 14% green cover in Singapore. In the past, we were planting gardens in the city. Today, we are planting cities in the garden. Those who have heard my presentation about our national review in UN last week were very impressed. In fact, you can watch our videos on Youtube on how other countries have responded to our presentation. They were full of praise and spoke highly of Singapore. Let us do well so that

we can continue to be proud of our nation.

#### **HOW INDIVIDUALS CAN PLAY THEIR PART**

10. Our habits and lifestyles today will have a direct impact on our environment tomorrow. What we teach our children to value will be what their children will enjoy. I look forward to your thoughts on how we can do more to save the environment and do less in wasting the resources that we have. Reducing, reusing and recycling must be part of our lives without the government telling you to do so. It has to become something that you automatically do.

11. I am heartened to hear that Fuhua Primary School has been collecting Climate Action pledges. You are 1 out of 250,000 pledges that we have collected today. But, let us not stop there. I hope that you can ask your parents, friends, siblings and colleagues to submit a pledge to show that Singapore is very serious about climate action. You can pledge at our website at [www.climateactionpledge.sg](http://www.climateactionpledge.sg).

#### **CONCLUSION**

12. I hope you had a wonderful experience learning about sustainable living in Singapore. Climate change is one of the aspects of understanding about sustainable living. There are 17 SDGs that all of us must learn about. I hope that we can do more to achieve this and become an example for the world to see. I look forward to viewing the exhibits and meeting some of you later.

Thank you very much and congratulations!

Mr Ong Chao Choon, Deputy Chairman, PricewaterhouseCoopers (PwC)  
Mr Tony Gourlay, Chief Executive Officer, Global Initiatives

Distinguished guests

1. A very good evening to everyone. It is my pleasure to be here to recognise the achievements of businesses that have made sustainability their priority.

### **The Singapore Sustainability Story**

2. Last week, I was in New York City to present Singapore's first Voluntary National Review at the UN High-Level Political Forum on Sustainable Development. I shared how Singapore was already pursuing sustainability before it became fashionable. We have pursued sustainable development since our independence, and always tried to balance environmental considerations while we pursued economic development, and social inclusion. I also explained that we employ a long-term, integrated approach to policy planning and implementation, underpinned by collaborative multi-stakeholder partnerships.

3. Our development approach has helped us to move from one where we are a garden city to building a City in a Garden. We have diversified our water supply to ensure resilience. More than 95 per cent of our electricity is generated from natural gas, the cleanest form of fossil fuel. But we are not there yet when it comes to green energy, because of our constraints. We have built a strong foundation as a sustainable city, but we need to accelerate our efforts in the face of climate change. To do that, we need collective action from individuals, households and businesses. The government cannot do this alone.

### **Milestones in the Climate Action Journey**

4. Under our Climate Action Plan, we are investing in solar energy, developing more sustainable buildings, and expanding our public transport network so that by 2030, 8 out of 10 Singaporeans can walk to a train station in 10 minutes. From 2019, we will be implementing a carbon tax to enhance energy and carbon efficiency, and help transition our economy to a low-carbon future. To move Singapore towards being a Zero Waste nation, we have introduced a mandatory reporting framework for packaging data and waste reduction plans from 2020. We will also introduce the Extended Producer Responsibility (EPR) approach to manage electronic waste next year.

5. The EPR approach will make businesses responsible for the proper recycling and disposal of their products at the 'end-of-life'. We hope to incentivise businesses to design products that last longer and can be more easily recycled, and pursue business models based on the circular economy. We take this approach because we believe that climate change presents new opportunities for our companies, even as it poses challenges. The world is moving towards a low-carbon and circular economy. Consumers are increasingly holding businesses accountable, and demand for sustainably sourced

products will continue to rise. We need to take these trends into account and move early, to stay ahead of the competition.

6. Singapore will be the first country in Southeast Asia to introduce a carbon tax. While a tax may not be a popular measure, we believe that it will ultimately benefit not just the environment but businesses as well. In 2019, businesses which are affected will have to report their carbon emissions, and in 2020, large emitters will start to pay the tax at \$5 per tonne of greenhouse gas emissions. We expect to yield revenue of close to S\$1 billion in the first five years. But we will not use this for fiscal purposes – we will put it back to the industry to co-fund energy efficiency measures by companies, including SMEs, so that they can transform into a low-carbon industry.

### **Recognising Best Practices**

7. As the largest employer in Singapore, the Public Sector will lead by example. Last year, we launched the Public Sector Sustainability Plan – a continuation of the public sector’s longstanding environmental sustainability initiatives. The plan commits the Public Service to further targets to reduce our carbon footprint and become more sustainable. I am heartened that the organisers have developed a new award category to recognise public agencies that undertake outstanding sustainability initiatives.

8. Businesses have been important partners in our sustainable development journey. You are uniquely placed to influence norms and practices through your value chain and stakeholders ranging from employees, to partners and suppliers. The diverse representation from the various industries this evening is a testament to the commitment of businesses to pursue environmental sustainability.

9. The Sustainable Business Awards, since its inception in 2012, has played an important role in encouraging and amplifying the positive impact organisations have made on the environment. Our winners this year have made significant progress in climate action. There are many best practices which businesses can learn from the award winners. I will highlight a few examples:

a. Singtel, one of the finalists this evening conducted a formal climate adaptation and resilience study, and a lifecycle analysis to identify vulnerabilities and risks across their entire operations. Using a science-based approach, they have set the target of reducing their carbon emissions intensity by 30 per cent by 2020 and 50 per cent by 2030 from the 2015 baseline. Singtel is also enhancing climate-related financial and risk information, guided by the climate risk reporting framework recommended by the Task Force on Climate-related Financial Disclosures.

b. Kimberly-Clark is on track to meet their target of zero waste to landfill by 2022. They are working with partners to further improve their waste disposal options. For example, they recently worked with Ngee Ann Polytechnic to use wet wipe trimming waste in place of the saw dust that is used in the disposal of medical and hazardous waste.

c. I am also heartened to see increasing adoption of the UN Sustainable Development Goals (SDGs). Keppel Corporation has identified eight SDGs it can make the greatest impact in. Under SDG 11 on Sustainable Cities and Communities, for instance, all completed commercial buildings under Keppel Land have achieved BCA Green Mark GoldPLUS standard, and Keppel Infrastructure's waste to energy technology is helping to divert as much as 90 per cent of waste from landfill. Under SDG 13 on Climate Action, Keppel Corporation has set a target of achieving a 16 per cent improvement in carbon emissions from 2020 business-as-usual levels. As one of the largest Singaporean conglomerates, these measures will have an immense impact on the UN SDGs in Singapore.

d. The Bliss Group, a small social enterprise, works with disadvantaged members of society, including ex-convicts and people with disabilities, to train them to work in catering. The Bliss Group also operates in a sustainable manner by supporting local farmers and reducing food waste.

## **Conclusion**

10. I would like to conclude by commending the organisers, Global Initiatives and PwC, and their partners, Control Union, Business Council for Sustainable Development (BCSD) and the Association of Chartered Certified Accountants (ACCA). Thank you for highlighting role models in sustainable business.

11. The diversity of the companies who participated in the Sustainable Business Awards add vibrancy to our story of sustainable development. To the winners, I hope your award will motivate you to play an even bigger role in the Sustainable Singapore Movement. I urge all of you to make a climate action pledge, via [www.climateactionpledge.sg](http://www.climateactionpledge.sg), to demonstrate your public commitment and leadership. As sustainability leaders in your respective industries, I urge you to share your best practices generously with others. Collectively, we can realise a low-carbon and circular economy for Singapore.

Thank you.

Distinguished guests

Scholarship recipients

Parents

1 Welcome to our Ministry. Congratulations to all our scholarship recipients. You represent some of the brightest minds of your cohort, and we are happy that you have chosen to join our MEWR family. I would also like to thank your parents, who have supported and guided you, and made sacrifices to raise you to be outstanding individuals. This scholarship marks the beginning of your journey with us, and we hope to nurture in you the passion and knowledge to address the future environmental and water challenges of Singapore. As NEW Scholars, you will have a vital role to play in the years ahead.

## **THE GLOBAL THREAT FACING COUNTRIES – CLIMATE CHANGE**

2 One of the monumental challenges that mankind is facing today is climate change. I hope that those who are receiving this scholarship understand the important problem that this poses for mankind. This is not just something that makes Singapore more vulnerable than before, but also something that the whole world has to face together. As an example, if the whole world does nothing, we will probably achieve a mean maximum daily temperature in Singapore of 34 to 35 degree Celsius by the end of the century. It also means that we will have more floods due to more frequent and intense rainfall. This is just one of the problems that we will be facing. In the region, the scenario that we are looking at is that 40 percent of the Mekong Delta could be underwater by the end of the century. So if you think about it, it is something that we all will face, and it is also not far away. Many of you who are receiving the scholarship will still be alive by that time to face these challenges.

3 This is why Singapore has put in place a range of policies and measures to strengthen our resilience against climate change. We have designated 2018 as the Year of Climate Action, and reached out to all segments of society to build awareness and mobilise climate action. To enhance energy and carbon efficiency, we will be implementing a carbon tax on large emitters from 2019. We have also launched the Climate Action Pledge, to encourage everyone in Singapore to commit to making changes in their daily lives, in order to mitigate climate change. I am glad to share that more than a quarter million people have pledged so far, and I encourage you to take the Climate Action pledge if you have not.

## **WATER AS AN EXISTENTIAL CHALLENGE FOR SINGAPORE**

4 On the water front, Singapore's water use is projected to double by 2060. In 2061, our Water Agreement with Malaysia will end. This is not very far away. Many of us will still be alive then. This is why we continue to plan and invest in water systems, ahead of our needs. The Tuas Desalination Plant that was recently opened, and the upcoming Tuas Nexus, are some examples of this. We are increasing the capacities of our NEWater and desalinated water production progressively so that they can supply up to 85% of our water needs by 2060. Although NEWater and desalinated water are less vulnerable to climate change, they are also costlier to produce, and more energy-intensive.

5 We are constantly looking to the latest technologies to build a resilient and sustainable water supply for the long term, and PUB is partnering R&D companies to explore possibilities. And the possibilities are exciting. Some of you will become part of the team that will formulate critical solutions to address the existential issue of water supply for Singapore.

## **OPPORTUNITIES IN THE WATER AND ENVIRONMENTAL SECTOR**

6 Even as we face increasingly complex water and environmental challenges, opportunities abound. To tap on opportunities from the environmental sector, MEWR launched the Environmental Services Industry Transformation Map, or ES ITM, in December last year. This roadmap seeks to encourage wider adoption of technology, amongst others, to help meet manpower challenges faced by the industry. With the implementation of the strategies and initiatives under the ES ITM, about 30,000 individuals in the environmental services industry will benefit from higher value-added jobs through upskilling and technology adoption by companies by 2025. As a NEW Scholar and as part of the MEWR family, you can look forward to contributing to the development of such industry transformation maps. I have mentioned before that we used to be seen as a Ministry that has to dispose of things that people do not want, and much of the work we do is to handle things that no one wants to see or smell. But the industry is transforming. Already, we are putting in Pneumatic Waste Conveyance Systems – our citizens will be putting their rubbish into a hole in the wall, and from there on, nobody will see it until it goes to our incineration plants. So this is the kind of transformation that you will be making to the industry that will make the jobs not just respectable, but actually interesting. Your efforts will help propel Singapore into the next stage of our sustainability journey, just like many other scholars who come before you.

7 Take for instance, Lynette Tay from NEA, who is involved in Project *Wolbachia*. By analysing data collected from mosquito traps in the field release and control sites, Lynette is able to suggest a better release strategy, build a

clear picture of the intervention efficacy and identify possible areas that need targeted releases of male *Wolbachia*-carrying *Aedes* mosquitoes. The *Wolbachia* technology, if proven effective, will further strengthen our capabilities to tackle dengue and other mosquito-borne diseases. This is especially crucial as higher global temperatures resulting from climate change can have an impact on the spread of mosquito-borne diseases and public health.

8 Similarly, her fellow alumnus at PUB, Fabia Lim, is involved in a project on the Cross Island Line. PUB has many proposed and existing sewer lines that will interface with the Cross Island Line tunnels and stations, and need to work closely with LTA to co-locate the sewers with MRT infrastructure. Fabia is also working closely with URA and other agencies to ensure that the services at the upcoming Changi Terminal 5 are coordinated. Fabia is able to use her skills to achieve outcomes on a Whole-of-Government level.

## **CONCLUSION**

9 The work that our Ministry is taking on is going to be even more exciting. Last week, I announced the formation of a new statutory board, the Singapore Food Agency (SFA). The SFA will oversee our entire food supply chain from “farm to fork”, and safeguard our food safety and security. It will be a new addition to our Ministry from April next year, and I look forward to welcoming SFA to our MEWR family.

10 As we expand our family in the face of a changing environment and evolving global landscape, it is imperative for MEWR to strengthen our talent pool. We need to continue to find ways to combat global warming, address environmental challenges, and strengthen Singapore’s water and food security.

11 I urge our scholars to make the most of the exciting opportunities that are provided by the NEW scholarship. The next phase of your education will be some of the best years of your life – learn, contribute and give back. I hope you will immerse yourself in learning and aspire to make a difference. Thank you.

1. Welcome to Singapore for the 29<sup>th</sup> Meeting of the ASEAN Senior Officials for the Environment.
2. Let me first convey my condolences to the families of the victims of the catastrophic flooding in the People's Democratic Republic of Laos and Cambodia caused by heavy rainfall and collapse of the Xe-Pian Xe-Namnoy dam. Record-breaking monsoon has also affected Myanmar, triggering landslides and floods. Our thoughts and prayers are also with those affected by the devastating earthquake that had struck the island of Lombok. We are further saddened by the flash floods in the Philippines caused by heavy rain brought on by Typhoon Yagi.
3. This series of disasters in ASEAN highlight once again the vulnerability of our region to extreme weather and therefore its environmental risks, and so the need to enhance ASEAN's resilience. Other environmental stresses are also putting pressure on our region. Based on the Fifth ASEAN State of Environment Report, the population of ASEAN will increase from 629 million to 741 million by 2035 – more than half will be in urban areas. Economic development will lift millions out of poverty but if not properly managed, it will exacerbate over-exploitation resulting in threats to biodiversity, irreversible deforestation, and pollution of our land, air and sea.
4. This is why Singapore chose "Resilience and Innovation" as the theme for our Chairmanship of ASEAN. As our aim has been to work with ASEAN countries to ensure our region remains cohesive, resilient and innovative. We have sought to achieve this in two ways.
5. First, we hosted the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and Expanded SAMCA last month for ASEAN to share our experiences and work together with our Plus Three partners to build a climate-resilient and low carbon future. We also launched the Climate Action Package, which includes capacity building in areas such as climate science, disaster risk reduction, flood management and long-term mitigation and adaptation.
6. Second, in July, we launched the ASEAN Smart Cities Network that will help ASEAN countries address urban challenges by harnessing the potential of digital and technological solutions to make our cities more sustainable and future ready for the benefit of our citizens. Each of the 26 pilot cities in the network has embarked on the programme, working with external partners, private sector solution providers and multilateral financial institutions. Projects in these cities span issues of environmental sustainability, waste management, urban mobility and public safety.
7. While the environmental challenges facing us are big, we can take comfort that each one of us is taking steps in the right direction. We have abandoned the "grow now, clean up later" philosophy and believe firmly that

“green growth” and “sustainable consumption and production” are integral to long-term economic planning and social well-being. Being clean, carbon efficient and eco-friendly is an opportunity, and not just a trade-off.

8. I would like to make special mention of Indonesian President Joko Widodo and Minister of Environment and Forestry Siti Nurbaya Bakar who have shown the way, through their strong leadership and determination to raise the bar for sustainable development, particularly in the area of sustainable commercial agricultural development and the protection of forests and peatlands which are valuable carbon sinks.

9. The threat of climate change looms large. We must build on the gains we have made in protecting the environment. Our region remains under international scrutiny. And our citizens demand accountability.

10. I offer three suggestions on how we can continue our journey towards sustainability.

### **Embracing Circular Economy**

11. First, we must see the challenges and opportunities associated with protecting the environment from the perspective of the circular economy. This requires a fundamental change in how we deal with traditional environmental challenges such as waste management, energy efficiency and water resources management - just three areas that I want to mention. The linear “take, use and dispose” model is unsustainable. Resources are not unlimited; neither is the capacity of the earth to absorb waste and pollution.

12. Instead, we must embrace the circular economy: keep resources in use for as long as possible, extracting maximum value from them, and recovering and recycling valuable materials at the end of product life. This includes designing products from the start for remanufacturing, refurbishing and recycling to keep components in use.

13. I believe that ASEAN is ready for a circular and connected regional economy, where waste can be transformed into feedstock for new products. We can start by setting common standards, with the right standards and safeguards in place, on the quality of exportable recycled fractions, to enable the movement of clean and safe fractions across borders as valuable economic resources. We can start small, by focusing on a limited number of higher value fractions in bilateral or regional pilot projects. If we succeed, we will effectively turn our cities into urban mines that allow resources to be used endlessly. Besides economic dividends, the circular economy will also offer social and environmental dividends. Marine litter will be reduced, public health will be significantly improved, and biodiversity will be preserved.

## **Strengthening ASEAN Institutions**

14. Second, strengthen our institutions through greater cross-sectoral coordination. Resource constraints and the increased complexity of challenges require us to do more with less. ASEAN Centres and institutions must strengthen their core capabilities, leverage each other's expertise, and operate in a coordinated and collaborative manner. Singapore has upgraded the three Centres for Initiative for ASEAN Integration in Cambodia, Vietnam and Laos into full-fledge Singapore Cooperation Centres. To be set up next year, these Centres will expand the range of technical assistance and new modalities for capacity building.

15. Singapore is also honoured to host the World Meteorological Organisation's Regional Office for Asia and the South-West Pacific. This will strengthen collaboration with the ASEAN Specialised Meteorological Centre in the coming years to enhance ASEAN's meteorological capabilities, and support the region's climate mitigation and adaptation efforts.

16. I congratulate Myanmar on the launch of the ASEAN Institute of Green Economy; and Thailand and Indonesia on the impending establishment of the ASEAN Centre for Sustainable Development Studies and Dialogue, and the ASEAN Coordination Centre for Transboundary Haze Pollution Control respectively. These Centres will help complement the work of existing ASEAN institutions.

## **Consensus Within, Cooperation Beyond**

17. Third, we must deepen cooperation with ASEAN's Dialogue Partners while we continue to preserve the principle of consensus within ASEAN. There is much scope for learning and exchange with our Dialogue Partners as we address common challenges posed by a changing climate and rapid urbanisation. In our interconnected world where environmental challenges transcend national boundaries, we cannot develop effective solutions unless we work together as a region, and as one global community. We all gain by sharing knowledge and best practices, and promoting the joint development and transfer of environment-friendly technologies.

18. At the same time, we must preserve the principle of ASEAN consensus. This has been the foundation of ASEAN's unity. It has ensured the equality of all ASEAN nations, and allowed us to transcend our economic, political and social diversities to adopt a larger and more sustainable view of our long-term interests.

19. We must build on this to lay a strong foundation for a sustainable and prosperous future for our peoples. Let us continue planting trees so our children and grandchildren will enjoy their shade.

20. I wish you all a fruitful ASOEN meeting, and a pleasant stay in Singapore. Thank you very much.

**Fellow Parliamentary Colleagues**

**Residents of Punggol North**

**Ladies and Gentlemen**

1. Good afternoon. Happy 53<sup>rd</sup> National Day to all. It is my pleasure to join you this afternoon.

**“Switch and Save – Use LED” Programme**

2. We are here today to launch a new programme by the National Environment Agency to encourage residents to switch to LED lights. Why are we doing this? Switching to LED lights will help you to save money by using less electricity. An LED bulb uses 40% less electricity than a compact fluorescent lamp, and 80% less electricity than an incandescent lamp. If you switch from incandescent bulbs to LED bulbs, you can save \$9 a year in electricity costs for every bulb changed.

3. In a 2017 survey, NEA found that only 28 per cent of households in 1- and 2-room HDB flats used LED lights. To encourage more to switch, NEA will provide 1- and 2-room HDB households \$25 vouchers to purchase LED lights at participating merchants’ outlets. For North East CDC, this programme will benefit 13,000 eligible households. If all eligible households switch to LED lights, we can save about 360,000 kWh annually – that is more than \$70,000 in collective energy savings and a reduction of more than 150 tonnes of carbon dioxide emissions annually.

4. So you can see, switching to more energy-efficient lights not only saves money, it is also a form of climate action. Less electricity generated means less greenhouse gas emissions. Our earth has been warming due to excessive greenhouse gas emissions from human activities. In Singapore, we already feel the impact of climate change in heavier rainfall, resulting in flash floods. This is why we have designated 2018 as the Year of Climate Action, to raise the level of national consciousness on the need to take individual and collective action for a sustainable Singapore and to fight climate change.

5. The government cannot tackle climate change alone. Using less electricity at home is one simple climate action that we all can take. I hope that this programme will make it easier for households to switch to LED bulbs. By doing so, you will not only save our earth, you will also save money.

6. We need strong support from the community to sustain the climate action momentum. In the North East district, community partners have been proactively organising ground-up initiatives to raise awareness on ways residents can take climate action in their daily lives. For example, the North East CDC organised the 'JOE Day' event, which stands for "Just One Earth". This is an annual family carnival for pre-schoolers and their families to spread the message of how everyone can take simple actions to care for the environment and take climate action. During the June school holidays, Punggol Coast and Punggol North Grassroots Organisations organised an annual two-day camp for 120 primary school students to learn how they can save electricity at home through hands-on activities.

7. We are making similar efforts in my constituency. At Our Tampines Hub's 1<sup>st</sup> Anniversary celebration on 5 August, we organised a climate action exhibition and related activities to encourage everyone to do their part to mitigate climate change.

8. I thank our key partners – North East Community Development Council and Young NTUC – for jointly organising this launch event, in conjunction with Project Refresh.

9. I also thank our retail partners – Sheng Siong, Home Fix, and Selffix, as well as suppliers from Megaman, Osram and Philips – for your strong support of this "Switch and Save - Use LED" programme.

10. We also thank our volunteers. Thirty-four volunteers from Hope Worldwide (Singapore), Meridian Junior College and Singapore Polytechnic were trained this morning by staff from the Sustainable Living Lab. They will be assisting some of the residents with the LED light installation, while more than 300 volunteers from all walks of life are here today to improve the living conditions of homes under Project Refresh. You all are making a difference.

Thank you everyone.

Ms Isabella Loh, Chairman, Singapore Environment Council

Distinguished guests

Ladies and gentlemen

## **Introduction**

It is my pleasure to join you this morning. The theme of RE-Economy: Creating a New Plastics Economy” is a very pertinent topic for this Year of Climate Action. I am glad that the Singapore Environment Council has published the report on “Consumer Plastic and Plastic Resource Ecosystem in Singapore”. The survey findings are timely and instructive. I hope you had a fruitful session this morning discussing how to address the plastic challenge for Singapore.

## **Zero Waste Masterplan**

2. One of the focus areas under the Sustainable Singapore Blueprint is to work towards becoming a Zero Waste Nation. We can do this by reducing our consumption, as well as reusing and recycling all materials to give them a second lease of life. Just like how we closed the water loop, we want to close the waste loop and extract maximum value from our precious resources.

3. My Ministry and the National Environment Agency are developing a Zero Waste Masterplan, to be released next year. As we work on the Masterplan, we will be actively engaging all of you for your ideas and feedback; and at a later stage, we would like to collaborate with you to develop key initiatives towards a zero waste nation. I hope that we will glean interesting insights and innovative proposals from today’s conference, which can provide inputs for our Masterplan.

4. Let me give a sense of some of our plans moving forward. First, we plan to introduce policies to encourage sustainable production and consumption. This includes Extended Producer Responsibility (EPR), starting with electronic-waste, which we will introduce by 2021. When producers are responsible for the ‘end-of-life’ of their products, they will be more incentivised to design products that are easily recycled, or come up with innovative circular business models to close their waste loop.

5. Apart from e-waste, we are studying the feasibility of extending EPR to plastic and packaging waste. To start off, we will introduce a mandatory reporting framework for packaging data and waste reduction plans in 2020. Businesses such as brand owners, importers, large retailers and supermarkets will need to start collecting data on the types and amount of packaging they place in the market and submit plans for reduction.

6. Second, we will support and partner industries to grow a circular economy. NEA recently launched a research grant call under the “Closing the Waste Loop Initiative” for the sustainable design of plastic materials. The goal is to allow for plastics to be more reusable, easier to recycle, and to extract value from waste plastics. By encouraging collaboration between the institutes of higher learning, research institutes and businesses, we will be in a stronger position to introduce fresh approaches to solving the longstanding plastic challenge, and capture the innovation value.

7. Third, and perhaps most important, we must raise awareness among the public to love and to take care of our environment. Government and businesses can only do so much. We cannot legislate desirable behaviour – we need to change societal norms and people’s mindsets, so that individuals are personally committed to living a “zero waste 3R lifestyle”.

## **Critical Role of Civil Society**

8. This is where civil society plays a critical role. SEC's effort to fight plastic waste, and its call for individuals to use one less plastic item a day, is commendable. I hope the public will rise to the challenge. Collectively, we can make a difference in reducing the amount of plastic waste we generate every month.

9. I also want to highlight the excellent efforts of many other organisations, such as Zero Waste SG's BYO or Bring Your Own campaign, or Tzu Chi's recycling activities for HDB households that are carried out regularly across the island. Such ground-up efforts help to spread mass participation and energise individuals to practise the 3Rs. If we all understand the value of individual action and the transformational impact of collective action, we will make good progress towards the vision of a zero waste nation.

### **Singapore Environmental Achievement Awards**

10. In recognition of the passion and contributions of many stakeholders in making Singapore a sustainable nation, SEC is using this occasion to give out the Singapore Environmental Achievement Awards (SEAA). The awards recognise companies that conduct their business operations to an excellent standard of environmental sustainability. I congratulate the 15 SEAA award winners. They are worthy role models. I look forward to hearing how they have managed to achieve high standards of corporate environmental and social responsibility.

11. I highlight two winners to illustrate what is possible. PacificLight's 800 megawatt power plant is capable of powering over 1 million households in Singapore. Its power plant is fuelled by Liquefied Natural Gas (LNG) and is one of the most efficient plants in Singapore and our region. It is the only power project in Singapore to have secured Certified Emission Reduction credits under the UNFCCC Clean Development Mechanism. Its efficiency improvement over the years has helped to reduce the company's carbon footprint by two per cent, equivalent to taking 10,000 cars off the road. PacificLight also gives back to society through its community engagement programmes. For this Year of Climate Action, it has organised the PacificLight "CREA8 Sustainability Competitions", comprising of art, essay and video competitions for students and youths to share their ideas on how to reduce our society's environmental footprint.

12. Another award winner is HP PPS Asia Pacific (HP), which manufactures printers, PCs and mobile devices. Through its Straw Pallet Programme, the company works with suppliers to replace wood pallets used to ship its products, with pallets made from straw. Using straw pallets helps to improve economic opportunities by opening up a market for straw waste and reducing air pollution from burning unwanted straw.

### **Conclusion**

13. I am confident that the discussions today will encourage many interesting ideas on what we can do, individually and collectively, to solve Singapore's plastic challenge. Together, let's continue to ensure that Singapore remains sustainable. I wish you an enjoyable and fruitful conference and extend my congratulations to all the SEAA Award winners once again.

Thank you.

Mr Tan Swee Yiow, President of the Singapore Green Building Council

Mr Lee Fook Sun, Chairman, Building and Construction Authority

Distinguished Guests

Ladies and gentlemen

Good evening. It is my pleasure to attend this dinner hosted by the Singapore Green Building Council (SGBC), which has done much to promote sustainability through green building solutions. For a densely populated city state like Singapore, green buildings are an integral part of our efforts to reduce energy use, waste generation, pollution and water consumption.

### **Singapore Green Building Council's Climate Action Campaign**

2 The Government cannot tackle the existential threat of climate change alone. We need all hands on deck and I am pleased that the SGBC is actively supporting Singapore's Year of Climate Action by encouraging our community to adopt sustainable practices and lifestyles.

3 Last month, Minister for the Environment and Water Resources Mr Masagos Zulkifli, launched the SGBC's first climate action campaign with the theme **Live.Work.Play.Green** to educate Singaporeans on green buildings and do their part for the environment. I am heartened that the campaign has received more than 3,000 entries for a quiz on green buildings. The campaign has been particularly effective in reaching young people, with 41 per cent of the entries submitted by youths. I understand that the SGBC had encouraged everyone here to make a climate action pledge earlier. Collectively, these pledges represent Singapore's commitment to climate action. I encourage all of you to make an organisational pledge and share the *greenbuildings.sg* website with your family and friends to learn more about green buildings.

### **Benefits of Green Buildings**

4 The Live.Work.Play.Green campaign highlights the symbiotic relationship between human health and the built and natural environment. Buildings account for about

a quarter of Singapore's carbon emissions, and we spend more than 90 per cent of our time in buildings. Greener buildings provide multiple benefits. Research has consistently shown that living, working and playing in a green and less pollutive environment lead to improved health and well-being, as well as increased productivity.

5 By conserving the use of resources, and adopting energy-efficient features or renewable energy, green buildings are not only environmentally-friendly, but also help to lower costs. SGBC will step up efforts to encourage building tenants to achieve greener and healthier workplaces by having a good indoor environment, setting environmental performance targets, and enacting energy action plans. I hope that more organisations will create workplaces that are greener and healthier for their employees, which will lead to increased productivity.

### **Co-Ownership in the Sustainable Singapore Movement**

6 The SGBC Secretariat will be working with the Building and Construction Authority (BCA) on the Green Mark certifications. This will help the SGBC to develop stronger green building competencies as well as gain insights into the green building industry to better support their members. I hope their collaboration on this certification programme will promote co-ownership of our Sustainable Singapore Movement.

7 The window of opportunity to limit global warming to below two degrees is closing. The climate action efforts by partners such as the SGBC will keep up the momentum for climate mitigation and bring us closer to a sustainable future.

8 Thank you for being part of our journey towards a sustainable Singapore, and have a pleasant evening ahead.

Good afternoon. I am very happy to join you today.

2 This learning journey is part of a series of events that agencies have organised to showcase how SMEs can become early adopters of change, and how they can become more productive and innovative while overcoming manpower challenges. The environmental services industry indeed plays a significant role in contributing to a clean, green and sustainable Singapore. That is why we are partnering companies to transform the environmental services industry and position it for the future.

3 As demand for environmental services continues to rise, increasing the number of workers to meet service demand, I think you all will agree with me, is unsustainable given our manpower constraints. Cleaning and waste management companies will need to review and redesign work processes, and make use of readily available cleaning equipment, tools and solutions to augment their operations. This will also at the same time make work easier, safer and smarter for our older workers, who comprise a significant part of the workforce in the cleaning sector. In fact, based on survey data gathered in 2016, the average age of the resident workforce in the cleaning sector is 60 years old.

### **Job Redesign for Environmental Services**

4 To help our environmental services companies achieve these objectives, we launched the Environmental Services Industry Transformation Map, or the ES ITM, last December.

5 Under the ES ITM, companies can tap on the Environmental Services (Cleaning) Job Redesign Initiative. This initiative aims to help cleaning service providers and service buyers adopt job redesign solutions that can benefit their older workers, optimise manpower resources and raise productivity.

6 Through this Job Redesign Initiative, we have provided cleaning companies with a range of job redesign solutions, such as compact scrubbers and light-weight water-jets. Contact information of vendors offering these solutions are made available as well. Cleaning companies and service buyers can also attend job redesign clinics, for one-on-one consultation to learn more about how they can benefit from the initiative. Lastly, companies keen to embark on their job redesign projects can tap on WSG's Workpro Job Redesign Grant to defray part of the implementation costs incurred when adopting the job redesign solutions. As at 30 June this year, more than 50 companies from the cleaning sector has tapped on this grant to implement job redesign solutions. This has helped make work easier, safer and smarter for close to 1,400 older workers.

7 The host company for today's Learning Journey, Lifeline Cleaning, is one of the companies which has tapped on the WorkPro Job Redesign Grant. They will be sharing with us the job redesign solutions that they have adopted using this grant, and how they have benefitted from job redesign.

### **Productivity Solutions Grant**

8 As we continue to ramp up our efforts to help the environmental services sector transform, I am also pleased to announce that we are launching a \$30 million Productivity Solutions Grant (PSG) for the ES sector. This grant will further help companies scale up and adopt technologies to improve efficiency and productivity. Environmental services companies as well as premises owners may tap on the grant to recover up to 50 per cent of the upfront direct cost of adopting commercially available and proven technologies such as autonomous floor scrubbers and smart compactor litter bins.

9 Indeed I hope today's learning journey will inspire you to adopt job redesign solutions and technologies, and tap on the WSG's Workpro Job Redesign Grant as well as our Productivity Solutions Grant, to become even better in what you are doing.

10 With that, I wish all of you a meaningful Learning Journey today. Thank you.

Ms Margaret Heng, Executive Director of the Singapore Hotel Association,  
Distinguished Guests,  
Ladies and Gentlemen,

It is my pleasure to join you this afternoon.

#### Introduction

1 In recent years, hotels around the world have been increasingly adopting sustainable practices – from improved food waste reduction to reducing reliance on single-use plastics. And there are compelling reasons to do so.

2 According to the 2018 Sustainable Travel Report by Booking.com – a global travel e-commerce company – 68% of 12,000 survey respondents from 12 countries expressed their preference for eco-friendly accommodation. In fact, 67% were willing to spend more on their travels to reduce the negative impact on the environment.

3 In “The Business Case for Reducing Food Loss and Waste” report published by Champions 12.3 in March 2017, where 1,200 businesses in food manufacturing, food retail, hospitality and food service across 17 countries were analysed, the median financial benefit-cost ratio was reported to be 14:1. This means that for every dollar invested in food and waste reduction efforts, companies can realise \$14 in financial benefits.

4 But ultimately, the need for sustainable development goes beyond dollars and cents, catering to environmentally-conscious consumers, or building a positive image for your brand. It is about protecting the environment we live in, to ensure that it continues to thrive in future.

5 Singapore has a vision of becoming a Zero Waste Nation, under the Sustainable Singapore Blueprint. For this vision to become reality, every individual needs to consciously reduce, reuse and recycle. We must also endeavour to build a circular economy, by minimising waste generation and maximising the value and resources that are extracted from key waste streams.

6 Last year, the recycling rate for hotels was 8.5%, up from 5.5% in 2016. On average, a hotel room generated 3.7 kg of waste daily, of which only 0.32 kg was recycled while the rest was discarded. There is still much potential for improvement. As a major pillar of our tourism industry, hotels must lead by example in contributing to our vision of a Zero Waste Nation.

#### 3R Awards for Hotels 2018

7 To promote and recognise waste minimisation and recycling efforts within the industry, the National Environment Agency and the Singapore Hotel Association introduced the 3R Programme for Hotels in 2011, and the biennial 3R Awards in 2014.

8 Today, we are pleased to recognise 14 award winners which have made a positive impact in their sustainability journey, including three first-time recipients – Festive Hotel, Mandarin Orchard Singapore and Regent Singapore. We also want to acknowledge the 3R efforts of Mandarin Oriental Singapore, our Distinction Award recipient for the third consecutive time.

9 Mandarin Oriental implements its sustainability policy of responsibly managing environmental impact and social commitments, in exemplary fashion. The hotel has a digital library to provide guests with the option of electronic newspapers. Since the service was implemented, the demand for printed newspapers has fallen by over 60%. Writing materials, gym mats at the fitness centre, and the swimwear and backpacks on

sale are all made from recycled material. In addition, reusable glasses for drinks are provided at meeting rooms.

10 The hotel conducts annual waste audits to constantly improve measures to reduce, reuse or recycle their waste. Through the in-room directory, guests are encouraged to care for the environment by practising the 3Rs.

11 I am also heartened to note that all our winners have taken the Climate Action Pledge – thank you for your commitment. Fighting climate change requires the collective efforts of government, businesses, communities and individuals. If your hotel has not pledged yet, I urge you to do so now at [www.climateaction.sg](http://www.climateaction.sg). To date, we have garnered more than 275,000 pledges with over 300 organisations taking a stand against climate change.

#### Food waste

12 One key area of concern is food waste. In 2017, Singapore generated about 809,800 tonnes of food waste. Half of this came from non-domestic sources including hotels, and only a small percentage of the food waste generated was recycled.

13 To support organisations in their food waste reduction efforts, NEA worked with the Agri-Food & Veterinary Authority and industry stakeholders to develop a Food Waste Minimisation Guidebook for Food Retail Establishments which was launched at the last 3R Awards for Hotels. This guidebook contains information on how hotels can improve and sustain their food waste minimisation efforts, for example through food waste audits, inventory management, redistributing excess food and recycling food waste.

14 The NEA has also developed materials that hotel operators can use to educate hotel employees and guests on reducing food waste. I am happy to see that some hotels have already put up these materials at their premises to promote awareness on food waste reduction. I encourage more hotels to do so and also reference the food waste minimisation guidebook from NEA's website.

15 Increasingly, F&B premises are treating their food waste using on-site food waste digesters. The benefits are aplenty. At Our Tampines Hub (OTH), the amount of waste disposed of has been reduced by two-thirds after digesters were installed. As a result, OTH is saving \$40,000 annually from needing fewer waste disposal trucks. The digester also converts the food waste into non-potable water, liquid plant nutrients and organic fertiliser. The non-potable water is used to wash the waste bins and the bin centre; the liquid nutrients are used to help grow vegetables and fruits at its rooftop community garden; while the fertiliser is distributed to residents. By managing food waste effectively, pest issues are also minimised. I urge all hotel operators to consider on-site food waste treatment systems, if you haven't already done so. Grants are available from NEA's 3R Fund should you need help to get started on the system. Currently there are 24 food waste digester projects under the Fund, of which eight belong to hotels.

#### Concluding Remarks

16 I warmly congratulate Mandarin Oriental Singapore, and all 3R award winners. You exemplify some of the best green practices in the industry, and your collective efforts will go a long way to safeguard our environment for our future generations.

Thank you.

## **INTRODUCTION**

1. Good evening. It gives me great pleasure to join you this evening to recognise outstanding individuals who have made significant contributions to keeping Singapore clean, green and sustainable.

## **IMPORTANT ROLE MODELS**

2. This year, the National Environment Agency received 338 nominations for the Ecofriend Awards. This is slightly more than the 329 nominations we received in 2017. It is encouraging to see that more people are stepping forward, not just to do their part for the environment, but also to influence and inspire others to do so.

3. This evening, we are recognising 11 individuals who have championed environmental initiatives and influenced their peers, colleagues or the wider community to do more for greater environmental ownership and responsibility. Their initiatives cover a wide range of areas, including waste minimisation, energy efficiency and climate action.

4. Among our recipients this year, we have two inspiring leaders. The first is Ms May Yap, Managing Director of LHT Holdings Limited. Ms Yap leads her company in reducing industrial waste generated and in recycling waste materials. The company established Singapore's first wood waste recycling plant, which produces re-engineered wood products from wood waste collected from their customers. Because of this, the company has been able to cut its waste disposal cost by a few hundred thousand dollars annually, save approximately 4,500 trees and reduce electricity consumption by 75,100 kWh.

5. The second inspiring leader I want to mention is Ms Esther An, Chief Sustainability Officer of City Developments Limited (CDL). Earlier this week, Esther was recognised as a 2018 SDG Pioneer at the United Nations Global Compact Leaders Summit. She is the first recipient from Singapore and one of the first two Southeast Asian women to be conferred the honour. Esther's passion for sustainability has made a positive impact on the company's environmental performance across its worksites, commercial buildings and corporate offices, helping them to attain local and global recognition. Esther also leads CDL's eco outreach programmes and initiatives, working closely with the community. A recent example of a successful initiative is the zero-energy Singapore Sustainability Academy (SSA), a collaboration between CDL and the Sustainable Energy Association of Singapore (SEAS), a non-profit organisation. The Academy is a ground-up initiative, in support of the UN Sustainable Development Goals (SDGs) and climate action. The SSA has held 120 events and engaged over 4,500 representatives from the People, Public and Private sectors.

6. Another notable recipient this year is Mr Allen Ang, BBM. As a District Councillor in the North West Community Development Council, he has played a key role in the implementation of environmentally-friendly features in the Bukit Panjang Community Club under the ECO CC @ North West programme. He also led efforts at Bukit Panjang CC to become the first CC to achieve the BCA Green Mark Gold PLUS award under the Existing Non-Residential Buildings category.

7. Our recipient under the Student Category this year, Mr Gan Rui Yi, President of Dunman High School's Environment Club, has initiated projects to reach out to his peers and other youth to adopt environmentally-friendly practices. His efforts have helped to increase the recycling rate in his school by 30%. Let us congratulate all award recipients!

## **CLIMATE ACTION**

8. Since the start of the Year of Climate Action in January, we have seen more than 275,000 individuals, schools, NGOs and corporate organisations pledging their commitment to take climate action.

9. 67 interest groups, NGOs and grassroots organisations have also taken up the Climate Action Grant to carry out around 215 climate action activities to reach out to people from all walks of life. One such group is Accommodate, an interest group set up in 2017. Accommodate received the grant for their unique "Accommodating Climate Change" programme. Their programme includes a land-use simulation game to start discussions about climate change and encourage participants to take further action.

10. We have the group with us here today. I encourage you to visit their booth at the networking session later, as well as the booths put up by other partners, to understand more about their sustainability efforts. I believe that as environmental advocates, many of you would have already made the climate action pledge by now and are taking climate action. I thank you for your support and commitment.

## **CONCLUSION**

11. I hope the good examples set by our Awards recipients will continue to inspire and encourage even more individuals to step forward and take ownership of our environment.

12. There are also many past recipients with us today. As we always say, "Once an Ecofriend, always an Ecofriend". Let us continue to work together and move towards a cleaner, greener and more sustainable Singapore.

Thank you.

Distinguished Guests

Ladies and Gentlemen

I am pleased to join you at this morning's opening of two important infrastructural projects, the Stamford Detention Tank and Stamford Diversion Canal, or SDT and SDC for short. Both SDT and SDC are significant additions to our suite of measures to protect against flooding and enhance Singapore's resilience against climate change.

### **Long-term and Pragmatic Planning for Flood Protection**

2 Long-term planning has been key to building a vibrant, sustainable and liveable Singapore. As we grapple with the pressing threats of climate change, long-term planning remains central. To guide climate adaptation planning, the Centre for Climate Research Singapore uses high-resolution models to project Singapore's climate for year 2100 and beyond. Based on these climate projections, our government agencies have developed a suite of climate adaptation measures as part of Singapore's Climate Action Plan. We have and will continue to invest billions of dollars in infrastructure such as raising our coastal roads, enhancing storm water systems and diversifying our water supply. All these are large and long-term investments to safeguard our future.

3 The SDT and SDC are timely and significant investments that will lower the risks of flooding in the Orchard Road areas. We have been experiencing rainfall of increasing intensity and frequency, particularly during wet seasons. For instance, in January this year, we had one episode where about half a month's worth of rainfall fell in the space of four hours. With climate change, this is likely to intensify and increase the risks of flooding. The Government has invested \$1.2 billion in drainage improvement works since 2012, and will spend another \$500 million in the next two to three years. As a low-lying island nation, investing and planning for the enhancement and renewal of our drainage system is critical work that will never cease.

4 However, with limited resources, we need to prioritise and find pragmatic solutions to reducing flood risks. This is another distinguishing trait of Singapore's approach: we are practical and we solve problems. With limited land and resources, it is not feasible to widen drains and build drainage infrastructure to guard against every extreme rainfall event. We have to prioritise our investments and look for cost-effective and practical solutions to meet our needs. The SDT and SDC are key outcomes of PUB's pragmatic approach and prudent planning.

### **How SDT and SDC Enhance Flood Protection for the Orchard Road Areas**

5 Where we are standing now is an area right above the SDT, which is almost 30 metres below the ground. When there is a heavy downpour, excess storm water from the drains along Holland Road will flow into the SDT. This prevents the drains from overflowing and giving rise to flooding. The SDT can hold 38,000 cubic metres of storm water – enough to fill 15 Olympic-sized swimming pools. After the storm subsides, the stored water will be pumped back into the drains that flow to the SDC.

6 The two-kilometre-long SDC, complemented by the SDT, diverts part of the storm water from the Stamford Catchment towards the Singapore River which has spare capacity to cope with the additional storm water. The existing Stamford Canal is left to serve a smaller catchment, thus protecting the area against flooding during intense storms.

7 SDT and SDC are fine examples of the holistic “Source-Pathway-Receptor” approach adopted by PUB for storm water management. Together with “receptor” measures such as the flood barriers put up by building owners, these two projects will significantly enhance the flood protection for the Orchard Road areas.

8 This same approach is deployed across Singapore, with over 300 drainage improvement projects by PUB since 2012 and building owners putting in place flood prevention measures during redevelopment. Looking ahead, we will also complete upgrading works at another two major waterways – Bukit Timah First Diversion Canal and Sungei Pandan Kechil – in the first quarter of 2019, which will enhance the flood protection for the Upper Bukit Timah and West Coast areas.

### **Good Planning is Not Enough; Implementation is Key**

9 Sound planning alone is not enough. Good execution is what delivers outcomes for the public. The SDT and SDC are complex infrastructural projects that have taken eight years to plan and construct, spanning the tenure of three ministers: Minister Yaacob Ibrahim, Minister Vivian Balakrishnan and now completed under me. PUB engineers had to construct the SDT and SDC in a densely built-up area surrounded by hard rocks. LTA’s construction of the Thomson East-Coast MRT line was also closely located. As tunnelling works were carried out very near to the ground surface, PUB engineers had to exercise great care to protect the structural integrity of nearby buildings and roads. Throughout the four years of construction, motorists remained unaware that they were driving on top of major tunnelling works as the roads above remained open and safe to use. This would not have been possible without the innovative engineering solutions deployed by our contractors and the close coordination between PUB and LTA.

### **Everyone has a Part to Play in Building Resilience**

10 Despite the continuous efforts of PUB, we cannot expect zero flash floods as the design capacity of the drains may be exceeded temporarily during very heavy rainfall. This is especially so as climate change impacts intensify. With the rainy season expected over the next few months, it is timely for industries and business owners to carry out thorough checks and proper maintenance of their drainage and flood protection systems. Everyone has a part to play in protecting Singapore from flash floods and building resilience to climate risks.

11 It is now my pleasure to declare the Stamford Detention Tank and Stamford Diversion Canal open. Thank you.

1. Mr Speaker, I thank Members for speaking in support of the Bill. They have also raised many thoughtful comments, which I will now address.

### **District Pneumatic Waste Conveyance Systems**

#### Overview of Costs Associated with DPWCS

2. Mr Murali Pillai asked how connection charges and tariffs will be determined, and Er Dr Lee Bee Wah asked if residents would have to foot these costs. Let me give an overview of the costs and how they will be recovered.

3. First, the **connection charge** will cover the capital costs. In Kampong Bugis, NEA will collect this from the Master Developer. The connection charge will be small compared to other costs like land costs and construction costs. In fact, it will be a very small proportion. It will be made known to bidders when the site is launched for sale, so that this would be factored in their bids. Second, a **monthly tariff** will be collected from owners of premises within the district, such as the Management Corporation Strata Title (MCST). This will cover operational and maintenance expenses for the DPWCS. The MCST will then collect payments towards this tariff from subsidiary proprietors under the MCST as part of their monthly maintenance fees.

4. To keep overall costs competitive, NEA will appoint the DPWCS licensee for Kampong Bugis through an open tender. The tariffs will take into account factors such as gross floor area (GFA) and amount of refuse generated for different types of premises. For example, the tariffs for residential premises will be different from that for commercial premises.

#### Managing potential cost increases from DPWCS

5. Ms Irene Quay, Mr Zainal Sapari and Ms Sylvia Lim spoke about potential cost increases arising from the DPWCS.

6. We will make every effort to ensure that the costs of waste collection remain affordable. But we also have to balance short term costs with long term sustainability. Waste generation in Singapore grew from 5.6 million tonnes in 2007 to 7.7 million tonnes in 2017, a 40% increase over the last decade. This trend is likely to continue as Singapore's population and economy grow. If we do not adopt technology but continue to manage waste the way we do today, we will need a proportionate increase in manpower which we cannot meet without turning to more foreign labour, given our manpower constraints.

7. We know that Singapore's workforce is shrinking and ageing. Manpower costs across all sectors will continue to rise. The challenge is even more acute in the environmental services industry, which many Singaporeans, as I had noted earlier, perceive as dirty and unappealing, and shun away from. We might not be

able to find workers, even if we were willing to pay for them. Members would agree with me that increasing our reliance on foreign workers to collect waste is not a sustainable solution. So we need to start putting in place systems now, such as the PWCS to automate waste collection, which will allow our workers in the environmental services industry to take on higher value-added jobs.

8. From our recent consultations with industry players, the operating costs for PWCS comprise only a very small proportion of the total maintenance expenses for a condominium. Hence, the PWCS will not significantly affect the residents' maintenance fees. Condominiums with PWCS will also benefit from reduced pests and odour, and manpower savings from not needing to manually transport waste within the premises.

9. At the district level, premises will also enjoy more cost savings due to economies of scale through shared bin centres, air and ventilation equipment, and pipe networks. In greenfield sites, these benefits would be even greater, as the planning and construction of the network will be done from the start without retrofitting. This is seen in other cities, including several in South Korea, where DPWCS are implemented on greenfield sites.

10. For these reasons, we expect the cost borne by each dwelling unit (DU) for the DPWCS at Kampong Bugis to be lower than that at Yuhua, which is a brownfield site that required extensive and more costly retrofitting works, as mentioned by Er Dr Lee Bee Wah. Over the longer term, as PWCS is used more extensively in Singapore, and with technological advancements, we can expect the costs of DPWCS to decrease.

11. As mentioned in my opening speech, NEA estimates that a 1000 dwelling units condominium would save GFA equivalent to a five-room HDB flat by eliminating its bin centre. In Kampong Bugis, this translates to the Master Developer saving 20% of the GFA used for bin centres, which could then be diverted to saleable units or facilities for residents. Residents will also benefit from a cleaner and quieter environment due to reduced truck traffic.

12. Mr Murali asked whether the Government would consider subsidising existing private developments to implement PWCS within their estates. Currently, the costs of conveying waste from individual chutes to bin centres in private developments are borne by residents through their monthly maintenance fees. So the Government does not subsidise this, and we have no plans to do so.

#### Measures in place to address residents' concerns and other operational problems

13. Mr Murali Pillai and Mr Zainal Sapari spoke about operational concerns related to DPWCS in Singapore and other cities, such as suction noise and smell from choked pipes.

14. I would like to assure Members that we take these concerns seriously. PWCS itself is a tried and tested technology and has been used in countries such as South Korea and Sweden for many years. To date, some 140 condominiums and commercial developments in Singapore have also used PWCS with only minor operational issues. Where disamenities occur, we will study and address them. For example, chokages have been addressed by improving the design of refuse chute hoppers, and odour, by ensuring the regular replacement of odour filters.

15. Let me share with Members the experience of a district in Gwacheon City, which is in Seoul. Residents were initially concerned when they saw the shared bin centre in the middle of the district. They were concerned that the bin centre would affect the aesthetics of the area, and whether there would be odour problems. These concerns were cleverly addressed by integrating the bin centre into a landscape garden, which residents welcomed.

16. This illustrates the importance of resident-centric design. The PWCS retrofitting project at Yuhua faced design limitations as it was in an existing estate with limited space. As a result, the bin centre had to be located in the middle of the estate, surrounded by blocks of flats. HDB has introduced acoustic mitigating measures and odour treatment solutions to address the noise and smell issues at the bin centre. Public education efforts were also intensified to remind residents of items that cannot be disposed of in the PWCS. This would prevent chokages that give rise to odours.

17. More importantly, the learning points from Yuhua have been incorporated in the Government's upcoming projects. These include the PWCS at the new HDB estate at Tampines North, where the bin centre will be located at the edge of the district, away from residents. Other effective design features include placing refuse hoppers outside of flats and sizing refuse hoppers to limit the size of items that can be thrown into the chute, thereby preventing chokage. New developments, such as those in Kampong Bugis, would incorporate such planning and design features that will facilitate the smooth operation of the PWCS.

18. Another cause of disamenities is improper maintenance of the PWCS. To address this, NEA is jointly developing a Singapore Standard for PWCS with HDB, Enterprise Singapore (ESG) and other stakeholders. The Standard covers proper maintenance of PWCS, such as recommendations to replace air filters every six months, so that they remain effective in removing unpleasant odours. PWCS vendors must also provide operation and maintenance manuals to managing agents and MCSTs and provide basic training to the staff of the managing agents.

19. As Ms Irene Quay, Mr Gan Thiam Poh and Dr Chia Shi Lu highlighted, users of DPWCS have a role to play in preventing chokage and its associated issues.

They must use the DPWCS correctly, and avoid throwing bulky or long items such as pillows or brooms into the chutes. NEA will support such efforts to educate residents on the correct way to use the PWCS, as we are already doing at private developments which have adopted PWCS. For instance, signage could be placed at throw-points to educate residents on proper usage. NEA has also amended the Code of Practice on Environmental Health to introduce a refuse chute hopper design that limits the size of items that can be thrown into the chute.

20. Mr Zainal Sapari, Mr Gan Thiam Poh and Mr Irene Quay highlighted the need for prompt detection of faults in the PWCS and the importance of contingency plans in the event of breakdowns. It is our priority that our residents have reliable waste collection services and NEA will ensure this through licensing conditions on the DPWCS licensee. In the event of a prolonged disruption in the main DPWCS network, the licensee must ensure continued service, such as through manual waste collection. These contingency plans are similar to those in other countries such as South Korea. PWCS are also equipped with sensors and monitors to alert operators of any system faults so that they can carry out prompt remediation.

21. Even as we prepare for contingencies, it is pertinent to note that most chokages are cleared within two to three hours, in existing developments that use PWCS in Singapore.

#### Working towards greater adoption of DPWCS in Singapore

22. Mr Murali, Ms Sylvia Lim and Mr Louis Ng spoke about the Town Councils' role in managing PWCS. Mr Murali and Ms Sylvia Lim asked why the Bill excludes Town Council-managed premises. This is because HDB has already been playing an active role in implementing PWCS in public housing estates. Hence the current Bill focuses on enabling DPWCS to be implemented on sites comprising private developments.

23. NEA and HDB are also collaborating closely on implementing PWCS, and will be adopting the Singapore Standard for PWCS in new projects.

24. Mr Louis Ng spoke about potential increases in maintenance costs to Town Councils due to PWCS. While this Bill covers private developments only, we understand that HDB works closely with Town Councils to address this. For example, as mentioned by Mr Murali, the Ministry of National Development is providing a temporary grant to Town Councils to help offset costs until the PWCS industry attains economies of scale. In addition, Town Councils will enjoy savings from PWCS due to the reduced manpower requirements for refuse collection and cleaning. And indeed they are already seeing this but in the initial phases, because the PWCS is only applied to a particular part of the constituency, the savings in collection costs cannot be passed through directly. Whereas, in a

private development, the costs can be directly offset in the maintenance fees payable.

25. We welcome Mr Murali Pillai's suggestion to extend the scope of DPWCS, by combining public and private estates to allow for greater economies of scale. This is something we can explore in future after we gain more experience in implementing DPWCS.

26. Ms Sylvia Lim asked how we intend to roll out the DPWCS areas under Section 31G. Our plan is to implement the DPWCS at Kampong Bugis, a greenfield development site that will enable the DPWCS to be planned and integrated from inception. We currently have no plans for a nation-wide rollout of the DPWCS to existing developments or brownfield sites. Our priority is to implement the Kampong Bugis DPWCS well and ensure that it operates smoothly. With the experience gained, we will continue to enhance the development and management of PWCS in Singapore by working with the relevant agencies on suitable areas, taking into account site, technical and financial considerations.

27. Ms Sylvia Lim also asked about extending DPWCS to landed estates. One of our considerations in implementing DPWCS is the financial viability and sustainability of the system. Currently, we do not think there are sufficient economies of scale to implement DPWCS in landed estates for the system to be financially viable. We will focus our efforts on non-landed developments, such as Kampong Bugis. Let me also assure everyone including residents of existing developments that we will not declare a DPWCS area lightly. It will be carefully and judiciously considered, we will work with the planning agencies, taking into account not only site and technical considerations but also costs. We will only do it if it benefits the residents and cost will be a key consideration.

### **PWM Bonus**

28. Mr Speaker, Sir, I will now address Members' questions about the Progressive Wage Model (PWM) Bonus.

29. Ms Joan Pereira and Mr Louis Ng asked about the profile of the cleaning workforce. There are currently more than 40,000 resident cleaners and 17,000 foreign cleaners; their average age is 60 years old and 37 years old respectively. The composition has remained stable over the past three years.

30. The Tripartite Cluster for Cleaners (TCC) has been rallying all stakeholders to support measures to uplift the skills and wages of cleaners, including the PWM Bonus. To raise awareness among workers, a need highlighted by Mr Desmond Choo, the unions have been conducting roadshows and briefings and have reached out to more than 6,500 workers. More sessions are being planned, and cleaning businesses have also been reminded to inform their workers.

31. Let me express our appreciation to Mr Zainal Sapari for championing the interests of our cleaners as Chairman of the TCC. Thanks to the TCC's efforts, some cleaning businesses have already factored in the PWM Bonus in their contracts that extend beyond 2019. Others such as 800 Super Holdings Limited have also been giving out additional bonuses to motivate and appreciate their workers. And indeed, I hope more businesses will do the same. I also support Mr Zainal's heartfelt call for service buyers to safeguard the welfare of their cleaners.

#### Compliance with PWM Bonus Requirement

32. Several members asked how the PWM Bonus will be enforced, and how errant businesses would be flagged out. NEA and the Ministry of Manpower (MOM) routinely inspect the records of cleaning businesses to ensure compliance with the PWM requirements. This includes making sure payslips are issued, and training records of cleaners are kept.

33. Mr Murali Pillai was concerned how existing cleaning contracts would be affected, and what considerations the Director-General of Public-Health would take into account before invoking the powers to postpone the effective date of the PWM wage requirements. Mr Zainal Sapari also suggested giving a grace period for businesses who do not pay the PWM Bonus when the requirement takes effect.

34. The TCC had consulted service buyers and providers extensively, and deliberately recommended that the PWM Bonus be implemented only in 2020. This was to give cleaning businesses ample time of more than three years to adjust their service agreements accordingly. As such, all cleaning businesses will be required to pay their resident cleaners the PWM Bonus from January 2020. For cases of non-compliance, NEA will review their circumstances on a case by case basis.

35. Mr Louis Ng raised concerns about cleaners' wages being reset when a contract ends and there is a change in service provider. The TCC shares such concerns, and had therefore proposed the yearly PWM wage increments, which would steadily lift wages at all skill levels for cleaners entering into contracts after 1 July 2018. We urge cleaning businesses and service buyers to recognise the skills and experience of workers, and pay them fairly.

36. By investing in productivity enhancements and technology, businesses can afford to sustain higher wages for their workers. The Government will continue to support cleaning businesses in pursuing productivity projects through various schemes such as the Environmental Services Productivity Solutions Grant or ES PSG. Under the ES PSG, cleaning businesses can receive support for up to half the cost of eligible productivity-enhancement solutions, up to a maximum of \$250,000. Service buyers should also reject cheap-sourcing in favour of

performance-based contracting. This will encourage cleaning companies to invest in productivity measures without compromising the interests of cleaners – a concern highlighted by Mr Desmond Choo.

### Training Support for Cleaners

37. Besides ensuring fair wages, we need to help our cleaners upskill and keep up with industry demands. Ms Joan Pereira asked whether training is tailored to the needs of all cleaners. All cleaners attend a basic cleaning course before starting out. The courses are offered in various languages, including English, Mandarin, and Malay. To facilitate learning, courses are designed to emphasise hands-on learning which I think is best suited to the profile of the workers.

38. Cleaners continue to receive support after they start work. For example, Horsburgh Integrated Services groups new and experienced cleaners together to facilitate on-the-job training. Another example is Lifeline Cleaning Pte Ltd, where older workers comprise 80% of the staff. The company tapped on WorkPro Job Redesign Grant and successfully trained its cleaners to use machines to clean floors more efficiently. In fact, I recently met 67-year old Mr Lee Thian Kok from Lifeline, who has learnt to operate automated cleaning devices that make his job easier and more productive. Mr Lee exemplifies the spirit of lifelong learning, and is proof that older cleaners are not disadvantaged. We will support workers of all ages to upskill and reskill, and encourage more businesses to adopt these best practices.

39. Cleaning work must not only become more efficient; it must also become more safe. Dr Chia Shi-Lu highlighted the need for tighter safety measures to protect cleaners at work. NEA and Workforce Singapore have jointly developed a list of enhanced tools, chemicals and machines that businesses can adopt to make cleaning more effective and safe for cleaners. Cleaning supervisors can also receive training under the Environmental Cleaning Workplace Skills Qualification (WSQ) framework to implement risk controls, and educate workers on workplace safety.

### Extending the Scope of Progressive Wage Model

40. Mr Louis Ng suggested extending the Progressive Wage Model (PWM) beyond the current pool of cleaners, to cleaners who are directly employed as well as foreign workers. The PWM was designed to help cleaners employed by cleaning businesses earn higher incomes through upskilling. Previously, these workers saw their wages depressed as cheap-sourcing was prevalent across the industry. The PWM sought to level the playing field, amidst a more comprehensive effort to raise wages of lower-income citizens across the board.

41. While the PWM does not apply to cleaners who are directly employed, we urge employers who are doing well to share their gains and reward their workers fairly, adopting the key principles of the progressive wage model.

42. Foreign workers are hired on different terms, and employers already bear other related expenses such as additional levies and accommodation arrangements for engaging them. While the PWM does not apply to the foreign workers, again, we encourage employers to adopt the key principles of progressive wages when paying their foreign cleaners.

43. Regarding Mr Louis Ng's suggestions to adopt the R1 scheme for foreign workers in the cleaning sector, there is already such a scheme for the Services sector which covers cleaning businesses. Under this scheme, employers enjoy lower levies and longer employment periods when they train and retain their foreign cleaners. Mr Ng also proposed mandating a minimum proportion of R1 foreign cleaners; we will study this suggestion with MOM.

44. As for Dr Intan Mokhtar's suggestion of extending the PWM to the Food and Beverage industry, I will convey it to my MOM colleagues to consider. With regard to Mr Chen Show Mao's comments, I would like to clarify that the PWM is not a national minimum wage, but a framework to raise wages in tandem with productivity improvement. It is applied to selected sectors prone to market failure such as the cleaning sector, the lift sector that Mr Chen Show Mao talked about, and the security and landscaping sector where wages are lower.

#### Deterrence Against Litterbugs

45. Dr Intan Mokhtar also asked for stronger enforcement action against motorists who litter and cause roadside fires. The Penal Code Review Committee has proposed to introduce a new clause linking those who litter materials containing embers to a fire that subsequently occurs at that place. The Committee also recommends that higher penalties be imposed for causing fires by littering of materials that contain embers, such as cigarette butts. The Government will review the Committee's recommendations.

46. Regarding Dr Intan's suggestion to deploy more surveillance cameras to tackle high-rise littering, NEA has deployed such cameras through our service providers more than 5,500 times over the past five years resulting in more than 5,000 enforcement actions. We will continue to be vigilant in tackling this issue, while also working with the community to foster collective responsibility and ownership of our shared spaces.

47. Dr Intan asked whether make-shift rubbish bins placed by good Samaritans to collect rubbish during community events or private functions would contravene section 17 of the Act. The answer is no – section 17 is not intended to discourage such activities.

48. Finally, let me come back again to the reason for introducing provisions on the PWM Bonus. We want to recognise our cleaners who have played such a big

part in keeping Singapore clean and green. As Mr Zainal Sapari said, there are many ways each of us can show our appreciation to the cleaners around us. By being considerate in the way we use public spaces; by picking up after ourselves; and by saying “thank you” to them. More importantly, as Dr Intan Mokhtar has emphasised, the onus is on each and every one of us to keep our housing estates clean. Er Dr Lee Bee Wah has shown the way with the Nee Soon “No Cleaners Day”. We must build a city that is truly clean because Singaporeans are gracious and mindful of their community and the environment.

### Conclusion

49. Sir, to conclude, the EPH Amendment Bill is a milestone in our journey to transform our environmental services industry through innovation and technology. At the same time, we will upskill our environmental services workers, and improve their livelihood and working conditions. All Singaporeans will benefit as we ensure a cleaner and greener environment in the years to come. I thank Members for their support of the Bill.

1 Mr Speaker, Sir, on behalf of the Minister for the Environment and Water Resources, I beg to move, "That the Bill be now read a second time".

### Transforming the Environmental Services Industry

2 Enacted in 1987, the Environmental Public Health Act (EPHA) has been key to maintaining Singapore as the clean and green city that we enjoy. The principles and provisions of the Act underpin the National Environment Agency's (NEA's) work on public cleanliness and waste management.

3 We cannot take for granted our clean and green environment. The environmental services industry, which includes cleaning and waste management companies, face real challenges. The industry is struggling to meet the growing demand for their services, even with a 78,000-strong workforce across 1,700 companies. Many of the jobs are shunned by Singaporeans, who perceive them as dirty, demanding or dangerous. The industry is heavily dependent on foreign workers – for instance, a large proportion of jobs in the waste collection industry are filled by foreign workers. The local workforce is also ageing. On average, our local cleaners are 60 years old and our local waste collectors are 50 years old.

4 This is why we launched the Environmental Services Industry Transformation Map (ES ITM) last year. The ES ITM will drive innovation and wider technology adoption, upskill workers to take on better jobs, improve productivity and capture value overseas. These will improve working conditions and equip workers with relevant skills to thrive in the future economy.

5 The ES ITM will not take away the jobs of Singaporeans. As it is, there are simply not enough Singaporeans who want to join the sector. We need to grow a vibrant ES sector which can compete with the best in the world, and provide more higher value-added jobs which can attract Singaporeans. This is the only way for us to reduce our reliance on foreign labour in the long run.

6 Sir, it is in this spirit that we move this Bill to update the Act. The measures which I will speak about will help address the challenges the ES industry faces, and ensure that Singapore continues to be a clean, green and liveable city for generations to come.

### District Pneumatic Waste Conveyance System

7 The Government has made a concerted push to expand the use of pneumatic waste conveyance systems, or PWCS, in Singapore. The PWCS is a tried and tested technology that uses air pressure to convey waste through sealed pipes from throw-points to a bin centre. Earlier this year, I visited Hammarby Sjöstad, a sustainable community in Stockholm. Over there, they first implemented a PWCS more than three decades ago, in 1982, to collect waste

from 3000 apartments. Over the years, they have added another two PWCS in the area to serve 5000 more apartments.

8 This shift to PWCS is akin to Singapore's transition from night soil buckets to sewerage pipes in our early years. It replaces the need for cleaners to manually collect waste from individual apartment blocks and bring it to a bin centre - a common sight in many condominiums and HDB estates today. This will transform waste collection, and allow us to improve the standards of cleanliness and public health, even with a shrinking workforce.

9 The PWCS will bring many benefits. Dis-amenities to residents, such as pests and odour, are reduced as the entire system is enclosed. Developments and their cleaning contractors will save on manpower needed to transfer waste and clean spillages. These jobs will be replaced by higher value-added jobs such as maintenance technicians and project engineers. These are jobs which we envision creating for Singaporeans under the ES ITM.

10 We have been taking steady steps towards this vision. Earlier this year, we made it mandatory for new development applications for non-landed private residential developments with 500 Dwelling Units (DUs) or more to implement PWCS. This will add to the more than 140 private residential and commercial developments which have already done so on their own accord.

11 We will **introduce a new Part IIIA** to the Act to enable PWCS to be deployed at the district level, beyond individual developments. We call this a **District Pneumatic Waste Conveyance System, or DPWCS** for short. We will implement the first DPWCS under these amendments at Kampong Bugis. As Minister for National Development Lawrence Wong announced at last year's Committee of Supply debates, this is part of plans to transform Kampong Bugis into a people-centric and car-lite precinct. Legislation is necessary as private developers are unlikely to, on their own, come together to embark on a district-level system, thus missing out on the benefits from scale. Moreover, as DPWCS is best implemented on a greenfield site where the sale or redevelopment of individual plots are likely to take place at different times, it would otherwise be very difficult to coordinate its implementation.

12 By implementing PWCS at the district level, we can reap more economies of scale. For example, instead of having bin centres in each development, the district can share a central bin centre. NEA estimates that a condominium with 1000 dwelling units that would no longer need a bin centre would save on space equivalent to one five-room flat. Refuse truck traffic within the district will also be reduced, as refuse will only be collected from one bin centre, which can be located away from residents.

13 HDB and JTC are already implementing the PWCS at the district level. In 2015, HDB retrofitted 38 blocks in Yuhua estate under its Greenprint programme.

Feedback from residents indicated that many were satisfied with the PWCS. For example, there was a reduction in odour and pests, and an improvement in estate cleanliness. The lessons from Yuhua will be incorporated into the district-level PWCS in new estates including Tampines North and Punggol. JTC is also exploring PWCS at the district level in their new business parks, such as the Punggol Digital District.

14 **Section 31F** will limit the new Part IIIA to premises which are not controlled or managed by a Town Council constituted under the Town Councils Act. There will thus be no change to the current arrangement where Town Councils manage PWCS in HDB estates.

15 **Section 31G** will allow the Minister to declare DPWCS areas, where owners and occupiers of premises within the DPWCS area must use the DPWCS. Where needed, **Section 31H** will allow the Minister to modify or revoke declarations of the DPWCS area. Before these powers are exercised, MEWR and NEA will provide advance notice to affected stakeholders in the Gazette under **Section 31I**. An avenue for written representation to the Minister is also provided.

16 **Section 31J** will provide powers to NEA to license the vendor that builds, operates or maintains the DPWCS. This minimises disruptions to residents served by the DPWCS by ensuring that the company taking on the project will be properly regulated. For example, one of the licensing conditions that we will require the licensee to comply with is the Singapore Standard for PWCS. The Standard will cover basic requirements for the construction and installation of the network and guidelines on maintenance.

17 **Section 31K** sets out the powers of the DPWCS licensee to carry out necessary works for the purposes of the DPWCS. For example, the licensee can conduct excavation works, provided the necessary approvals from authorities are obtained. These rights are similar to those provided to gas transporter licensees under the Gas Act.

18 With your permission, Mr Speaker, may I ask the Clerks to distribute a handout?

19 Thank you Mr Speaker. I will be referring to this handout as I explain the next section, which talks about three key components in the DPWCS.

20 Under **Section 31L**, the Director-General will have powers to require owners or occupiers of premises within the declared area to connect to the refuse pipeline network. This "refuse pipeline network", indicated in brown on the handout, refers to the main DPWCS network which will be shared across the district. It will be owned and maintained by NEA or the DPWCS licensee. Individual premises would own their internal PWCS pipes. This is marked in blue

on the handout and termed “related internal assets”. It will be the responsibility of the premise owners to maintain and operate the internal PWCS pipes. The connection to the refuse pipeline network will be demarcated by a “connection point”, the triangle in the handout. This will be considered part of the refuse pipeline network.

21 Mr Speaker Sir, to ensure the financial sustainability of the DPWCS, the **new Sections 31M to 31O** will give NEA the powers to require owners and occupiers of premises to pay connection charges and/or tariffs where necessary. The connection charge will cover the capital costs of the DPWCS. The tariffs will cover the operating, maintenance and replacement costs.

22 Taking Kampong Bugis as an example, NEA will collect the connection charge from the Master Developer that is appointed to plan and develop the site. When a particular development, for example a condominium, has been built at Kampong Bugis, the tariffs will be collected by the DPWCS licensee from either the developer or the MCST when it is formed.

23 We will also make **related amendments to Sections 16(2) and 39(1) of the Building Maintenance and Strata Management Act (BMSMA)** so that connection charges and tariffs can be paid from the maintenance fund. It will also allow contributions from subsidiary proprietors to be raised for these payments.

24 **Sections 31P to 31R** will make it an offence to conduct works that breaks or would otherwise affect the ground without first ascertaining the location of refuse pipes in the DPWCS area. It will also be an offence to damage the DPWCS or affect its operations. Similar provisions are found in the District Cooling Act, Gas Act and Public Utilities Act. This is to minimise inconvenience and potential public health risks to residents in the district.

25 **Section 31T** will protect the DPWCS assets from distress or being liable to be taken in execution under court processes, in cases where the DPWCS owner faces bankruptcy or insolvency. Under certain circumstances, the **new Section 31V** will allow NEA to take over management of the DPWCS under a special administration order to ensure that the DPWCS will continue to function.

26 Mr Deputy Speaker Sir, waste collection is an essential service to protect public health, but the industry is facing manpower shortages. Through implementing the PWCS, we will upgrade the waste collection industry and improve the environment for everyone.

#### Mandating PWM Bonus for Cleaners

27 Even as we harness technology to enhance our environmental services, we must not forget the people behind them. A skilled workforce will be crucial for sustaining productivity growth as our labour situation tightens.

28 In 2014, we introduced the mandatory Progressive Wage Model (PWM) for the cleaning sector, to upgrade the skills and wages of resident cleaners. This was done to boost the income levels of cleaners sustainably and improve productivity and standards in the cleaning industry.

29 Within two years of the PWM being mandated, the real median gross salary of a full-time resident cleaner had risen from \$1,100 to \$1,200. Many businesses were paying cleaners above the minimum PWM wage level to attract capable staff. Sectoral productivity also improved as companies adopted technology to save man hours and improve work conditions.

30 In 2016, the Tripartite Cluster for Cleaners (or TCC) proposed a suite of recommendations to build on this momentum. These included yearly wage adjustments between 2017 to 2022 to sustain wage growth, and an annual PWM Bonus to be paid from 2020, to encourage cleaners to stay on their jobs and raise their incomes.

31 The Government had given its full support to the TCC's recommendations. This Bill reaffirms that support by introducing the PWM Bonus as a licensing requirement for cleaning businesses. Through amendments to **sections 80G and 80H** of the Act, it will become mandatory for every licensed cleaning business to provide for the payment of a PWM Bonus to its eligible resident cleaners, regardless of the worker's performance. Cleaning businesses who do not comply will face financial penalties or risk losing their licence, similar to how other PWM-related offences are dealt with.

32 The Commissioner for Labour (CoL) will, based on the TCC's recommendations, specify in an order the minimum amount, frequency of payment, and eligible class of cleaners for the PWM Bonus. Currently, the minimum quantum recommended by the TCC is two weeks of the basic monthly wage.

33 With the PWM Bonus, some 40,000 resident cleaners may receive up to 4% more in wages each year. Coupled with the scheduled annual wage increments, cleaners receiving PWM basic wages today could see their salaries increase by up to 7% each year from now till 2020, when the PWM Bonus is mandated. More details will be released in due course.

34 Sir, these amendments signal our continual commitment to improve the wages of our cleaners, even as the push for productivity continues. But our efforts alone will not be enough; employers and service buyers must also act responsibly and reward staff fairly. Only by working together can we realise our vision of a skilled and productive cleaning workforce.

Enhancing Operational Efficiency and Penalties

35 Mr Speaker, this Bill also seeks to enhance NEA's operational efficiency and tighten penalties against certain public health offences.

36 **Section 98** will be amended for greater efficiency in serving documents required or authorised under the Act. Currently, regulatory documents such as summonses must be served by hand to only the secretary of an errant company. The amendments would enable these documents to be served onto any other like officer of that company, and at any location, in addition to the registered address of that company. Additionally, if the document is not intended for proceedings in court, it can now be served by fax. Many other Acts, like the Environmental Protection and Management Act, similarly provide for such methods of service.

37 Amendments will also be made to **section 86** of the Act to increase the penalties against uncooperative offenders who withhold their identification, from a maximum fine of \$300 to \$1,000 upon conviction. This will deter belligerent offenders from hampering NEA's enforcement efforts. A similar provision can be found in the Control of Vectors and Pesticides Act.

38 Taken together, these changes will minimise abortive enforcement work and enable NEA to optimise limited resources.

39 Sir, Part VII of the Act currently provides for the licensing of swimming pools, while Part VIII provides for the licensing of funeral parlours, cemetery and crematoria, and for the management of human corpses.

40 Serious public health implications may arise from the unlicensed operation of such facilities. To guard against these risks, sections 65 and 77 of the Act will be repealed so that stiffer penalties under section 103 of the Act, which provides for general penalties, will apply to offences under Parts VII and VIII respectively. This will effectively raise the maximum fine for non-compliance for both Parts from \$2,000 for a first conviction to \$5,000, in line with other offences under the Act where penalties are not expressly provided.

41 The remaining clauses 4 and 8 in the Bill are made for legal clarity.

### Conclusion

42 Mr Speaker, we must continually transform the environmental services sector to meet the challenges of the future economy. This Bill marks another milestone in our efforts to develop a productive environmental services sector that is innovative and forward looking and provide good jobs with good pay for our workforce.

43 I have explained how we will leverage technology to manage our waste efficiently through the District Pneumatic Waste Conveyance System. I have also shared how we will help our cleaners upskill, upgrade, and earn higher wages through our tripartite efforts, even as we automate many of these tasks.

44 We have made progress over the years, but more must be done. Businesses must proactively develop the skillsets of their workers, in order to realise the benefits of a productive and committed workforce. Workers should also be nimble, adaptable and open to learning new skills. We will continue to support our stakeholders to transform the environment services industry.

45 Mr Speaker, I beg to move.

各位嘉宾,

先生女士们,

下午好!很高兴能与大家一起参与今天的座谈会。

2

本地环境服务业有超过1700家公司。在座的各位所属的公司为我们提供日常生活中不可或缺的清洁与废物管理服务,为我国的清洁与绿化扮演重要的角色。

3

根据2016年的环境服务业调查,新加坡有超过9成的环境服务公司属于中小型企业。调查数据也显示本地清洁员工平均年龄为60岁,废物管理员工则为49岁。

4 我国对环境服务业的需求将持续增长。在劳动市场面

临人力短缺的情况下,单靠增加人力来应付需求并非长远之计。业者必须进行转型以应付市场需求,并提高生产力、加强竞争力和为环境服务业的员工打造更好的就业环境。

5

为了协助业者达成这些目标,政府在去年推出了环境服务业转型蓝图,提供多项计划帮助企业提升人力资源。

6

环境局同事稍后将详细分享这些政府计划。让我先为大家举几个例子。其中一项计划是环境服务业(清洁)重新设计工作计划(Environmental Services (Cleaning) Job Redesign

Initiative)。政府希望通过这项计划鼓励业者改善工作流程,从而优化人力资源的支配和提高公司的生产力。业者也可申请优化职场计划(Workpro)下

的重新设计工作津贴(Job Redesign Grant),协助公司

重新设计工作,为年长员工改善工作环境。

7 借助津贴改善了工作流程的其中一家公司是 Lifeline Cleaning

清洁公司。该公司的员工改用了自动化机器,例如自动道路清扫车还有收集和搬运垃圾的电动拖车。其中一位清洁工和我分享他的工作时间在使用自动器材后减少了一半,且以车代步,工作也比以前轻松多了。该公司也因此减少员工的离职率和病假申请次数。

8 两个星期前,我也宣布了全新的生产力提升计划(Productivity Solutions

Grant)。政府将拨款3千万元资助环境服务业者购买电动清理和废物管理器材以及转

用相关科技。在该计划下，政府给予业者高达采购费用一半的资助。

9

有些中小企业可能担心进行企业转型会加重营运成本。实际上利用科技有助于改善业务运作，从长远角度来说，企业能借此降低营运成本和提供更好的服务。

10

自动化也能减轻员工繁重或重复性的工作，让他们负责更高增值的工作。这有助于吸引和保留员工。如果员工具备更高的技能和更具生产力，雇主将从中受惠。更强的工作队伍和更好的营运模式也有助于中小企业迈向国际化。

11

我希望今天的座谈会将启发大家踊跃利用环境服务业转型蓝图的多项计划，加强公司的效率和生产率。

12

在此祝各位有个富有成效的对话会，并从今天的讨论中获得实用的知识和见解。谢谢大家。

Minister of Maritime Economy and Inland Navigation,  
His Excellency Marek Gróbarczyk

Ambassador Magdalena Bogdziewicz

Distinguished guests

Ladies and gentlemen

1. Good evening. I am happy to join you on this beautiful ship on the occasion of the 100<sup>th</sup> anniversary of Poland's independence. I would like to thank the Government of Poland and His Excellency Gróbarczyk for the invitation.

2. This ship is appropriately named the "Gift of Youth", having hosted 12,000 youths for meaningful programmes since 1982. I understand that 150 youth ambassadors have come all the way from Poland on a year-long "Independence Cruise" to celebrate Poland's remarkable journey over the last 100 years and to share their hopes for a bright future.

3. Compared to Poland, Singapore is a very young nation – at 53 years old, we are only a little over half of Poland's age. Nevertheless, we share your belief that we must never forget our history - how we came to be where we are today, and the values and principles that have served us well in our nation's development.

4. As a small state, Singapore has always looked outwards to make a living. During the 19<sup>th</sup> century, Singapore gained a reputation as a free port under the British colonial administration and served as a transshipment point of regional and international trade. After independence, we continued to develop our port while strengthening trade, economic and people-to-people linkages around the world. Today, Singapore is the world's second busiest port, connected to 600 other ports in over 120 countries.

#### Addressing the Global Challenge of Climate Change

5. Singapore is particularly open to the world. But the reality is that today, every country's prosperity and security are inextricably bound up with global developments and trends. Climate change, for example, is one of the most significant challenges of the 21<sup>st</sup> century, and affects us all. The recently released report by the Intergovernmental Panel on Climate Change (IPCC) has delivered a serious warning on the urgent need to get global warming under control. The litany of climate disasters, including the extreme storms and droughts that inflicted untold damage in 2018 alone, underscores our vulnerability.

6. Singapore is fully committed to supporting global action on climate change. We were one of the first 55 countries to ratify the Paris Agreement and have pledged to reduce our emissions intensity by 36% from 2005 levels by

2030, and stabilise our emissions with the aim of peaking then. This is a challenging target given our limited access to alternative sources of clean energy. Next year, we will also be the first country in Southeast Asia to implement an economy-wide carbon tax. The carbon tax, which will be applied uniformly to all sectors without exemption, will encourage companies to price in the cost of externalities and spur the adoption of innovative eco-friendly solutions.

#### A Sustainable Maritime Industry

7. As a major maritime hub, Singapore is committed to developing a maritime transport industry that is not only competitive and efficient, but also responsible and sustainable. As part of our efforts to promote clean and green shipping in Singapore, we launched the Maritime Singapore Green Initiative in 2011 to reduce the environmental impact of shipping and related activities. The Maritime and Port Authority of Singapore has also pledged to invest up to S\$100 million to support five major programmes to encourage ship owners to adopt environmentally-friendly practices and reduce the environmental impact of their operations through voluntary initiatives.

8. We are also enhancing our infrastructure to cope with climate change. The waterfront you see here today at this Promenade may look somewhat different in future, when you visit Singapore again. As a low-lying island, Singapore is highly vulnerable to rising sea-levels. Hence, we are planning ahead to ensure that our infrastructure is resilient to climate change impacts. This includes planning for new wharves at the western part of Singapore, where we will develop our new mega-port. Just as what we are doing for the new Changi Airport Terminal 5 which will be built 5.5 meters above mean sea level, we will be doing likewise for the new port wharves. We have also made significant investments in building seawalls and raising the height of coastal roads.

#### Partnership for Climate Action

9. To tackle climate change, we need all stakeholders, businesses, civil society organisations, and individuals to work together. To galvanise ground-up action, Singapore designated 2018 the Year of Climate Action. Since its launch, more than a quarter of a million pledges for climate action have been received from individuals, businesses, organisations and educational institutions.

10. When I met His Excellency Gróbarczyk in Warsaw six months ago, he shared with me the ambitious initiatives that the Polish government is undertaking to pursue economic and social development. Whether it is in shipbuilding, or setting high standards in the maritime industry, or using cleaner energy mix – all of these point to the need for strong leadership supported by good governance. On this note, I would like to commend Poland for its leadership of global climate action, as the incoming Presidency of the 24<sup>th</sup> Conference of the

Parties to the United Nations Framework Convention on Climate Change. Poland's leadership will be crucial during this landmark year, as we are due to conclude negotiations on the Paris Agreement Work Programme that will guide the implementation of the Paris Agreement. I am deeply appreciative of Poland's leadership and commitment in this important endeavour. You can count on Singapore to support your efforts to achieve a successful outcome at COP-24 in Katowice, Poland.

#### Strengthening Bilateral Relations

11. 2019 will mark the 50<sup>th</sup> anniversary of diplomatic relations between Singapore and Poland. Our countries have much to learn from one another and collaborate on. Our bilateral trade has been growing and now stands at S\$1 billion annually. There are also opportunities for collaboration in technology and innovation, particularly in the area of financial services. Our universities have been growing student exchanges and research collaboration with Polish institutions of higher learning and to-date, 300 students have gone for programmes at Polish institutions, while Singapore has received around 280 students from Poland. All these augur well for our relationship, and I look forward to many more years of friendship and collaboration.

12. On this note, I wish all the crew members a safe and enjoyable journey and the successful completion of the sail in January next year.

13. Thank you.

Distinguished Guests

Ladies and Gentlemen

1 Good morning. Today, we recognise companies and individuals who have made outstanding contributions in energy efficiency, through the adoption of technology and best practices.

## **IMPORTANCE OF ENERGY EFFICIENCY**

2 Many of you would have read about the UN's Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C earlier this week. The report highlighted the impacts of global warming, including extreme drought, floods and food shortages, on hundreds of millions of people around the world. It serves as a timely reminder on why we need to take action to reduce our emissions now.

3 Singapore is a low-lying city state. We will feel, and in fact, are already experiencing the impacts of climate change. We acknowledge the global ambition to limit temperature rise to well below 2 degrees. Thus, although we only contribute 0.1% to global greenhouse gas emissions, we, as a responsible global citizen, have committed to implementing a comprehensive suite of mitigation measures to reduce our emissions intensity by 36% from 2005 levels, and to stabilise our emissions with the aim of peaking around 2030 under the Paris Agreement. This is an ambitious stretch goal for us.

4 The industry sector is the largest contributor to greenhouse gas emissions. Hence, improving industrial energy efficiency, or EE, is one of our key strategies to combat climate change and build energy resilience. Singapore imports all of our energy and we are exposed to volatility in the global energy market. Like water, energy is a scarce resource, and we must manage our consumption prudently and efficiently.

5 There are practical benefits to improving EE. For instance, EE improvement helps companies lock in energy cost savings over the lifespan of the industrial systems and equipment, limiting the cost impact from potential energy price increases.

6 Next year, we will introduce a carbon tax on large greenhouse gas (GHG) emitters, to incentivise emissions reduction and encourage the transition to a low carbon future. As Minister for Finance announced earlier this year, the estimated \$1 billion in carbon tax collected over the first five years will be used to support companies, including SMEs, to improve their energy efficiency. The government will announce details of the grant enhancements very soon. I encourage companies to tap on these grants and reap the benefits of EE early.

## **ANNOUNCEMENTS**

7 Apart from grants, the National Environment Agency (NEA) has been working to build up our talent pool of EE expertise, to better support companies in their EE improvement

efforts. Today, I am pleased to announce the launch of the Energy Efficiency Opportunities Assessor Certification scheme, or EEO Assessor scheme in short. Through this certification scheme, NEA hopes to build a pipeline of engineers specialising in industrial energy efficiency - to support companies in improving the energy performance of their energy intensive industrial facilities. This is especially pertinent as the industrial sector accounts for 60 percent of Singapore's greenhouse gas emissions.

8 This certification scheme is jointly developed by the NEA and The Institution of Engineers, Singapore (IES). Administered by the IES, the scheme aims to certify engineers with technical expertise in energy performance management of industrial processes, systems and equipment. It will also qualify them to conduct Energy Efficiency Opportunities Assessments (EEOAs) for energy-intensive industrial facilities regulated under the Energy Conservation Act.

9 EEO Assessors are professionals who have a unique blend of industrial experience and energy management expertise. They will play a crucial role in helping companies evaluate the energy performance of their processes, systems and equipment, and recommend engineering solutions for EE improvements. These EEO Assessors will be recognised by the Chartered Engineer Board (CEB) of the IES as qualified professionals, and be accorded the Chartered Engineer title within the energy sector. We hope that this certification and recognition scheme will inspire practising engineers and those aspiring to be one, to build a career in EE to support Singapore's journey towards a low-carbon future.

### **EENP Awards 2018**

10 Today, 10 companies, 2 energy managers and 3 public sector agencies will be receiving the EENP Awards for their commitment and outstanding achievements in EE. My congratulations to all the award recipients.

11 From the applications received this year, it is heartening to know that many companies are tapping in-house capabilities to optimise energy use in manufacturing processes.

12 One example is GLOBALFOUNDRIES Singapore, which improved the energy efficiency of their wafer fabrication process. Traditionally, hot de-ionised water is required to rinse off chemicals used in the process. Through rigorous engineering evaluation, the energy management team found that chemical rinsing with cold de-ionised water was just as effective and efficient without affecting the quality of the end-product. This resulted in an energy reduction of almost 25 GWh every year, which translates to about 6,800 tonnes of annual carbon abatement.

13 GLOBALFOUNDRIES and several other EENP Award recipients will be sharing their success stories and best practices later on. I trust that you will find these sessions engaging and insightful. Whether you are an EE advocate, energy manager, or a decision maker in your company, I encourage you to share your experiences with one another, and help every one of us strive to be more energy efficient in our day to day lives.

## **CONCLUSION**

14 Since Singapore designated 2018 as the Year of Climate Action, I am happy to see members of the industry, community as well as individuals come forward and do their part to fight climate change. Your EE initiatives have contributed to our collective efforts. I look forward to continuing this partnership with you to make Singapore a more liveable and sustainable home.

15 Thank you and have a fruitful day ahead.

## **Singapore's Water Story: A journey towards water sustainability**

His Excellency Mohamed Abdel Atty

Minister of Water Resources and Irrigation, Egypt

Dr Hani Sewilam

UNESCO Chair in Hydrological Changes and Water Resources Management

Distinguished Guests

Ladies and Gentlemen

1 A very good evening to all. I am honoured to be here at the inaugural Cairo Water Week.

2 The theme for our plenary session today, "Water Management for Sustainable Development", is pertinent. According to a 2017 report by the World Health Organisation and UNICEF, some 844 million people worldwide still lack basic drinking water service, while some 2.3 billion people lack basic sanitation. Access to Clean Water and Sanitation is one of the UN Sustainable Development Goals. And rightly so, for they are at the core of sustainable development, underpinning poverty reduction, economic growth and environmental sustainability.

3 Water has and will always be an existential issue for Singapore. The World Resources Institute ranked Singapore as one of the most water-stressed countries in the world. Our small land mass does not allow us to collect and store much rainwater. Despite these constraints, we have progressed from a country lacking in water, to our current state where every citizen has access to clean drinking water at the turn of a tap. Singapore's journey towards water sustainability, our Singapore Water Story, however, has not been easy.

4 Our progress was made possible by long-term planning and a political leadership determined to improve people's lives. We pursued innovation to improve water management, and continually engaged and educated our citizens on our water situation and the need for conservation. The latter has ingrained in Singaporeans a heightened national consciousness of our water challenge.

5 There are five key elements in Singapore's water sustainability approach.

## **THE FIRST ELEMENT – OUR FOUR NATIONAL TAPS**

### ***Our First Two Taps***

6 The first element is our Four National Taps strategy to ensure a diversified water supply. At independence in 1965, Singapore had only two sources of water – our first Tap, water from local catchments; and our second Tap, imported water from Malaysia.

7 Over the years, we have created new reservoirs, cleaned and dammed up our rivers to capture rain and maximise yield. Our storm water and wastewater streams and systems are kept separate so that storm water can be channelled to our reservoirs through a comprehensive drainage network before it is treated to potable standards. Today, two-thirds of Singapore is water catchment, making us one of the few countries in the world to harvest urban storm water on a large scale for consumption.

8 One project that was emblematic of our efforts is the clean-up of the Singapore River in 1977. The River was literally an open sewer back then. The clean-up took ten years and involved the relocation of thousands of Singaporeans from farms, factories and street-food stalls that were polluting the river catchment. The successful clean-up eventually paved the way for the development of the Marina Barrage and Marina Reservoir in the heart of our city, some 30 years later.

9 However, Singapore's water demand grew exponentially over the years, and will continue to grow. Compounded by the vagaries of weather, as early as the 1970s, we started looking into weather-resilient water sources to ensure the sustainability of our water supply.

### ***NEWater***

10 Singapore first examined water recycling in the 1970s. However, the membranes then were costly, unreliable and could not remove all contaminants. By 1998, our studies showed that the cost and performance of reverse-osmosis membranes had improved significantly, making it economical for wastewater to be treated and recycled into ultra-clean water. Our research and development efforts culminated in two full-scale NEWater plants which commenced operations in 2003. NEWater, Singapore's third Tap, was thus established.

11 Today, we have five NEWater plants in operation. NEWater is Singapore's brand of ultra-clean, high-grade water reclaimed from treated wastewater. NEWater allows Singapore to close the water loop and re-use water endlessly. With it, we can "multiply" our water supply through recycling. What this means is that if we recycle half our wastewater, we effectively double our water supply, if we recycle three-quarters of our wastewater, we quadruple it.

12 However, we cannot rest on our laurels. If we continue business-as-usual, by 2060, we will require four times the energy footprint to meet future water needs. To ensure NEWater's sustainability, we continue to focus on R&D, with the aim of increasing NEWater recovery rate from the current 75% to 90%, while reducing our energy consumption. Electrodialysis reversal, which uses an electric field to remove

charged pollutants from wastewater, is one potential technology that we are currently exploring.

13 Beyond the technical aspects of NEWater, equally if not more key was to convince our people that NEWater was not only safe but acceptable for consumption. Before we launched NEWater as our third Tap, we undertook extensive public engagement, through exhibitions, briefings and publicity to foster public acceptance. Our then-Prime Minister Goh Chok Tong endorsed NEWater by drinking a bottle on national television. Religious leaders also came out to reassure their believers of NEWater's acceptability. Today, our people stand firmly behind NEWater being part of our water supply.

14 In 2012, then-UN Secretary General Ban Ki-Moon visited our NEWater complex and said that he would recommend the strategy of recycling wastewater to water-stressed countries, and called NEWater the "elixir of life".

### ***DESALINATED WATER***

15 Our fourth Tap is desalinated water. As a small island surrounded by seawater, desalination may appear to be an obvious and practical choice for Singapore. There are many parallels between our ventures into NEWater and desalinated water. Desalination faced the same problems with membrane technology in the early days. Desalination was also expensive as it was extremely energy-intensive. As with NEWater, advancements in membrane technology in the 1990s allowed us to build our first desalination plant in 2005.

16 Today, we have three desalination plants in operation. As with NEWater, we are exploring new technologies to make the desalination process more energy-efficient. For example, we are experimenting with electro-deionisation technology, which can potentially more than halve our current energy consumption. Another project which we are looking into is the use of more energy-efficient membranes based on biomimicry, or mimicking the biological mechanisms by which mangrove plants and euryhaline fish extract seawater.

### **THE SECOND ELEMENT – RIGHT PRICING**

17 I have touched on our Four National Taps, the first element of our water sustainability approach. The second element is right-pricing of water. In Singapore, water is unlike any other ordinary public good. Right-pricing water, while still keeping water affordable for all, is crucial so that we can continue to upgrade our water system to ensure a reliable and sustainable supply, in the face of challenges such as climate change. Singapore's potable water is priced to reflect its long-run marginal cost. This means that the price of water is pegged to the cost of supplying the next drop of water. This is part of instilling a national consciousness of the value of water. It helps to prevent excessive consumption and wastage of water.

### **THE THIRD ELEMENT – MANAGING WATER DEMAND**

18 Long-term sustainability in water cannot be achieved by boosting water supply alone. Our third element lies in managing water demand, which is equally critical to our

water management policy. By 2060, Singapore's water demand is expected to double from today. Every drop of water saved today can contribute to meeting future demand.

19 Inculcating the right mindsets is key. In Singapore, we conduct extensive community outreach efforts such as public education and campaigns for our people and water efficiency courses for companies, so that they develop a water-saving mindset. While we have comprehensive initiatives to educate, support and recognise consumers in their water conservation journey, we still require a regulatory push.

20 We have mandated measures to ensure that companies and households use water efficiently. Companies using large quantities of water are required to look into water conservation measures. We also introduced a Mandatory Water Efficiency Labelling Scheme to allow consumers to make informed decisions when purchasing water fittings and appliances. Less water-efficient products are phased out from our market by law. Our efforts have borne fruit and our household water consumption has fallen over the years to 143 litres per person per day. We are continuing to work with our people to reduce this further.

## **THE FOURTH ELEMENT – COLLABORATION WITH THE PRIVATE SECTOR**

21 The fourth element is collaboration with the private sector. We partner the private sector to encourage innovation, create incentives for optimisation, mobilise expertise and allow for risk-sharing, in a cost-effective manner. We have awarded seven Public-Private-Partnership projects for some of our desalination and NEWater plants. Let me illustrate the benefits of collaborating with the private sector with a recent example, the Marina East Desalination Plant. This plant will be designed, built, owned and operated by Keppel Infrastructure Holdings. Breaking new grounds, this will be Singapore's first large-scale dual-mode plant that, when completed in 2020, can treat both reservoir and sea water. It will also be our first plant to feature a green rooftop which serves as a recreational area for our people.

22 Singapore's spirit of continuous innovation and willingness to try out new technology are evident globally. We have attracted international water companies to conduct research in Singapore and use it as a base for their business. This year, we also launched the Singapore Water Exchange to house an ecosystem of companies along the value chain, allowing them to work together and tap on mutual strengths to push water innovation and business growth. Today, Singapore has established ourselves as a global hydrohub, having 200 local and international water companies and 25 research centres.

## **THE FIFTH ELEMENT – CULTIVATING STEWARDS OF OUR WATERS**

23 Finally, the fifth element in our water sustainability plans is to cultivate stewards of our waters. This stems from our belief that when our people enjoy and appreciate our reservoirs and waterways, they are more likely to care for them and keep them clean. We launched the Active, Beautiful, Clean Waters Programme, or ABC Waters Programme, in 2006, to transform Singapore's utilitarian drains, canals and reservoirs into clean and beautiful streams, rivers and lakes, and integrate them with our urban landscape. Doing so enhances our living environment with community spaces that bring the public close to water. Through this programme, our people learn to value and cherish

our waterways, and become stewards of our water, passing on Singapore's Water Story for generations to come.

24 Private developers have also embraced the concept and incorporated ABC Waters design features in their developments. With the combined efforts of the government and private developers, there are now 115 of such projects, meaning that there is an ABC Waters project in almost every Singaporean neighbourhood.

25 One of our most iconic ABC Waters Projects is the Bishan-Ang Mo Kio Park where we naturalised a concrete canal into a flood plain and integrated it with a neighbourhood park. Many families and friends now have picnics and gatherings beside the river while enjoying its tranquillity. Another project is the Paya Lebar Quarter, a mixed-use development by a private developer, with ABC Waters design features that allows storm water runoff to be cleansed before it is discharged into the river.

## **CONCLUSION**

26 Singapore's water story is still being written. How the story will end will depend on how we respond to the growing threat of climate change, which has already brought about extreme weather patterns, both droughts and floods alike. We are determined to meet this challenge.

27 Even as we continue to grapple with our water challenges, we note that there is no single recipe for sustainable water development. Each country will have their individual circumstances and will need to find a solution that works for them. Nevertheless, underlying each solution must be a strong will to improve people's lives, and the willingness to change and keep up with evolving times.

28 With this, I look forward to a lively panel discussion later in the plenary session, and I wish everyone a fruitful week ahead at the Cairo Water Week. Thank you.

Professor Walter Woon, SC, Non-Executive Chairman and Senior Consultant,  
RHTLaw Taylor Wessing

Your Excellencies

Distinguished Guests

Ladies and Gentlemen

1. Good morning. It is my pleasure to join you at the ASEAN Summit 2018. This year's focus on sustainable growth is timely.

### **Towards a Resilient and Innovative ASEAN**

2. The ASEAN economy is growing. The International Monetary Fund estimated that ASEAN grew at an impressive 5.3% in 2017. The strong growth is expected to continue; ASEAN has the potential to become the fourth largest single market in the world by 2030.

3. However, we are also one of the most vulnerable regions to natural disasters and climate change. Our thoughts and prayers extend to those affected by the catastrophic earthquake and tsunami that hit Sulawesi last month. Recent episodes of extreme weather have also resulted in damage and lives lost. We witnessed the devastation brought about by Typhoon Mangkhut, which struck the Philippines, Hong Kong, and southern China. In 2016, ASEAN countries experienced intense heat waves, and this year, Japan and South Korea. The impact of these climate-related disasters is magnified in today's inter-connected world, and can affect economies and societies beyond national boundaries. These events underscore the need to strengthen ASEAN's environmental resilience.

4. As Chair of ASEAN, Singapore has chosen the theme of "Resilience and Innovation". We are working with fellow ASEAN countries to ensure that ASEAN remains resilient and united against increasing environmental risks, whilst transforming our economies to be more innovative and future-ready. We have sought to achieve this in various ways.

5. We hosted the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and Expanded SAMCA in July. The meetings brought together ASEAN countries and our Plus Three partners, China, Japan and the Republic of Korea, to galvanise action towards a climate-resilient and low-carbon future. We also established the ASEAN Smart Cities Network, which serves as a new collaborative platform for ASEAN countries to tackle urban challenges through digital and technological solutions. To address infrastructure needs, we set up an Infrastructure Office – Infrastructure Asia. Infrastructure Asia will seek to connect local and international stakeholders across the value chain, and catalyse

infrastructure projects in the region. These platforms will open up new opportunities for green growth.

## **Balancing Risks and Opportunities in Sustainable Growth**

6. We must grow resilient and innovative partnerships at all levels. Businesses are a key partner in our journey towards sustainable development. Companies should seize new opportunities for growth while recognising new areas of risks. Singapore is an open, globally connected, and export-driven economy, and our companies must stay ahead to remain competitive. Let me touch on some key trends.

7. First, the world is moving towards a low-carbon future, in response to climate change. A 2018 report by the CDP Worldwide and the Climate Disclosure Standards Board (CDSB) found that a majority of companies recognises the risks and opportunities brought about by climate change. 80 per cent of companies have publicly disclosed emissions reduction targets, and 21 per cent of companies are using internal carbon pricing. However, there continues to be a gap in taking concrete actions to address climate risks and seize opportunities.

8. Setting a carbon price is an important way of capturing the external costs of carbon emissions. Starting next year, Singapore will join the growing list of countries to implement a carbon tax. The carbon tax sends a crucial economy-wide price signal on the need to reduce carbon emissions and to invest in green, energy-efficient technologies. Singapore's carbon tax is not intended as a fiscal measure. The Government is prepared to spend more than the carbon tax collected in the initial years to support worthwhile projects that deliver emissions reductions.

9. Enhanced regional and international cooperation on climate action will also facilitate our transition to a low-carbon economy. To contribute to such efforts, Singapore has launched a Climate Action Package under the Singapore Cooperation Programme to build up ASEAN's capacities in climate science and long-term climate mitigation and adaptation strategies.

10. Second, there is a growing call for sustainable production and consumption. Our resources are finite, as is the earth's capacity to absorb waste and pollution. The current linear economy model of "make, use and dispose" is unsustainable. It faces inherent risks such as supply chain vulnerabilities. In contrast, a shift to the circular economy will see resources being kept in use for as long as possible. This requires a fundamental change in perspective, where materials at a product's 'end-of-life' are no longer considered waste, but a valuable resource.

11. Let me give an example from the farming sector. Citizen Farm, an urban farm in Singapore, practises what is called "closed loop farming". Citizen Farm

uses food waste to feed their black soldier fly larvae. When the larvae transform into pupae, they are in turn fed to fish which the farm rears. Both the waste produced by the larvae and fish are used as nutrient-rich fertiliser for growing vegetables. In this farm, waste has become resource.

12. In Singapore, we are turning our attention to closing the waste loop. A pioneering development is the Tuas Nexus. It is the world's first facility designed to integrate used water and solid waste treatment. Tuas Nexus will reap synergies from the water-energy-waste nexus to maximise energy and resource recovery. For example, by combining used water sludge with food waste, Tuas Nexus will increase the yield of biogas, which will then be used for electricity generation.

13. We are also implementing an Extended Producer Responsibility (EPR) framework in 2021 to manage electrical and electronic waste, or e-waste. The EPR approach will make businesses responsible for the collection, and proper recycling and disposal of their products at 'end-of-life'. This will incentivise businesses to design products that last longer and can be more easily recycled. We are studying the feasibility of EPR for plastics and packaging waste. I encourage all businesses to move early, seize the opportunities, and develop innovative business models, products and solutions around the circular economy.

14. Supply chains transcend national boundaries. We will need to work as a global community to shape a circular economy. We can exchange best practices and eco-friendly technologies, and develop proper safeguards, such as common standards on the quality of exportable fractions. As Chair of ASEAN, and the coordinator for ASEAN-EU relations, Singapore will work with ASEAN countries and our Dialogue Partners to strengthen regional cooperation on the circular economy.

15. Finally, we see green finance gaining traction globally and regionally. Green bonds, a relatively more developed asset class in green finance, has seen strong growth in the past five years. This growth trajectory is expected to continue this year, with estimates of up to US\$200 billion worth of issuances globally[1].

16. Through green financing, the financial sector has a unique role in catalysing the broader adoption of sustainability practices in the economy. Beyond adopting green practices in their own operations, financial institutions must assess and manage the risks that climate change poses to their business models and that of their customers. By integrating Environmental, Social and Governance (ESG) principles into their decision-making processes, financial institutions can make lending and investment decisions that will channel capital towards resilient and sustainable markets.

17. There are rapid developments in green financing, and rising demand for green loans and green investment funds. The Monetary Authority of Singapore (MAS) launched a Green Bond Grant Scheme last year to kick-start the development of a green bond market in Singapore. Also in 2017, the ASEAN securities regulators launched the ASEAN Green Bond Standards. Adoption of these Standards throughout ASEAN will serve to promote high-quality green bond issuances from the region. Such developments will help us unlock the US\$3 trillion potential in green finance opportunities in the region from 2016 to 2030[2].

## **Conclusion**

18. Risks and opportunities often go hand in hand. The United Nations Secretary-General Antonio Guterres has called climate change “the defining issue of our time” and declared that “we are at a defining moment.” There is an opportunity for us now – governments, industry leaders, businesses, civil society organisations, and individuals – to take the future in hand and set our course for sustainable growth.

19. Today’s ASEAN Summit provides a valuable platform for the exchange of ideas, and I wish all of you a fruitful discussion ahead. Thank you.

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[1] Moody’s Investors Service, Global Credit Research Announcement, 1 August 2018.

[2] DBS and UN Environment Programme, “Green Finance Opportunities in ASEAN”, 2017.

Mr Vincent Sim, General Manager, Karcher Singapore

Mr Milton Ng, President, Environmental Management Association of Singapore (EMAS)

Ms Sherri Lim, Chief Park Operation and Revenue, Wildlife Reserves Singapore

Mr Tan Meng Dui, CEO of the National Environment Agency

Members of the Cleaning Industry

Ladies and Gentlemen

Good morning. I am very happy to join you today.

2. Everyday, our team of dedicated cleaners work behind the scenes to ensure that Singapore is kept clean. To recognise the efforts of our cleaners and raise their incomes, we recently announced the introduction of the Progressive Wage Model bonus for the cleaning sector. So many you can look forward to a bonus. I am also glad that Karcher Singapore and EMAS have taken the initiative to recognise the contributions of our cleaners through this inaugural "Thank Your Cleaner Day".

3. As the demand for environmental services continues to rise, increasing the number of workers in tandem is not sustainable given our manpower constraints. We cannot keep increasing the number of workers as the demand for cleaning services increases, simply because we do not have enough people. Transforming the industry is thus necessary to improve productivity, promote growth and create better jobs. When we say to improve productivity, we do not mean you do a lot more work. We meant you do work in a smarter and more efficient way, so that you can get more done within the same number of hours, for instance.

4. It is with these objectives in mind that we launched the Environmental Services Industry Transformation Map (ES ITM) in December last year. Under the ES ITM, companies can tap on government support schemes to adopt new technologies and job redesign solutions to improve efficiency and productivity. Last month, we launched the Productivity Solutions Grant which allows firms to recover up to half the upfront cost of adopting commercially-available and proven technologies such as the autonomous floor scrubbers and smart compactor litter bins. I hope companies will leverage these support schemes to improve operational efficiency and productivity, and make the jobs of the workers easier and less menial.

5. As we continue to ramp up our efforts to help the environmental services sector transform, some of our cleaners may have concerns that your jobs will be replaced by technology. The fact is technology makes your jobs easier, safer and smarter as laborious, repetitive and routine tasks can be reduced with the help of automation. Jobs can also be redesigned cleaners can take on higher value-added roles or tasks, such as operating equipment and machines, instead of using the broom or mop to clean manually. This makes the job more attractive, and perhaps it will help our companies to retain workers as well. After all, employees are at the heart of the success of companies.

6. On this note, let me congratulate our cleaners who are with us today. All of you have been nominated by your companies to receive an award in recognition of your outstanding performance and contribution. So let's give our cleaners here a big round of applause. Congratulations! As part of the recognition, Karcher, together with EMAS, NEA as well as Singapore Zoo, have organised this outing for you and your family at the Singapore Zoo. I hope you will really enjoy today's outing at the Zoo, and have a wonderful time with your family, as well as friends from the industry.

Thank you very much.

Mr Kazuhisa Goto,

Managing Director, Ricoh Asia Pacific Pte Ltd,

Ms Jacqueline Tan,

Assistant Chief Executive, Sentosa Development Corporation

Ladies & Gentlemen,

1 Good morning. It is my pleasure to join you today to plant trees here in Sentosa, as part of Ricoh's annual Eco Action Day Campaign. This place brings back memories for me. Sentosa is a very special place for those who are around my age. We grew up enjoying the attractions in Sentosa, particularly Fort Siloso, which was one of the first attractions to open in Sentosa. It was a coveted place to visit as it was then ticketed.

### **3P PARTNERSHIP IN THE YEAR OF CLIMATE ACTION**

2 I hope you are already aware that we have designated 2018 as the Year of Climate Action to raise awareness on the need to take individual and collective action to fight climate change. We have been urging organisations, educational institutions and individuals to take a pledge to fight climate change.

3 I am greatly encouraged by the support that we have received. When we started, we targeted 100,000 pledges, and I thought that may be too many. We met that target in March fairly quickly when we celebrated the Singapore World Water Day. We crossed the 200,000 mark in June, when we celebrated World Environment Day. We have now achieved over 300,000 pledges. Not only are the pledges a reflection of the momentum that has gathered in the Year of Climate Action; they are an achievement made possible through our Climate Action Champions from the Public, Private and People, or 3P, sectors.

### **CLIMATE ACTION CHAMPIONS IN THE PRIVATE SECTOR**

4 Under the Paris Agreement, Singapore has pledged to reduce our emissions intensity by 36 per cent from 2005 levels by 2030, and to stabilise our emissions with the aim of peaking around 2030. The Government has put in policies and infrastructure to mitigate our emissions. But we can only do this successfully with the collective effort of our 3P partners to achieve this goal. I am heartened that many corporate organisations have taken substantive climate actions and encouraged others to do the same.

5 As a President's Award for the Environment recipient, Ricoh's sustainability and climate action efforts stands tall among our climate action champions. They raised awareness of the Sustainable Singapore Movement amongst local Japanese students by translating Sustainable Singapore storybooks into Japanese and printing them. Marina Barrage, which we are celebrating our tenth anniversary today, also has its first Japanese language brochure translated and printed by Ricoh.

6 As part of Ricoh's Eco Action Day 2018 campaign, Senior Minister of State for the Environment and Water Resources Dr Amy Khor participated in the Industry Roundtable in May 2018. At the Roundtable, she engaged the private sector on furthering Sustainable Development Goal 9 of building resilient infrastructure, promoting inclusive and sustainable industrialisation, and fostering innovation. As mentioned by Mr Kazuhisa, the 315 saplings we are planting today represent the number of organisations which have made an Eco Action Day pledge and contributed to climate action.

7 I am also happy to see Ricoh's partners, such as Keppel Land, Keppel REIT, PacificLight Power, Mitsubishi Electric Asia, Sunseap, Interface, and Singapore Pools actively supporting Ricoh's Eco Action Day campaign. Keppel Land and Keppel REIT have been partners of Eco Action Day since 2014. Through active engagement and outreach, 192 tenants under Keppel Land and Keppel REITS have made corporate pledges towards a greener environment. I hope to see more like-minded companies coming together to create a bigger impact.

## **PUBLIC SECTOR TAKING THE LEAD IN ENVIRONMENTAL SUSTAINABILITY**

8 The public sector too has been doing our part for climate action and environmental sustainability. In addition to the Public Sector Sustainability Plan, which sets targets for electricity savings, water savings, and green building adoption, many agencies have taken their climate action pledge.

9 Sentosa, where we are gathered today, is another good example of our environmental sustainability efforts. As the public agency responsible for developing and managing this island, SDC is committed to running Sentosa as a sustainable leisure and tourism destination for all. Ms Jacqueline Tan had shared SDC's gold, blue and green efforts, and how they are conserving heritage and enriching biodiversity earlier. I will elaborate on their public engagement and climate action efforts. While major changes are in store for Sentosa as part of the Government's Masterplan for the Greater Southern Waterfront, these will be done with minimal impact to the environment, and taking climate change into consideration. In addition, SDC has actively worked to raise environmental awareness of the public through activities such as nature walks and public talks. They have also worked closely with corporates like Ricoh to host environment-related activities on the island as part of joint community outreach efforts.

## **CONCLUSION**

10 As we celebrate the success of Eco Action Day, let us remember the pledges that we have made and consistently act on them. There is a Chinese proverb that “one generation plants the trees and the next generation enjoys the shade”. May the saplings we plant today give our children a better tomorrow.

Thank you.

Mr Edwin Khew, Chairman, Sustainable Energy Association of Singapore;

Mr Adnan Amin, Director General, International Renewable Energy Agency;

Distinguished Guests,

Ladies and Gentlemen,

## **A. INTRODUCTION**

1. It is a pleasure to be here again at the Asia Clean Energy Summit (ACES). Two years ago, I was here to launch the world's largest floating solar photovoltaic (PV) testbed of 1 Megawatt peak at Tengeh Reservoir. Since then, ACES has grown from strength to strength. This year, as many as seven conferences are being hosted and co-located together with ACES. I am glad to see so many thought leaders from the clean energy space gathered here today, and I thank the Sustainable Energy Association of Singapore (SEAS) for making this possible.

## **B. ADOPTION OF CLEAN ENERGY IS VITAL FOR CLIMATE ACTION**

2. The strong interest and growing investments in clean energy are timely, as the international community works towards finalising the Paris Agreement Work Programme at the 24<sup>th</sup> Conference of Parties in Katowice, Poland. As a responsible global citizen, Singapore is doing our part. We have pledged to reduce our emissions intensity in 2030 by 36 per cent from 2005 levels, and to stabilise our emissions with the aim of peaking around 2030.

3. Investing in renewable energy is one of the strategies under our Climate Action Plan. Singapore has an ambitious target to increase our adoption of solar energy to 350 Megawatt peak by 2020, and to 1 Gigawatt peak beyond 2020. We welcome the partnership of all stakeholders as we forge ahead in the global energy transition.

## **C. POSITIONING SINGAPORE AS A GLOBAL HUB FOR CLEAN ENERGY INVESTMENTS**

4. Global opportunities in clean energy are growing rapidly, underpinned by this global transition towards a low-carbon future. A study released by the International Renewable Energy Agency (IRENA) last year showed that the clean energy space is one of the fastest growing sectors in terms of employment and investment. In Southeast Asia, there

could be as many as 2.2 million jobs in the clean energy sector by 2030, from around 600,000 in 2016.

5. I am pleased to announce that in Singapore, recent investments in the clean energy space are expected to generate about 1,000 professional jobs and S\$180 million in annual business spending in the next five years.

6. Our companies are leveraging new green growth opportunities in our region to innovate and transform. Today, Singapore Power Group (SP) will be signing a Memorandum of Understanding (MOU) with JTC Corporation to develop a smart energy grid in Punggol Digital District, home to technology firms in key growth sectors such as digital and cybersecurity. Under this MOU, JTC and SP will drive the design and integration of smart energy solutions in the areas of renewable energy and electric mobility. With the deployment of the smart grid across buildings in the District, we hope to reduce carbon emissions and deliver energy savings.

7. More clean energy companies are also choosing to invest in Singapore. I am heartened that global utilities such as ENGIE and EDF will be establishing their Asia-Pacific headquarters in Singapore and embarking on exciting projects. Through its District Cooling Centre of Expertise, ENGIE will support the development of new district cooling projects in Singapore and in the Asia-Pacific region, while EDF is developing microgrid solutions on Semakau Island in partnership with the Nanyang Technological University (NTU) to serve the Southeast Asian market.

#### **D. SINGAPORE'S STRONG PROGRESS IN FLOATING SOLAR PV DEMONSTRATES LEADERSHIP IN CLEAN ENERGY INNOVATION**

8. Singapore is land-scarce, but we have turned this constraint into opportunity by supporting innovative deployment methods for urban solar. In particular, we have made much progress in floating solar PV over the years.

9. PUB, Singapore's National Water Agency, has called for studies to explore floating solar PV at four reservoirs, namely Bedok, Lower Seletar, Upper Peirce and a larger-scale 50 Megawatt peak system at Tengeh. Together, these four reservoirs would have a total solar capacity of 60 Megawatt peak and the solar energy generated will help meet PUB's energy needs and reduce our overall carbon footprint, whilst contributing to our national solar targets.

10. On this note, I am happy to update that the environmental and preliminary engineering studies at Tengeh Reservoir have been completed. The results show that there will be minimal impact on our environment and water quality, with a floating solar PV system. This 50 Megawatt peak system at Tengeh Reservoir will be the first large-scale floating solar PV system in Singapore and is targeted to be deployed in the next three years. PUB will be calling the tender for the detailed design and deployment in 2019.

11. We are also seeing very strong interest in renewables from the private sector. To support this, I am pleased to announce the launch of a Request for Information (RFI) for a commercial floating solar PV system at Kranji Reservoir. Led by the Economic Development Board (EDB), the RFI seeks to assess the feasibility of deploying a much larger 100 Megawatt peak floating solar PV system, and to identify a private sector user to consume the solar energy generated from this project. We are mindful of any impact to the surroundings, and the selected company will have to undertake comprehensive environmental studies and consult relevant stakeholders before any decision on implementation is made.

12. If successful, this project could rival some of the world's largest floating solar PV systems and anchor Singapore's position as a global leader in floating solar PV

13. The adoption of floating solar PV is an exciting new area and there is much potential for growth. I am pleased to learn that SERIS has co-authored a first-of-its-kind Guidebook on Floating Solar PV with the World Bank and the International Finance Corporation (IFC), which will be launched later. This Guidebook aims to raise awareness and share information on floating solar PV technology.

14. Singapore will continue to push the boundaries of solar innovation and adoption in Singapore. Beyond our reservoirs, we are also exploring sea-based floating solar PV systems off Singapore's coast, as well as integrating solar PV into our building facades to maximise generation of solar energy. We are working with SERIS, NTU and the Agency for Science, Technology and Research (A\*STAR) to update the Solar PV Roadmap for Singapore. When completed, this roadmap will provide a blueprint on pathways to achieve higher solar deployment in Singapore in the medium- and long-term.

## **E. CONCLUSION**

15. To conclude, the world is at an unprecedented age of opportunity to transform the way we generate and consume energy. And we must do so, for the sake of our planet.

Singapore is committed to do our part. Through collaboration and innovation, we – government, businesses, investors, and individuals – all play an important role in transforming our energy landscape to pave the way for a low-carbon future. On this note, I wish all of you a fruitful conference. Thank you.

Er Edwin Khew, Chairman of Sustainable Energy Association of Singapore (SEAS)

Ladies and Gentlemen,

1. It is my pleasure to join you this afternoon.
2. The recent UN Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C was a grim reminder on the need to take urgent action to reduce our carbon emissions. Notably, a commentary by the Asian Development Bank (ADB) in *The Business Times* last week underscored the importance of increasing global investment into clean energy, and for all countries, particularly in the Asia-Pacific, to embrace renewable energy. Hence it is timely that we are focusing on the adoption and development of clean energy today.

#### Clean Energy & Singapore

3. As energy demand in Singapore grows, we must continue to explore options that meet our needs in a secure, competitive and sustainable manner. Among the clean energy options, solar energy is the most feasible for Singapore. We plan to raise the adoption of solar power in Singapore to 350 Megawatt peak by 2020, and to 1 Gigawatt peak beyond 2020. Initiatives like the SolarNova Programme and the installation of solar photovoltaic (PV) panels on the rooftops of HDB blocks are contributing to these targets.
4. We are also investing in innovative solar technologies to overcome our land constraints. At the ACES opening ceremony yesterday, Minister for the Environment and Water Resources Masagos Zulkifli spoke on PUB's plans to explore floating solar PV systems at four of our reservoirs. He also spoke about a Request for Information, led by EDB, to assess the feasibility of deploying a commercial floating solar PV system at Kranji Reservoir. These floating solar initiatives could potentially supply up to 160 Megawatt peak of solar energy, which is equivalent to taking about 19,000 cars off the road annually.

#### Opportunities in Clean Energy

5. Regionally and globally, there are growing opportunities in renewables and clean energy. The ADB's Strategy 2030 indicates that 75% of its committed operations would support climate change mitigation and adaptation by 2030, and climate finance from ADB's own resources would reach US\$80 billion cumulatively from 2019 to 2030. The International Energy Agency notes that the share of renewables in meeting global energy demand is expected to grow by a fifth to reach 12.4% in 2023. It is opportune for companies to adopt clean energy, and leverage the prospects for innovation and growth.

#### PowerACE 2018

6. I am inspired to see so many clean energy start-ups here today, which bodes well for the development of the clean-energy ecosystem in Singapore. This is an excellent

platform to share your ideas, receive valuable feedback, and perhaps bring them a step closer to commercialisation.

### Conclusion

7. I would like to commend SEAS for their tireless efforts in promoting clean energy in Singapore. The working group mentioned by Er Edwin earlier for start-ups to share their ideas and innovations with established industry professionals, is an excellent initiative. Such efforts will go a long way in growing and sustaining the clean energy sector in Singapore.

8. I would like to encourage everyone to continue your good work and contribute to the development and vibrancy of the clean energy space. I wish you all a fruitful event. Thank you.

Ms Esther An, Chief Sustainability Officer, City Developments Limited,  
Ladies and Gentlemen,

Good afternoon. It is my pleasure to join you for the Youth4Climate Fest 2018 at our UNESCO World Heritage Site, the Singapore Botanic Gardens.

2 Many of you are probably aware that climate change has led to warmer weather and more frequent flash floods in Singapore. But you may not know the threat that this poses to our plant diversity and food security. To build up the resilience of our flora against climate change, the Singapore Botanic Gardens established Singapore's first seed bank in April this year, to conserve seeds of threatened plant species from Southeast Asia. This is merely one of many adaptations that we are making as we confront the multi-faceted challenges posed by climate change.

3 Long-term planning has been critical to the development of our climate adaptation measures. Not only do they take time to execute, they also cost us a lot of money. One example is the investments we have made to address the risks of flooding as we face more intense and frequent rainfall. The Government has spent \$1.2 billion in drainage improvement works since 2012. We will spend another \$500 million in the next two to three years. One of the measures we have taken is the development of a large detention tank to temporarily store storm water during heavy rainfall. The Stamford Detention Tank, which we opened last month, can store as much water as 15 Olympic-sized swimming pools. When there is a heavy downpour, excess storm water from the drains along Holland Road will flow into the detention tank, and reduce flood risks around Orchard Road.

4 Besides adapting, we also need to mitigate. That is why we made 2018 the Year of Climate Action, to rally Singaporeans to take action together against climate change. I am heartened that many of our youths today are showing an active interest in environmental issues. In August this year, I spoke to IKEA Singapore's Young Designer Award finalists on the design of their prototype products, which aim to rethink and change the way energy is consumed or generated in Singapore. The quality of these prototypes are impressive, and assured me that our youths have the potential to make immense contributions. I would like to encourage the youths with us today to think of how you too, can formulate solutions to reduce carbon emissions. You can also become an agent of change by reaching out to your peers and the wider community, and encouraging them to lead a sustainable lifestyle.

5 As one of the earliest companies to make their Climate Action pledge, CDL actively champions climate action to the public. In support of World Environment Day 2018, CDL answered the call by UN Environment to #BeatPlasticPollution with three installations made from recycled plastics. Recently, they also initiated and organized the Sustainable Development Goal City Challenge with public agencies to raise awareness on the close relationship between green buildings and good health.

6 I am thankful to City Developments Limited for empowering our youths today by providing a creative platform for them to express their passion for the environment and wishes for the future through music. Together with other partners from the Public, Private and People sectors, we can encourage our youths to take more active steps towards a sustainable future. I look forward to seeing you shine at the concert today and beyond.

Have a wonderful evening ahead. Thank you.



Mr Zainal Sapari, Assistant Secretary-General, NTUC, and MP for Pasir Ris-Punggol GRC

Mr Milton Ng, President of Environmental Management Association of Singapore (EMAS)

Ms Melissa Tan, Chairman of Waste Management & Recycling Association of Singapore (WMRAS)

Ladies and Gentlemen,

1. It is my pleasure to join you this morning at the first ever Environmental Services Workforce Day.

2. Singapore has come a long way in our green and clean journey. In the 1960s, before independence, Singapore was a congested, polluted city with a poor sanitation and waste management system. Some of us might even remember the days when sanitary waste was collected in a bucket under a hole.

3. Today, we see a very different picture – proper waste management infrastructure, and high standards of cleanliness and hygiene in all of our shared spaces. Having a clean and green environment provides many benefits to our people, for example, better physical health, mental well-being, and more options for recreational activities. In fact, many Singaporeans see our clean environment as a source of national pride.

4. This would not have been possible without the contributions of the people in this room today. With your commitment and years of hard work, Singaporeans are able to enjoy a clean environment.

### **Industry Role Models**

5. Allow me to share the stories of three outstanding individuals who have demonstrated passion and dedication to their jobs.

6. The first is **Mr Abdul Hamid bin Abdul Razat**. He has been with waste management company RVAC Pte Ltd for one year. His career began in another sector — he worked as

a Cleaner in a commercial building for 25 years. One day, he observed the operations of a Pneumatic Waste Conveyance System (PWCS) by chance, and was impressed by its technology. He decided to learn the necessary skills and joined RVAC as a member of its PWCS crew. His learning journey did not stop there. He continually upgraded himself, picking up process planning and soft skills along the way. Abdul Hamid is now a Crew Team Leader — he manages his team and also helps to improve workflow processes and service delivery to better meet clients' expectations.

7. Another individual I wish to highlight is **Mr Kunasegar S/O Velayudhan**, a Supervisor at Horsburgh Integrated Services Pte Ltd. He first joined the cleaning sector in 1986 as a General Cleaner. Over the years, he has completed 10 Workforce Skills Qualifications (WSQ) courses to hone his technical and supervisory skills. Mr Kunesagar has been based at Tengah Air Base since 2011, and now leads a team of 40. Workers are happy under his guidance, and clients appreciate his 'Can Do' spirit and efficiency. His personal accomplishments have motivated him to stay in the industry.

8. The third individual I wish to highlight is **Ms Teh Geok Lian**. She has been a Senior Executive at Chye Thiam Maintenance Pte Ltd for the past 11 years. Ms Teh plans and executes building and facilities maintenance for clients. She has a positive work attitude, and has established good rapport with her clients and cleaning teams to ensure quality service delivery. This has resulted in her excellent track record of having near zero Liquidated Damages (or "LD") for all the contracts under her in over 11 years!

9. I am sure there are many more inspiring journeys and stories amongst the 300 environmental services workers here today. All of you deserve a round of applause.

### **Towards a more professional image**

10. Your contributions are important to the nation, but it is not easy work, and the Environmental Services Industry may not be perceived as the career of choice by many. Under the Environmental Services Industry Transformation Map (ES ITM), the Government is working with the unions and trade associations to make jobs in this industry safer and smarter through technology adoption and job redesign.

11. As a start, we need to look professional so that we can portray a positive public image, and attract talent to do our work well. This is why **we are launching the first ever “Guide on Uniforms for the Industry”**, as part of our efforts to develop a more professional workforce. The Guide, which can be found on the National Environment Agency’s website, focuses on three aspects – comfort, safety, and appearance – and will set the baseline standard for the industry. We hope that companies will refer to the Guide when designing their uniforms or office attire.

### **Tripartite collaboration to realise the Worker 4.0 Vision**

12. Recently, Mr Ng Chee Meng, Secretary-General of the National Trades Union Congress (NTUC), shared the Labour Movement’s vision of Worker 4.0. As we move into the era of a digital workplace, it is important for our workforce to acquire adaptive, technological and technical skills to keep pace with the evolving working environment. Transforming the environmental services industry to meet the needs of a digital economy is what we want to achieve through the ES ITM. NTUC will continue its efforts to ensure that workers are Ready for new jobs, Relevant with new skills, and Resilient in embracing new ways of working.

13. It is thus opportune that on this ES Workforce Day, a Memorandum of Understanding will be signed between NTUC, NEA, Skillsfuture Singapore (SSG), Workforce Singapore (WSG), EMAS, WMRAS and NTUC’s e2i to ink our tripartite partnership in support of realising the Worker 4.0 Vision. Parties to the MOU will identify the necessary skill sets and training modules for our workers to prepare them for the future workplace.

### **Guardians of our environment**

14. Let me end by saying again that the achievements in our clean and green journey would not have been possible without you. As the guardians of our environment, I hope you will continue to pursue excellence in your work, and work with us to bring the workforce to the next level — one that is attractive, highly-skilled and offers good career prospects for Singaporeans.

Thank you.



Your Excellencies,

Ladies and Gentlemen,

1. Thank you for joining us this afternoon. It is a pleasure to see so many familiar faces as we reflect on our collective efforts on climate action this year.

### **THE YEAR OF CLIMATE ACTION**

2. Since the start of the year, we have seen more scientific reports and evidence on the threats posed by climate change. The recent Special Report on Global Warming of 1.5°C by the Intergovernmental Panel on Climate Change is another sobering reminder of the potentially devastating impacts of climate change. A recent scientific report issued by 13 US federal agencies warned that global warming would knock off as much as 10% of the US economy by the end of this century – almost \$500bn annually from costs of deaths, damages and productivity losses.

3. Our decision to designate 2018 as the Year of Climate Action was first announced last November at the United Nations Framework Convention on Climate Change, or COP-23 in Bonn, Germany. We realised that although the government had clear plans to mitigate and adapt to climate change, there was only latent awareness among Singaporeans that climate change had led to higher temperatures and extreme weather conditions. More importantly, this did not generally translate into action to reduce carbon emissions. We realised that it was important to raise national awareness and the urgency to act – and to act together – not just the government but with the people, public, and the private sector.

4. As I was representing Singapore at COP-23, I took the initiative when delivering Singapore's National Statement, to announce that 2018 would be Singapore's Year of Climate Action, to rally Singaporeans to act together for a sustainable Singapore. Thus the birth of the YOCA 2018!

### **PARTNERSHIP IN MITIGATING CLIMATE CHANGE**

5. Since then I'm glad my Cabinet colleagues and senior ministers have often referred to YOCA2018 as a rallying point to bring Singaporeans together to take climate action. During the recent launch of Clean and Green Singapore at the beginning of November, Prime Minister Lee Hsien Loong referred to it and urged everyone to be a steward for our environment and to take climate action. He observed that "Just like our 'Save Water' campaign where every drop counts, every climate action counts."

6. Why do I call the campaign a success? Let me count the reasons:

a. We are heartened to have received more than 300,000 pledges from individuals, organisations and educational institutions.

b. Over 800 climate action related events were initiated and organised by our 3P (People, Private, and Public) partners, many of whom are present here today. Of these, 300 were supported by our Climate Action Grant. This overwhelming support from the ground is encouraging. While it is not possible to share all of these events, we have captured some highlights in a video which will be screened later.

c. We even gave birth to climate action champions some of whom I will highlight. The Singapore Green Building Council helped raise awareness on the role of green buildings in addressing climate change, through its *Live.Work.Play.Green* campaign on public buses. Our educational institutions and grassroots organisations have stepped up efforts to encourage their students and residents to lead a sustainable lifestyle and reduce their carbon footprint through simple actions such as reducing energy consumption and recycling right.

d. We formed the Climate Action SG Alliance in April, which comprises 15 corporate, educational, and civil society leaders. This was a result of a dialogue with NGOs in January where the participants suggested forming a 3P alliance to drive climate action efforts. We have invited the Alliance to share with us the progress of their efforts and upcoming projects at today's lunch.

e. The Public Sector has also taken the lead in adapting to and mitigating climate change. All Ministries have taken the climate action pledge and will reduce their plastic, water and electricity consumption.

## **THE GOVERNMENT WILL EXECUTE ITS CLIMATE ACTION PLAN**

7. The government is committed to meet its Paris Agreement commitments and adapt to climate change impact. We have opened the Tuas Desalination Plant and the Stamford Diversion Canal in June and September respectively, to increase our resilience against extreme weather conditions such as droughts and flash floods.

8. To reduce our carbon emissions, we have passed the Carbon Pricing Bill, to price carbon emissions right. This provides a framework for implementing the carbon tax on large emitters of greenhouse gases. The Ministry of Trade and Industry has also announced an enhanced set of Industry Energy Efficiency grant schemes to encourage industrial facilities, including small and medium-sized enterprises (SMEs), to be more energy efficient. Indeed, when we collect our carbon tax from 2020 onwards, we expect a revenue of close to \$1 billion in the first five years. The government is prepared to spend more than this in the initial five years to support worthwhile projects which deliver the necessary abatement in emissions. We are setting the carbon tax rate at \$5/tCO<sub>2</sub>e; it will be applied uniformly to facilities that emit more than 25,000 tCO<sub>2</sub>e of emissions annually; the tax rate will be reviewed by 2023 – we intend to increase the tax to between \$10/tCO<sub>2</sub>e and \$15/tCO<sub>2</sub>e by 2030.

9. On the regional and international front, we convened the Special ASEAN Ministerial Meeting on Climate Action, or SAMCA, and the Expanded-SAMCA in July. At these

meetings, ASEAN member states and the Plus Three countries – China, Japan, and the Republic of Korea – reaffirmed their commitment to the Paris Agreement and committed to step up regional action to address climate change. Singapore launched the Climate Action Package to support ASEAN member states' climate plans and actions. In July, we also presented our first Voluntary National Review at the UN High Level Political Forum on Sustainable Development, where we shared Singapore's sustainable development journey and implementation of the Sustainable Development Goals.

## **BUILDING A RESILIENT FUTURE BEYOND YEAR OF CLIMATE ACTION**

10. Taking climate action cannot be just a year-long affair. This is why the theme for today's event is *Building a Resilient Future: Beyond Year of Climate Action*. Our collective efforts must continue beyond 2018, especially since the window to keep the rise in world temperature within 1.5 degree Celsius from pre-industrial levels is closing rapidly. To sustain the momentum, we will organise a Climate Action Week next year. I hope all of you will come on board, and make the Climate Action Week a collaborative effort by the 3P sectors.

11. To successfully mitigate climate change, we have to target the reduction of carbon emissions from multiple sources. A significant source is waste generation. We will accelerate our efforts towards zero waste in 2019, and strive to build a circular economy that will extract maximum value from precious resources and convert trash to treasure. We will transform our industries to bring about new businesses and job opportunities. My vision is for Singapore to be an urban mine, where resources have many life cycles. And from this, to lead our region to partner us in our quest to be good stewards to our planet. I invite you to share your ideas with us to realise our vision of a Zero Waste Nation.

## **CONCLUSION**

12. Let me conclude. The Government will continue to take the lead by developing infrastructure, frameworks and industry transformation maps, but no government can do it alone. Collaboration among the public agencies, industries, civil society, and individuals remains a force multiplier in our journey to build a resilient and sustainable Singapore.

13. Thank you for being with us on this historic journey, and I look forward to your continuous support.

Excellencies,

Distinguished Delegates,

Ladies and Gentlemen,

It is an honour to participate in the Sixth Ministerial Forum. On behalf of Singapore, I would like express my appreciation for the warm and gracious hospitality provided by the Government of the Philippines through the Department of Environment and Natural Resources. I would also like to thank PEMSEA for your effort in organising the EAS Congress 2018.

2 Let me first outline Singapore's approach to sustainable development and coastal and ocean management. As a small island developing state with no natural resources, Singapore has always sought to achieve economic development in tandem with environmental protection and social inclusion. Given our limited land, we have taken a pragmatic approach in balancing our needs. Singapore's coastal areas are heavily utilised for industry, particularly port operations, ship building and petrochemical industries, as well as housing and recreational areas for our population. And yet, because of our careful approach to development, Singapore's coastal and marine environment has continued to support a surprisingly diverse range of habitats and biodiversity. Singapore's inter-tidal and sub-tidal reef areas, at just over 12 square kilometres in size, are home to over 250 hard coral species, 12 seagrass species, 100 marine fish species, and countless others.

3 Since the adoption of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) in 2003 and the update in 2015, the SDS-SEA has been aligned closely to the Sustainable Development Goals under the United Nations' 2030 Agenda for Sustainable Development. Singapore has also ensured that our SDS-SEA efforts are in line with broader sustainable development efforts. As part of the Da Nang Compact, Singapore has also completed our State of Coasts and Oceans Report 2018 on our progress in implementing SDS-SEA.

4 In 2009, Singapore adapted PEMSEA's Integrated Coastal Management principles to our local context by incorporating an urban perspective in the framework. Singapore's Integrated Urban Coastal Management has enabled us to carefully manage and preserve our fragile marine environment in a holistic and integrated manner for future generations. We have established Singapore's first marine park, the Sisters' Islands Marine Park which spans 40 hectares and houses a wide range of marine habitats, including coral reefs, sandy shores and seagrass areas. The Marine Park showcases our unique biodiversity within the sub-tidal reefs, inter-tidal areas and coastal forests, and educates visitors about our marine natural heritage. We have also developed the Marine Conservation Action Plan (MCAP), which is grounded in science and guides our efforts in conserving Singapore's marine habitats and biodiversity. Physical safeguarding,

community stewardship, habitat enhancement and species recovery are the four main thrusts under the MCAP.

5 Singapore takes the issue of marine pollution very seriously as it is a key challenge facing the seas in our region. We have stringent policies to prevent marine pollution from land-based sources. For example, all discharge of trade effluent, oil, chemicals, and sewage are tightly controlled so that they do not cause pollution to our watercourses. We also enforce strict anti-littering laws, and have an integrated waste management system to minimise waste at source and collect all waste for proper disposal so that waste will not be washed into the ocean. Waterway clean-up measures prevent land-based litter, including plastic waste, from reaching the sea. In addition to preventing pollution, Singapore conducts regular water quality monitoring of inland water bodies and coastal areas to ensure that they meet international water quality standards.

6 Going forward, we will implement mandatory reporting of plastic and packaging waste data and waste reduction plans by 2020, and are exploring the Extended Producer Responsibility (EPR) framework for packaging, which will address the upstream components of land-based sources of marine pollution. These would include single-use plastics. However, Government efforts are not enough. Fostering shared ownership in keeping the environment clean and minimizing waste is key. We partner the People, Private and Public sectors on initiatives that reduce waste generation and promote recycling. Environmental groups help raise awareness and encourage the public to keep our city and watercourses clean.

7 Singapore is also committed to developing a maritime transport industry that is responsible and sustainable. To promote clean and green shipping in Singapore, the Maritime Singapore Green Initiative (MSGI) was launched in 2011 to reduce the environmental impact of shipping and shipping-related activities on the coastal and marine environment. The Maritime Port and Authority of Singapore (MPA) has pledged to invest up to S\$100 million under the MSGI's expanded programmes, namely, the Green Ship Programme; the Green Port Programme; the Green Technology Programme; the Green Awareness Programme and the Green Energy Programme. Ship owners are also encouraged to adopt environmentally-friendly practices and reduce the environmental impact of their operations through these programmes.

8 Singapore was one of the first countries in Asia to ratify all six Annexes of the International Maritime Organization's (IMO) MARPOL Convention, the main international convention to prevent pollution by ships, including prohibiting the discharge of plastics into the sea. MPA also works with the IMO to provide capacity building courses for countries under the MPA-IMO Third Country Training Programme (TCTP), which offers courses on the implementation of relevant IMO instruments, including those that protect the marine environment through the prevention of pollution from ships.

9 The Seas of East Asia are an important resource. We recognize that PEMSEA has been working closely with its partners to contribute to the sustainable development and management of the region's marine and coastal resources. More can be done. We are confident that the expertise and capacities that PEMSEA has helped to build up will continue to make a positive impact.

10 Singapore strongly supports the Ministerial Declaration that will re-affirm our commitment to sustainable coastal and marine development in our region. It is our hope that the Seas of East Asia will continue to be a precious resource. I am confident that, collectively, we can achieve sustainable coastal and marine development for the benefit, not just of our current, but also our future generations.

11 Thank you for your kind attention.

Mr President,

1. Congratulations on your election as the President of this Conference. Thank you for the warm hospitality and excellent arrangements.

2. As host of two previous COPs, Poland is well placed to lead us in our efforts to ensure that the Paris Agreement is translated into a truly functioning and effective regime to strengthen the global response to the threat of climate change. I am appreciative of the Presidency's efforts in galvanising political commitment on other important issues such as forestry. Singapore is fully committed to work with Parties under your capable leadership to achieve a successful outcome for COP-24. I would like to express my sincere gratitude for Fiji's outstanding stewardship for the past year, which has set a strong foundation for our work here in Katowice.

#### Urgency for Global Climate Action

3. The recent Intergovernmental Panel on Climate Change (IPCC) Special report on 1.5°C has warned that the global warming threshold may be breached as early as 2030 if current warming trends continue. This will have dire consequences for many countries, particularly Small Island Developing States (SIDS). Singapore is one of these low lying island states that is vulnerable to sea level rise and severe floods from intense storms. Clearly, we need urgent, collective and coordinated efforts by all.

4. At a time when multilateralism is being challenged, COP-24 will be a key test of the multilateral system to deliver an effective response to the climate change challenge. COP-24 must send a strong and unequivocal signal that the world is united in advancing global climate action. We must build on the Paris outcomes to consolidate the nationally-determined system of pledges, and put in place a robust enhanced transparency framework and an effective global stocktake mechanism to drive ambition over time by all Parties. Success at COP-24 will be measured according to the following deliverables.

5. First, we must conclude a credible, durable and pragmatic set of guidance to operationalise the Paris Agreement. The Paris Agreement was not designed to be a "perfect agreement", but to enable all Parties to put their best foot forward and improve

ambition over time. The “Katowice Rulebook” must hence be an enabler, and not a barrier, for action. We can achieve a successful outcome if we stay faithful to the principles and political balance achieved under the Paris Agreement.

6. Second, the Katowice outcome needs to drive urgent climate action by all. The Talanoa Dialogue must help identify climate solutions and forge new partnerships between all stakeholders. It must also send a strong message for Parties to push the envelope on climate efforts to stay within the global temperature goals of the Paris Agreement. The Dialogue is not about “finger-pointing” but should maintain the spirit of the Pacific islands’ “Talanoa” tradition, that is, ask questions, share experiences and identify solutions together.

7. Third, COP-24 must deliver a package of decisions to support the implementation of the Paris Agreement by all. A rulebook is only effective if it can be implemented domestically by all Parties. We must ensure adequate support for developing countries, particularly SIDs and the Least Developed Countries, to implement the guidance. This includes enhancing support to: (a) meet the requirements of the Enhanced Transparency Framework; (b) develop and access finance for their NDC<sup>[1]</sup> implementation plans and 2050 low emissions strategies; and (c) enhance adaptation planning, and manage climate change related disaster risks.

#### Singapore’s Climate Actions

8. Singapore is fully committed to supporting global action on climate change, and not only because we are extremely vulnerable. It is because global action calls for everyone, big and small emitters, to come on board. Singapore calls on everyone to see climate change not just as an inevitable catastrophe but as an opportunity to transform the way we live, work and pursue economic growth in a sustainable way. Even if the actions needed to address climate change are costly, and require resources to be channelled away from other competing needs, we deem them as necessary. Acting pre-emptively will be less costly in the longer term, and we believe it is important to move Singapore towards a low carbon and climate-resilient future.

9. As a small city state with limited access to alternative sources of energy, there is a limit to how much we can do. But we will not allow our constraints to be barriers to action. Singapore will continue to rely on innovation and long-term strategic planning to overcome our natural constraints. The government has been co-investing in our industries to make them more energy-efficient and provide the necessary policy signals to engender the transformation needed for a low carbon future.

10. We have therefore submitted an ambitious but challenging target or NDC[2]. Even though our share of global emissions is only around 0.11%, we are taking bold steps to reduce our carbon emissions. To complement our existing suite of mitigation measures, Singapore will be the first country in Southeast Asia to implement an economy-wide carbon tax. The carbon tax, which will start from 2019 and apply transparently and uniformly without any exemptions, will incentivise the transition towards a low-carbon economy and adoption of low-carbon technologies.

11. To galvanise ground-up action, I announced at COP-23 in Bonn that Singapore would designate 2018 as the Year of Climate Action. The campaign was a success. We have received over 300,000 climate pledges[3] from all stakeholders, including all our government Ministries, even companies affected by the carbon tax. More than 800 climate action events were held, many in partnership with NGOs and the private sector – this is in excess of 2 events a day every day in 2018. 2018 has built strong momentum for climate action, but we know this cannot be just a year-long affair. We will continue to work with our stakeholders to raise awareness and act together to address climate change.

12. At the same time, we are taking timely and concrete steps to protect ourselves against the adverse effects of climate change. Our adaptation efforts consider the far-reaching effects of climate change on our infrastructure and people. It includes significant and costly infrastructure investments such as raising the height of coastal roads and new buildings, and enhancing our drainage and flood managements systems. I have three examples to share. First, our new Changi Airport Terminal 5 will be built at 5.5 metres above mean sea level. Second, we are establishing a dedicated food agency, the Singapore Food Agency (SFA), from April 2019 to safeguard and strengthen the

resilience of Singapore's food supply, particularly given the challenges caused by climate change. Third, we have just commissioned the Stamford Detention Tank, the size of 15 swimming pools, 10 storeys below ground, to address the frequent flooding of Orchard Road, our commercial district.

13. We are happy to note that the Global Climate Action 2018 report prepared by the UNFCCC Secretariat for the Talanoa Dialogue has recognised Singapore's cost-effective and efficient integrated water management approach as a good practice. We hope that these efforts, apart from strengthening our climate resilience, will be seen as part of our contribution to the global goal on adaptation.

#### ASEAN's Climate Action Response

14. As the Chair of ASEAN and the ASEAN Working Group on Climate Change, Singapore has worked to make climate change a priority for the region. At the recently-concluded 33<sup>rd</sup> ASEAN Summit in Singapore, ASEAN Leaders adopted the ASEAN Joint Statement on Climate Change, where they reaffirmed the region's commitment to the UNFCCC process and the Paris Agreement.

15. Singapore also convened the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and the expanded SAMCA in July, where ASEAN and China, Japan and the Republic of Korea reaffirmed the region's commitment to the Paris Agreement, and discussed ways to step up regional action to address climate change. A summary of our discussions has been submitted as input to the Talanoa Dialogue.

16. We also launched the ASEAN Smart Cities Network (ASCN), a collaborative platform for cities in ASEAN to work towards the goal of smart and sustainable urban development. 26 cities from all 10 ASEAN countries have been named as pilot cities and are developing concrete action plans to grow sustainably. Mayors and governors from ASEAN capitals also signed the Singapore Declaration on Environmental Sustainability on 7 July 2018 in Singapore. Cities and actors at the local level in ASEAN are committed to taking practical ground actions to address climate change and achieve sustainable development.

17. Singapore is also supporting the Southeast Asia Disaster Risk Insurance Facility (SEADRIF), which will be ASEAN's first regional catastrophe risk pool. The SEADRIF will be set up in Singapore by 2019 to address the rising natural catastrophe protection gap in the region.

18. ASEAN is making real progress. At the ASEAN Energy Ministers' meeting in Singapore on 29 October 2018, it was announced that ASEAN has exceeded its energy efficiency target, reducing energy intensity by more than 20% in 2016 compared to 2005 levels, well ahead of its 2020 target.<sup>[4]</sup> But we are not resting on our laurels. ASEAN has signed an MOU with IRENA in October to scale up renewable deployment further. ASEAN will continue with our efforts to implement the Paris Agreement and the 2030 Agenda for Sustainable Development.

#### Working with the International Community

19. Internationally, Singapore is a keen advocate of a multilateral, rules-based approach to addressing climate change. Singapore was one of the first 55 countries to ratify the Paris Agreement, contributing to its early entry into force. Singapore is also doing our part to support the efforts of fellow developing countries to address climate change and be more climate resilient. Approximately 123,000 officials from 170 countries have benefited from the capacity building programmes run under the Singapore Cooperation Programme in areas such as disaster management, education, health, water, and human resource management. To build on this, Singapore launched a Climate Action Package in July to help fellow developing countries build capacity in areas such as climate change adaptation strategies, disaster risk management and green climate financing. To enhance regional resilience capabilities, Singapore hosts the ASEAN Specialised Meteorological Centre (ASMC). The Centre launched a Regional Capability Building Programme in 2018 to build capabilities in the formulation of national adaptation plans.

#### Conclusion

20. Mr President, the Paris Agreement was a hard-fought agreement forged through the unity of purpose of all Parties. We must leave Katowice with a credible, durable and

pragmatic rulebook that enables all Parties to implement the Paris Agreement in good faith. Allow me to close by recalling the words of former UN Secretary General and a key champion of the Paris Agreement Mr Ban Ki-moon, “Climate change is a global challenge demanding global solutions. No one country can face it alone, no matter that nation’s political, economic or military might. From the richest to the poorest, we all share one planet, and we all have a stake in its survival.” [5]

Thank you, Mr President.

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[1] Parties’ climate pledges under the Paris Agreement are referred to as Nationally Determined Contributions (NDCs).

[2] Singapore’s NDC aims to reduce the country’s greenhouse gas emissions intensity by 36% from 2005 levels by 2030, and stabilise emissions with the aim of peaking around 2030.

[3] This includes more than 500 pledges from businesses, close to 40 pledges from NGOs and more than 300 pledges from educational institutions.

[4] The ASEAN Plan of Action for Energy Cooperation 2016-2025, among other objectives, seeks to reduce energy intensity in the ASEAN region by 20% from 2005 levels by 2020, and to increase the component of renewable energy in the ASEAN energy mix to 23% by 2025.

[5] Source: Article contributed by Ban Ki-moon to Time magazine on 8 October 2018. <http://time.com/5416793/climate-change-ban-ki-moon-trump/>

Ladies and Gentlemen,

1. I am happy to see many of us gathered here to mark another chapter in Singapore's efforts towards sustainable development. We have lined up an exciting programme here at Our Tampines Hub (OTH) this weekend. You can visit our partners' booths that showcase their innovations on reducing, reusing and recycling. There will be a tour later to see the wormery, eco-digesters and Eco garden. And we are privileged to have CEO and Founder of Miniwiz, Mr Arthur Huang, to share how his company innovates to design solutions for the circular economy, a concept you will hear a lot more of from today. I hope you will enjoy yourselves here this weekend and be inspired to take action.

### **2018 – A successful Year of Climate Action**

2. In 2018, we had a successful Year of Climate Action. Individuals, institutions and organisations stepped forward to take climate action. More than 340,000 of them pledged to reduce their carbon footprint. Collectively, we held more than 800 climate action related events across the 3P (People, Private, and Public) sectors – that's more than 2 events per day.

3. These efforts demonstrate our firm commitment to climate action and that we are doing this together. I am proud that the Year of Climate Action has shown that Singaporeans care, and has brought everyone closer together to take collective action against climate change.

### **2019 to be the “Year Towards Zero Waste”**

4. That is a good start, but we must not stop here. Climate change will have a growing impact on our lives, more on our children and even more on our grandchildren. We need to continue with our efforts to address climate change. Various ministries are implementing measures to address climate change: building a comprehensive public transport network and increasing green energy alternatives to name a few. We also take Climate Action when we address issues around waste.

5. To build on the success of our Year of Climate Action, we will designate 2019 as the Year towards Zero Waste. The aim is to imbue a consciousness within Singaporeans on the need to treasure our precious resources and to do our part to protect the planet. We need a paradigm shift. We need to adopt a circular economy approach.

6. Let me explain. Traditionally, we use resources in a linear fashion. Take for instance, a can of sardines. We make the cans, fill them with sardines, eat what we are able and throw the can and leftovers away. But one key aspect of the circular economy approach is to turn trash into treasure by reusing and recycling our resources endlessly – the can and even the unfinished food. So that same metal can be collected and reused after processing, and the food waste turned into useable products.

7. Another key aspect of the circular economy is to produce and consume sustainably. The majority of the world's greenhouse gas emissions come from the production and consumption of goods. A Norwegian study puts this figure at more than 60 per cent. Recognising this as a critical area, world leaders included “Responsible Consumption and Production” among the 17 United Nations Sustainable Development Goals. That is why becoming a Zero Waste nation is a key pillar of climate action.

8. Adopting a circular economy approach and striving towards zero waste is not just environmentally sustainable. It will also bring new economic opportunities for our companies, and good jobs for Singaporeans. One example is Australian Fruit Juice, or AFJ. AFJ is a local manufacturer and supplier of fruit juices. They produce waste fruit peels as a result. Instead of throwing them away, AFJ partners UglyGood, an upcycling solutions provider, to process these fruit peels as ingredients for producing organic cleaning agents. In doing so, they turn trash into treasure, generating new economic value from something that would have been thrown away. They have also created new green jobs as skilled workers would be required to perform the conversion process.

### **Building a Zero Waste Nation in everyday living**

9. A Zero Waste Nation may sound complex, but it is actually well grounded in our Asian culture. I recall my parents teaching me not to waste – don't waste food, don't waste electricity, don't waste water. Today, we teach our children the same. And this is what the Year Towards Zero Waste is about – where we consciously act to treasure our resources and protect our environment.

10. Similarly, the circular economy is all around us, including here at OTH. Every day, about 700kg of discarded food is sent to eco-digesters instead of waste bins. This is equivalent to 3,500 bowls of rice! These digesters convert the food waste to water which is used for washing, and fertiliser, which is distributed to Tampines residents for their gardens to grow food. Again, we turn food waste into something useful! There are other benefits. Since there is no food waste to be collected, OTH's general waste collector comes only once a day, instead of four times daily, reducing transport costs and emissions. Food waste segregation also means that recyclables in blue recycling bins are less likely to be contaminated. And, we all enjoy a clean, pest-free environment.

11. We have mobilised the community in Tampines to join this effort. I am proud that our residents at Tampines Greenlace have been diligently segregating their food waste at home, and bringing it down to a special bin on the ground floor, where the food waste is collected and sent to our OTH digesters. This pilot was supposed to last three months, but I am happy to announce that we will extend the project following positive feedback and requests from many residents to continue with it.

**A national consciousness for the environment as the foundation for the “Year Towards Zero Waste”**

12. The OTH and Tampines Greenlace projects show how everyone must do their part as we strive towards a Zero Waste nation. It can be as simple as bringing reusable bags to carry our shopping, or handing down used textbooks instead of throwing them away. Each of us can contribute to the environment in our own ways as we strive towards a Zero Waste Nation.

13. Every effort counts. Joined together, they are a powerful force for tackling the environmental challenges we face. Nature reminds us of this. Redwoods are among the world's tallest trees and they can be as tall as 100 metres – that's a 30 storey high building. But what's amazing about redwoods is not their height, but their roots. For such a tall tree the roots are actually not very deep. Instead, the roots of each redwood tree intertwine with that of another redwood. This is what gives the redwood trees collective strength to weather strong winds and storms – far greater than what an individual tree can withstand – even with deep roots. As we join together our individual efforts and forge a collective, national consciousness to care for our environment, we will likewise build the strength to overcome environmental challenges and build a sustainable Singapore. This will be a central theme in the Year Towards Zero Waste, and we will consult and co-create actively with the community.

14. I hope that our collective efforts will allow us to Save Semakau, our only off-shore landfill. Nas Daily showed Singapore and the world how impossible but beautiful Semakau is. But it will be completely filled by 2035 if we do nothing now. Let us take action to extend the lifespan of Semakau as part of our progress towards a Zero Waste Nation.

### **Highlights in the Year Towards Zero Waste**

15. There are many things that we can all look forward to in this Year Towards Zero Waste. We will launch public consultations for our inaugural Zero Waste Masterplan to foster shared ownership. I warmly encourage everyone to participate as we chart this journey together.

16. We will also launch the #RecycleRight movement to mobilise all Singaporeans to recycle right – by keeping recyclables clean, dry and free from food contamination. Also look out for our new video featuring today's emcee and our zero waste ambassador, Ms Denise Keller, after my speech.

17. The private and people sectors are our valuable partners in rallying Singaporeans in this Year Towards Zero Waste. We will start a 'Towards Zero Waste Grant' to support ground-up projects relating to zero waste. If you need inspiration, I encourage you to visit our partners' booths later.

### **Conclusion**

18. I believe that if we adopt the circular economy approach and do it right, we will conserve resources, preserve our environment and create new economic opportunities.

19. The products of the circular economy are not only profitable, but beautiful as well. Many of us know Tzu Chi has successfully engaged the community in practising not just 3, but 5Rs – reduce, reuse, recycle, repair and recover. But do you know that they are also converting used PET bottles into comfortable dry-fit shirts?

20. There is also Miniwiz. They produce durable furniture using only recycled materials. I can personally testify to this as I have one set of tables and chairs designed by Arthur himself just outside my office.

21. I hope you are now all excited about the upcoming year. Do stay tuned to our updates. Together, we can make Singapore a Zero Waste Nation.

22. I wish you an enjoyable time this weekend. Thank you.

Your Excellencies,

Distinguished Guests,

Ladies and Gentlemen.

Good morning.

It is an honour to join you today. I thank Minister Thani Al-Zeyoudi for inviting me, and congratulate him and his team for arranging an important and beneficial conference.

### **CLIMATE ACTION IN 2018**

2 2018 was an active productive year for Singapore on the climate front. We launched the Singapore Year of Climate Action to raise awareness, and encourage ground-up actions to address climate change. More than 800 activities were conducted with our partners from civil society, the corporate sector and the community, which would amount to two activities for every day of 2018. At the same time, we also got 340,000 pledges for climate action from the public. On the regulatory front, we implemented a carbon tax - the first in South East Asia - after adopting the Energy Conservation Act to regulate large consumers of energy - the industry in particular. We also pushed for greater adoption of solar power, and continued to invest in water supply and drainage infrastructure to increase Singapore's climate resilience.

3 At the regional and international fronts, we convened a Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and the Expanded SAMCA which involved other partners from China, Korea, as well as Japan. This is important because for climate action, we need to galvanise regional and global action. At the meeting, Singapore launched a Climate Action Package to help build capacity. I delivered Singapore's first Voluntary National Review on the implementation of the Sustainable Development Goals at the United Nations to reaffirm our commitment to sustainable development.

4 We concluded our Year of Climate Action by playing a key negotiation role at the UN Climate Conference in Poland last December to adopt the Katowice Climate Package which included the rules for implementing the Paris Agreement. With the rules in place, I hope all countries will accelerate efforts to implement our respective Paris Agreement commitments. Singapore will of course do its part.

### **INNOVATION FOR DENGUE CONTROL AND WATER SCARCITY**

5 We know that with climate change, there will be rising temperatures. In our tropical urban environment, this will lead to a higher incidence of vectorborne diseases, notably dengue, which accounts for 20,000 global deaths each year. Combatting dengue raises unique challenges for Singapore. First, the *Aedes aegypti* mosquito species, which is the main vector of dengue, is not indigenous to our region but has adapted very well to our tropical climate. If you want to know where it breeds, you just have to look around you – the mosquito doesn't fly very far. Second, breeding occurs indoors in our homes, in densely populated high-rise dwellings, which means that outdoor fogging is generally less effective. And third, there are large visitor movements in and out of the country, which increases the risk of spreading viruses and thus diseases across borders.

6 To stem this threat, we have turned to technology and innovation to prevent more severe consequences of dengue as a result of climate change. The Environmental Health Institute of the National Environment Agency has been studying the use of male *Aedes aegypti* mosquitoes carrying the *Wolbachia* bacteria to reduce the dengue mosquito population and lower dengue transmission. How does this work?

7 When a male *Wolbachia*-*Aedes* mosquito mates with an urban *Aedes aegypti* female mosquito that does not carry *Wolbachia*, their resultant eggs do not hatch. It's as simple as that. However, releasing male *Wolbachia*-*Aedes* mosquitoes could thus potentially suppress the dengue mosquito population in the community. In other words, we reduce the mosquito population by adding mosquitoes, a paradox of this innovation. The results have been promising, with 50% of *Aedes aegypti* mosquito eggs in the community shown to be non-viable in the field trials that we have conducted recently.

8 I believe that we are leading in this area to understand the behaviour of our released mosquitoes in an urban setting. It has, among others things, highlighted the challenges of ensuring uniform distribution of the *Wolbachia Aedes* mosquitoes in our high-rise landscape. We have discovered for example, that the mosquitoes do not like to fly high, so if you release them at the ground floor, you will find that they don't fly easily to the tenth floor or higher floors. You will actually have to release them up there.

9 This has spurred further innovation with local and international companies. By working with a local start-up company called Orinno Technology, we have developed a mosquito launcher that systematically and uniformly releases mosquitoes. Other inventions include simple yet sophisticated counters that accurately count mosquitoes for efficient and quality production of the mosquitoes. Five intellectual property patents have been filed from these creative solutions. As this nascent technology matures, we hope innovation and technological solutions will contribute positively to research and economic activity, whilst improving public health in Singapore and in similarly dense urban cities around the world.

10 Let me now touch on water. Water is another example where innovation and technology were critical to enhancing our resilience and preparing for climate change. Because it is an existential issue for us, Singapore had early on shifted away from viewing water as a "single use" resource. Over the last three decades, we have developed a circular water ecosystem which focuses on conserving and reusing water resources. This was achieved painstakingly by investing in infrastructure that recovers and recycles every single drop; pricing water in accordance to its long-term scarcity; and leveraging on technology. The result is as follows. After over ten years of investing in R&D, we have created about 14,400 jobs across more than 200 companies and 25 R&D centres. The sector was further boosted in 2016 with an injection of SGD\$200m for R&D from the National Research Foundation under the Research, Innovation and Enterprise (RIE) 2020 Plan. This will bring total funding for water to \$670m over 15 years and contribute \$2.85b annually to the economy by 2020, and create more companies like Ecosoft which received the Zayed Sustainability Prize on Monday for innovating to increase sustainability in Singapore and beyond.

11 Today, recycled water in Singapore – known as NEWater – and desalination provide us with new sources of water that is more climate resilient. As a result of these efforts, our water sector closely reflects a circular economy. Water and *Wolbachia* technologies are just two areas where innovation has or is bearing fruit to overcome urban challenges and climate change.

## **2019: YEAR TOWARDS ZERO WASTE**

12 Having seen the value that a circular economy has brought to the water sector, we are keen to extend this approach to other sectors. We are acutely aware that population growth, industrialisation, and the rise of consumerism have led to unrestrained exploitation of global resources. Yet, we remain fixated with the "take, make, use then toss" philosophy, and ignore the fact that resources are finite, as is the earth's capacity to absorb pollution and waste.

13 As such, we designated 2019 as Singapore's "Year Towards Zero Waste" last Saturday. The aim is to imbue in our citizens a greater consciousness on the need to treasure our precious resources and to do our part to protect the planet. Our strategy for Zero Waste is to adopt circular economy principles that will support future economic growth without compromising on our environmental goals. It will require a paradigm shift from our usual "take, make, use then toss" philosophy to one where we treasure every resource, and aim to reuse and recycle them endlessly - and like water, retain the resources within and not keep taking them from Mother Nature. This will require us to go beyond the traditional 3Rs (reduce, reuse and recycle) and embrace broader *Re-X* approaches such as re-purposing, re-manufacturing, re-designing, re-pairing and even re-thinking business processes. We can derive maximum value from resources, by extending their life through recovery and regeneration. The circular economy will also create new value, opportunities and green jobs. Imagine, our cities becoming urban mines, where the raw materials we need is right under our noses, and we recover treasure from trash.

14 Singapore will publish our Zero Waste Masterplan later this year. Our efforts will centre on three key waste streams, namely electronic waste, plastic and packaging waste, and food waste. We will increase Singapore's R&D funding to transform the environmental services industry. For instance, we will require producers to recycle and dispose of electronic waste responsibly by implementing the Extended Producer Responsibility (EPR) Framework by 2021. We will also implement a mandatory reporting framework for packaging data and waste reduction plans from 2020. We will thereafter consider adopting the same EPR Framework for plastics and packaging waste.

15 However, we know that the government cannot do it alone. To deal with the challenges ahead, we need a whole-of-nation effort. We need all stakeholders notably the private sector and civil society, to come together, pool our efforts and work together for the common good. For example, we have launched the #RecycleRight movement to ensure proper recycling in order to keep recyclable waste clean, dry and free of food waste.

16 We are also working closely with other governments. Yesterday, Minister Thani Al-Zeyoudi and I launched a Workshop on Zero Waste that is jointly organised by Singapore and the UAE as part of the ADSW. Conferences such as these are useful as they allow us to share best practices and provide opportunities for cooperation and partnerships between countries and across regions.

17 Indeed, next week, Singapore will host the Third Forum of Ministers and Environment Authorities of Asia Pacific. 41 countries from the Asia Pacific will share their views on “Innovative Solutions for Environmental Challenges and Sustainable Consumption and Production”. The outcome of the meeting will be conveyed to the 4<sup>th</sup> UN Environment Assembly to be held in March in Nairobi. Later this year, Singapore will also participate in the Climate Summit specially convened by the UN Secretary-General. I am confident that these platforms will further global progress on sustainable development, as will the meetings held here this week in Abu Dhabi.

## **CONCLUSION**

18 Let me conclude. Singapore is a small, resource-poor island nation. Like the UAE’s founding father Sheik Zayed bin Sultan Al Nahyan, Singapore’s first Prime Minister Mr Lee Kuan Yew also recognised from the outset the need to balance economic growth with the conservation of our precious resources. We have looked to technology and cooperation to enable us to do more with less, help us overcome constraints, and develop innovative solutions to deal with environmental challenges. We will continue to attach a high priority to sustainable development, and take active steps to safeguard critical national resources so that economic growth leads to good social outcomes.

19 On this note, let me thank Minister Thani Al-Zeyoudi once again for inviting me to the Abu Dhabi Sustainability Week.

20 Thank you.

Distinguished guests

Ladies and Gentlemen

A very good morning to everyone. It is my pleasure to be invited again to the “Unlocking Capital for Sustainability” forum which I launched a year ago. I am heartened to see thought leaders from financial institutions and corporates gathered here to discuss how economies and businesses can invest and grow sustainably amidst one of the greatest challenges of our age – climate change.

### **Urgency in Tackling Climate Change**

2 The Intergovernmental Panel on Climate Change (IPCC) released their special report on the impacts of global warming a few months ago, and the findings were alarming. The earth has already warmed by one degree Celsius above pre-industrial levels, and is likely to reach 1.5 degrees Celsius between 2030 and 2052, if we do not take further action today. In Singapore, we are feeling the effects too. According to the latest report released by the Meteorological Service Singapore (MSS), 2018 was the joint eighth warmest year on record for Singapore, despite an extended cool spell in January. More worryingly, the last decade from 2009 to 2018 was Singapore’s warmest decade, a sign of a long term warming trend.

3 As a low-lying nation state highly vulnerable to the impacts of climate change, Singapore welcomes the successful conclusion of the Katowice Climate Package at the United Nations Climate Conference in Poland last December. The Katowice Climate Package prescribes a robust set of guidelines for the effective implementation of the Paris Agreement, and shows that Governments around the world recognise the need for urgent climate action. I am glad that Singapore played a key role in advancing the complex negotiations in formulating these rules. The hard-won success of COP-24 demonstrates the strong support for a multilateral approach in addressing climate change.

4 Singapore will continue to do our part. Last year, we had a successful Year of Climate Action. More than 340,000 pledges were received from organisations, including financial institutions, demonstrating our shared commitment to climate action. Our carbon tax just came into force on 1<sup>st</sup> January 2019. The carbon tax will send an important price signal to incentivise emission reductions in the most economically efficient way. To build on this momentum, we have designated 2019 as the Year Towards Zero Waste.

### **Shift in Investment Sentiment**

5 However, the Government cannot fight climate change alone. The success of economies and businesses will depend on how well they manage the transition to a low carbon economy. The finance sector plays an important role in unlocking and directing capital flows towards economic activities with environmental benefits. It is encouraging to see growing numbers of investors who want to “do well” and “do good” at the same time. A Standard Chartered Private Bank survey found that 64% of Singapore investors were highly motivated to do good while earning a profit.

### **Growing Opportunities and Support in the Region**

6 As you are aware, the green market is growing rapidly. According to a report by DBS and UN Environment on Green Finance Opportunities in ASEAN, an estimated US\$200 billion of green investment is needed annually from 2016 to 2030 in this region alone.

7 In Singapore, green bond issuance continues to grow. To date, over \$2 billion of green bonds have been issued in Singapore by both local and foreign issuers. Most recently, Singapore-based Sindicatum Renewable Energy had issued green bonds that aim to support its renewable projects in the Philippines, where they intend to build a portfolio of solar and wind assets that can generate 250 megawatts. This is Sindicatum’s second green bond issuance in Singapore.

8 Singapore takes a practical approach of adopting international standards and market-led best practices to support the financial institutions operating here. We also provide support to institutions to adopt these standards.

9 One example is the Green Bond Grant scheme introduced by the Monetary Authority of Singapore (MAS) in 2017. This scheme helps to cover the cost of certifying sustainability-oriented bonds as green bonds. I am happy to learn that MAS will be expanding the scheme to now include all social and sustainable bonds as qualifying types of bonds.

10 To strengthen financial institutions' awareness of green bond issuance and build capacity for decision makers and banks, MAS has also signed a Memorandum of Understanding with the International Finance Corporation (IFC), a member of the World Bank Group.

### **Enhance Integration of ESG Principles**

11 Moving forward, I encourage financial institutions to continue contributing to the design and development of new environmental, social and governance, or ESG-related products that the global economy will need, as it moves towards greater sustainability. In the insurance asset class, MAS will be working with insurers to anchor deep ESG research to spur the development of innovative ESG products such as insurance cover for energy efficient infrastructure and renewables.

12 There has also been progress in sustainability reporting. The Singapore Exchange (SGX) introduced a sustainability reporting requirement for companies, beginning from the financial year ending on or after 31 December 2017. The inaugural sustainability reports by first-time reporting companies are progressively being published. Almost all listed companies with year-end in December have done so. This is an encouraging sign. Building on these efforts, the SGX will look for ways to help companies better connect sustainability to their business strategies.

### **Adopt Green Practices**

13 With today's advanced technology, adopting green practices that could catalyse further demand for sustainability has become even easier. Digital technology, such as block-chain, has enabled the linking of like-minded organisations with a sustainable cause. For example, in the world's first blockchain-powered renewable energy certificate (REC) marketplace launched by the SP Group, buyers can easily purchase renewable energy from sellers by trading virtual certificates. Such platforms not only allow businesses to grow and broaden their revenue stream, but also accelerate Singapore's transition to a low-carbon economy.

### **Closer Collaboration with Partners**

14 Finally, I hope financial institutions will continue to work with like-minded stakeholders on innovative climate solutions. Partnerships and collective action are essential to achieving sustainable development. I am happy that WWF's Asia Sustainable Finance Initiative (ASFI) was launched yesterday. This multi-stakeholder platform, bringing together academia, industry and science-based resources, will facilitate cross-sectoral sharing to develop, promote and coordinate sustainable finance initiatives in Singapore and the region. With increased global recognition of the key role that the financial sector plays in driving sustainability, my Ministry, together with MAS, welcome the formation of ASFI to help advance the sustainability agenda in Singapore and the region.

### **Conclusion**

15 Climate change is no longer a distant threat on the horizon, but one that is near and present. It is a long-term issue that will require the commitment of governments, investors, businesses and consumers. I am confident that we can transform the challenges into opportunities as we navigate our journey towards a more sustainable future.

16 With this, I wish all of you a fruitful conference. Thank you.

Distinguished delegates,

Ladies and gentlemen,

Welcome to the Senior Officials Segment of the 3<sup>rd</sup> Forum of Ministers and Environment Authorities of Asia Pacific. This is the first time the Forum is being held outside of Bangkok and signals the importance of global effort on the sustainable development and climate action.

### **Innovation is Key to Overcoming Environmental Problems and Constraints**

2 Here in the Asia Pacific region, we have seen tremendous growth and economic success. However, this has come at a price to the environment, straining resources, producing more waste, and generating higher greenhouse emissions.

3 Innovation is key to overcoming these environmental problems and constraints. For Singapore, innovation is absolutely essential. We are heating up twice as fast as the rest of the world. We cannot continue with business as usual; otherwise, we risk continuing on a catastrophic trajectory for climate change. Policymakers need to take the lead in seeking innovative solutions.

4 One of the innovative approaches many countries are pursuing is a shift away from the linear to the circular economy.

### **Singapore's Innovative Solutions in Circular Economy**

5 Singapore is committed to pursuing innovative solutions in the circular economy. That is why we have recently declared 2019 as the Year Towards Zero Waste. Singapore has closed the water loop, by recycling every possible drop of waste water into NEWater, Singapore's brand of pure, reclaimed water. In the same way, we are now striving to close the waste loop and produce treasure out of trash.

6 For instance, we are planning an integrated facility called Tuas Nexus that treats used water and solid waste. This will be the first and largest of its kind to be built from the ground up. Co-locating the two processes of used water and solid waste treatment will allow us to maximise energy and resource recovery. The Tuas Nexus will be able to reduce more than 200,000 tonnes of CO<sub>2</sub> emissions annually, equivalent to taking 41,000 cars off the road. Waste here is not a problem, but a resource.

7 Another innovation is processing incineration bottom ash for use in road or pavement construction. Countries like the Netherlands and Denmark are already using the ash for this purpose.

8 Singapore has also set its sights on turning ash into construction material - NEWSand - and had previously worked with Samwoh Corporation, a leading integrated construction company and green products supplier.

### **Partnerships with Private Sector to Drive Innovation**

9 Such partnerships between the public and the private sectors are critical for innovation. To this end, we launched the Environmental Services Industry Transformation Map, or ESITM in December 2017, to work with industry to launch several key initiatives to drive innovation and technology adoption, upskill the workforce and improve productivity.

10 One of our partners under a programme of the ESITM is City Developments Limited, a real estate developer. They are trialling in-sink grinders used in conjunction with on-site food waste digesters at one of their residential developments. This would allow apartments to easily recycle food waste to produce fertiliser for landscaping.

11 We also launched a regulatory sandbox last July, to enable innovative environmental technologies and solutions to be tested in a safe environment, with relaxed regulations. We have received three proposals to trial waste management technologies and solutions that could enhance productivity in the delivery of environmental services.

12 To promote research and development into innovative solutions, we have the Closing the Waste Loop R&D initiative led by the National Environmental Agency. This funds R&D projects related to the circular economy; and thus far, it has supported projects such as ultrafast conversion of food waste to bio-fertilisers, and green technology for metal recovery from electronic waste.

### **Conclusion**

13 Let me conclude. Our sustainability journey requires all hands on deck, between the public and private, but also within the region. At this Forum, we have the opportunity to sow the seeds of innovation, by sharing ideas and best practices.

14 I hope that you will have productive discussions in the next few days. Thank you.

Your Excellency Maithripala Sirisena, President of Sri Lanka

Your Excellency Enele Sopoaga, Prime Minister of Tuvalu

Your Excellency Teo Chee Hean, Deputy Prime Minister of Singapore

Distinguished Delegates,

Ladies and Gentlemen,

Welcome to the Third Forum of Ministers and Environment Authorities of Asia Pacific. This is the first meeting held outside Bangkok and with the largest turnout ever. I warmly welcome all of you to Singapore.

2 Since the end of World War II, **Asia Pacific has experienced a remarkable economic boom** that has lifted millions of people out of poverty. It is the fastest-growing region in the world today. Yet, such growth is **not without trade-offs**. Our resource use has intensified three-fold since 1990, accounting for 63% of global material use. Waste volume will double by 2025, further stressing our environment.

3 **Climate change also threatens to reverse gains we have made.** The recent IPCC Special Report on Global Warming 1.5°C warns that global temperatures could reach 1.5°C above pre-industrial levels as early as 2030. If we continue with business-as-usual, our societies will suffer as climate change intensifies.

4 We therefore need to **embrace a new form of economic growth not purely reliant on resource exploitation.** We need to **adopt circular economy approaches.** By transforming waste into resource, we will generate new economic value from something that would have been thrown away. A new industry can emerge where skilled workers design innovative products and manufacturing processes for waste.

5 **To succeed, a circular economy needs a strong foundation in R&D and innovation.** Innovations in material recovery, remanufacturing and recycling can help close resource loops. Our National Environment Agency (NEA) has launched a “Closing the Waste Loop” R&D initiative to catalyse such innovation. Through this, a research alliance between Nanyang Technological University and the French Alternative Energies and Atomic Energy Commission will explore innovative and circular solutions for treating e-waste like lithium ion batteries and silicon solar panels. Further research in circular economy will arise from this R&D initiative.

6 Embracing solutions that promote a circular economy **should be a part of our region’s commitment to climate action and sustainable development.**

If we embrace circular economy approaches together, we can transform our region and safeguard our collective future.

Countries in our region have already begun to plan for a Circular Economy future

7 I recently announced that **Singapore has designated 2019 as the Year Towards Zero Waste and we will launch our Zero Waste Masterplan this year. Other countries in our region are also moving towards a future based on circular economy principles.** In its 13<sup>th</sup> five-year plan, China outlined measures to promote circularity in industrial parks and enterprises. They have begun to focus on Extended Producer Responsibility (EPR) for electronic waste. Indonesia is exploring an EPR scheme for plastic products. Japan and South Korea are pioneers in this regard, having established EPR schemes over a decade ago. These initiatives are a good start but we have a long way to go.

Regional cooperation and partnerships will be indispensable in our transition

8 Beyond promoting circular economy within our own countries, **we should collaborate to establish a coordinated regional approach.** This meeting provides an excellent opportunity to enhance our cooperation and partnerships. Last November, members of the 13<sup>th</sup> East Asia Summit met in Singapore and issued a Leaders' statement on Combatting Marine Plastic Debris to improve plastic waste management, which is a first significant step towards solving a transnational issue. **Similarly, the Asia Pacific region could explore knowledge sharing and dialogue to develop a regional circular economy.** This has been done elsewhere. The **North Sea Resources Roundabout**, signed in 2016 by the Netherlands, United Kingdom, France and Flanders, aims to facilitate cross-border trade of recycled materials as resources. This agreement harmonises quality standards of secondary resources and contributes to building a regional circular economy within the EU. Our region, the Asia Pacific too, could explore ways to facilitate the trade of secondary raw materials, while preserving the integrity of our environment.

Conclusion

9 Let me conclude. Amongst the countries present today, we have a wealth of experience in developing circular solutions. By fostering dialogue and cooperation, we can combat the growing problem of waste and promote regional circular economy initiatives. More than ever, we will need to embrace new and innovative solutions to build low carbon cities with a high quality of life, and develop an economically vibrant region that is also sustainable in its use of resources.

10 We have a full agenda ahead of us. As Chair of this Forum, I would rely on the spirit of cooperation of all distinguished delegates, and the able support of

the members of the Bureau to produce meaningful outcomes for our work together. Thank you.

Ms Low Yen Ling  
Mayor of South West District

Grassroots Leaders  
Distinguished Guests  
Ladies and Gentlemen

## **INTRODUCTION**

1. I am very happy to be here for the ECO Day Out 2019 @ South West. As Mayor has said, this is the 14<sup>th</sup> year we are organising this event. This green festival is a meaningful event to raise environmental consciousness among our residents, to encourage them to adopt green habits, which in turn creates an environmentally sustainable and caring South West community. Let's give all our South West CDC councillors a big round of applause for your sustained environmental efforts and for promoting a recycling culture among the residents!
2. This year, the "ECO Plan South West" sustainability masterplan is in its 10<sup>th</sup> year. Recently Mayor Low had also announced that the South West District has already achieved many of the milestones in the masterplan, such as the 1,000,000 Native Plants @ South West, which I have heard has now grown to more than a million across the community gardens in South West!
3. It is time to review, update and refresh the ECO Plan. I am happy to be part of the next chapter, and kick-start the public consultations with the community for the new "ECO Plan towards 2030". This will be a future-ready sustainability masterplan which involves the 3P (people, public and private) sectors. I look forward to the many views and suggestions that will be given, to develop this plan.

## **2019 YEAR TOWARDS ZERO WASTE**

4. About three weeks ago, we declared 2019 as Singapore's Year Towards Zero Waste. Why is this necessary? One of the reasons is because the amount of waste that Singapore generated over the last 40 years has increased by seven times! In 2017, we generated 7.7 million tonnes of waste. If you need a comparison for that, it is equivalent to more than 15 Olympic-sized swimming pools! We only have one landfill, Pulau Semakau, and if we continue at this rate, Semakau will run out of space by 2035.

5. That's why in this Year Towards Zero Waste, we want to encourage everybody to adopt a 3R lifestyle – to reduce consumption, re-use instead of dispose, and recycle more and recycle right. Let us take on the challenge of striving for zero waste in our daily living.

### **#RecycleRight MOVEMENT**

6. Why do we want everyone to recycle right? Today, 40% of what is in our blue recycling bins cannot be recycled because some people throw in items which are unsuitable for recycling. Others treat the blue bins as general waste bins and throw in food and liquids. This contaminates the items in the recycling bin and makes them unsuitable for recycling. The items then end up incinerated instead of recycled.

7. That's why we have started a #RecycleRight movement. What is this movement? Just remember three things:

(i) Only put recyclable items into the blue bin. Don't treat it like a trash bin. Follow the labels on the blue bin on what can be put inside.

(ii) Make sure the recyclable items are dry, clean and free from food and liquid contamination. If you have containers with food or liquids inside, give them a simple rinse before you put them into the blue bin. Otherwise you will contaminate the other recyclables and waste other people's efforts in putting recyclables into the blue bin.

(iii) No need to sort different types of recyclables for the blue bins because they will be sorted centrally.

8. I hope you will all join the #RecycleRight movement to recycle, and more importantly, recycle right.

### **GOOD COMMUNITY INITIATIVES ON ZERO WASTE**

9. There are many good community initiatives on Zero Waste. South West District has some very good innovative initiatives to encourage residents to reduce, reuse and recycle. This includes the newly-launched Recycle Our E-Waste @ South West, which Mayor Low shared earlier. This local initiative complements the national drive to encourage e-waste recycling.

10. I also want to give special mention to the Cool South West! 'Towards Zero Waste' initiative that was launched last year by South West CDC and the National Environment Agency (NEA). This aims to encourage residents to reduce the consumption of single-use disposables, such as plastic or styrofoam takeaway containers. Residents are invited at roadshows to make a photo-pledge of their commitment to use fewer single-use disposables, and in return, they get a limited edition Cool South West reusable lunchbox. They can use this for takeaway, to save on disposable containers. I heard that about 2,000 lunchboxes have been distributed to residents, and I hope they have been using them instead of disposable containers.

11. Another good example is a project by 4 Nanyang Technological University (NTU) undergraduates who felt that Singaporeans were using too many plastic water bottles and contributing to plastic waste. I encourage everyone to learn about their 'Drink Wise, Drink Tap' campaign, which aims to promote the consumption of tap water over bottled water. This is an excellent campaign which will ultimately reduce the use of plastic bottles in Singapore and build a refill culture by encouraging people to bring their own reusable water bottles. By the way, I would like to affirm that PUB tap water is perfectly

safe to drink – my family and I can also vouch for this – so there is no need to buy bottled water. PUB has a comprehensive water treatment process, and robust sampling and monitoring programme from source to tap, with over 400,000 tests conducted annually. PUB tap water tastes very good, and is well within the World Health Organisation (WHO) Guidelines for Drinking–Water Quality. There is no need to boil or filter the water. If you are not convinced, visit NTU’s booth later and try it for yourself!

## **CONCLUSION**

12. I look forward to more such initiatives. Join us to work towards a Zero Waste Nation and be part of the #RecycleRight movement. We can all make a difference. Enjoy the day ahead. Thank you.

Mr Andrew Kwan, Chairman, Barramundi Asia Private Limited,  
Distinguished guests,  
Ladies and gentlemen,

1 Good morning. I am really pleased to join all of you here on Semakau Island. I think we are one of the most famous small islands in the world, after the video by Nas Daily went viral - 90 million views worldwide. Perhaps Nas himself doesn't know yet what else will be on this island, and hopefully this can showcase some of the things we do on this island that as Nas said, is "made of trash".

### **Growing our agri-food ecosystem to enhance food security**

2 The agri-food landscape presents many challenges today. While global population and food demand are projected to rise, vital resources for food production, such as water and energy, are becoming increasingly scarce. To add to that, the challenge of climate change such as temperature and sea level rise – these will impact food production. Singapore, as a city state that imports more than 90% of our food, becomes very vulnerable to external shocks and developments that impact food supply. Therefore, to enhance our food security, we will pursue three strategies: Diversify Import Sources; Grow Local; and Grow Overseas. Growing local will also help us to reduce our dependence on imports.

3 With the advent of modern agriculture methods and techniques, farms now have the potential to become more productive, sustainable and more importantly for the long term, resilient to climate change. It is timely to transform and grow our agri-food ecosystem. Our farms can harness the latest technologies to overcome resource constraints, optimise production and increase their yield exponentially.

4 The Government is supporting our farms with this transformation. Farms can tap on the Agri-Food & Veterinary Authority of Singapore (AVA)'s Agriculture Productivity Fund to co-fund the adoption of innovative technologies and systems that will boost farm productivity and capabilities. Beyond co-funding, AVA has also been supporting farmers in research and development, transfer of technology and by providing technical assistance. Barramundi Asia, or BA, is actually one of the farms that have benefited. It has tapped on AVA's support, including the expertise of the Marine Aquaculture Centre, to enhance the productivity of its nursery and deep sea farm.

### **Adopting modern agri-tech to transform farming operations**

5 The opening of BA's Recirculating Aquaculture System (RAS) extension today is a milestone for BA. It is also important for Singapore's aquaculture industry. I was told that BA has the largest RAS in Singapore. The RAS is a closed containment aquaculture system for fish culture in a controlled indoor environment. This results in higher productivity and resource efficiency.

6 The new nursery extension will significantly enhance BA's production capability. Once they are of a good size, the fingerlings from the nursery are transferred to BA's deep sea farm, which is located off this island. The deep sea farm is expected to yield 6,000 tonnes of fish annually. This is more than what our 120 fish farms produced in 2018! This breakthrough is a result of BA's innovation, adoption of modern agri-technology and its system of good husbandry. BA also develops and manufactures autogenous vaccines, which has greatly improved the survival rate of fish at its deep sea farm.

7        However, the latest technology and processes have to be matched with the right people with the relevant skills. Aquaculture is the fastest growing food production sector, according to the United Nations Food and Agriculture Organization (FAO). The growth of this sector will create new and exciting opportunities for modern farmers. I am glad to see young Singaporeans working alongside experienced industry veterans in BA. The veterans are both knowledgeable and passionate about sustainable, and responsible fish farming. One such individual is Marie Tan, the Assistant Fish Health Manager, who is also the emcee today. A marine biologist by training, Marie looks after the health of the barramundi at the nursery and the farm. Fish health directly affects the output of the farm.

8        I am also heartened that BA takes sustainability seriously. BA will partner the Nanyang Technological University (NTU) by participating in the Renewable Energy Integration Demonstrator – Singapore (REIDS) project. I welcome BA’s plans to power the new nursery with 100% renewable energy by the end of this year, and their plans to replicate their Singapore set-up at their overseas farms in Australia and Brunei. I wish BA success and look forward to BA exporting made-in-Australia or Brunei barramundi back to Singapore and around the world.

### **Conclusion**

9        The Singapore Food Agency, or SFA in short, will be formed under the Ministry of the Environment and Water Resources on 1<sup>st</sup> April. It will oversee food safety and security from farm-to-fork. SFA will build on AVA’s close partnership with local farmers like BA. We will continue to support the development and transformation of our aquaculture industry, to bring about new jobs and opportunities for our people and our businesses.

10      It is now my pleasure to declare BA’s nursery extension open. Thank you.

Her Excellency Margriet Vonno

Ambassador, Embassy of the Kingdom of the Netherlands

Mr Sherman Kwek

Group CEO of City Developments Limited

Ms Jessica Cheam

Managing Editor of Eco-Business

Ms Esther An

Chief Sustainability Officer of City Developments Limited

Distinguished guests,

Eco Champions,

Ladies and gentlemen

1 Good morning. It is my pleasure to join you today for the opening of the EcoBank Bazaar 2019. I look forward to seeing what the booths are offering later.

### **Year Towards Zero Waste**

2 I am happy to be part of Ecobank. Not only does this initiative raise funds for selected social causes, it also helps to build awareness and care for the environment.

3 This is important because it is when we care, that we start to think about the resources we are using, and the impact of our actions on the environment. How we use our resources, and how much waste we generate are issues that are very pertinent to Singapore. We are generating waste at an unsustainable rate. Our Semakau landfill will run out of space by 2035, if we continue at our current rate of waste generation. Last

year, we rallied Singaporeans to take climate action. Addressing our waste situation is one of the ways we can do so, in order for us to move towards a sustainable Singapore.

4 This is why my Ministry has designated 2019 as the Year Towards Zero Waste. This year, we want to work with partners to rally Singaporeans to treasure our precious resources. We need to build a strong 3R culture in Singapore – where reducing, reusing and recycling is a way of life. Today, 40 per cent of items placed in our blue recycling bins cannot be recycled. One of the reasons is that people throw rubbish into the bins, and also items with food or liquids. The food and liquids contaminate other items, and make the entire bin of items unrecyclable. The other problem we have encountered is that people deposit items such as clothing, which are actually reusable. These items should be donated if they are in good condition.

5 Initiatives such as EcoBank provide an avenue for such donations. I am heartened to hear that public awareness of EcoBank has continued to grow, along with donations and the number of volunteers you attract.

6 During this Year Towards Zero Waste, we will need the support of all individuals and organisations to rally everyone to embrace the 3R lifestyle. I recently hosted a roundtable discussion with representatives from more than 20 NGOs and green groups. We discussed how we can better engage Singaporeans and motivate people to change their lifestyle. I look forward to more of such conversations, to explore how we can work together and support one another to get everyone on board to make Singapore a Zero Waste Nation.

### **Fashion3R**

6 It is important that all of us step up to address the issue together, and make reducing, reusing and recycling a habit. Last year, I launched Fashion3R, the sister initiative of EcoBank. Fashion3R aims to promote sustainable fashion and raise awareness of the true cost of consumption. I am heartened to participate in the second edition of Fashion3R this year.

7 Such events encourage us to reflect on how we can take greater responsibility in our use of resources. In the context of fashion, we are reminded to be responsible consumers, to recycle what we have in order to prolong their useful lifespan, and to embrace pre-loved items as a fashionable choice. What we once thought of as unwanted clothes, can be given a new lease of life.

8 CDL, Eco-Business and Raffles College of Higher Education have worked together with Fashion Marketing students to run a month-long campaign on the EcoBank Facebook page to share tips on responsible fashion disposal. Students will also be on duty as roving fashion stylists, to provide advice today on upcycled items at the EcoBank premium sale booths.

9 For those who are not able to find what you want in the booths, you can visit the booth set up by National University of Singapore students, to promote fashion rental services. Or you can check out the booth by Our Singapore Reefs to learn how clothing materials contribute to microplastic pollution, and why it is important to choose the right materials.

10 The outfit I am wearing today is made from two entirely different dresses which have been reused and upcycled, and given a brand new look. It was made by The Fashion Pulpit in collaboration with CDL. I am not the only one wearing an upcycled outfit today. Later, Fashion3R will be highlighting five eco champions who have been doing good work in promoting a sustainable lifestyle. They will each be modeling an upcycled outfit.

### **Conclusion**

11 These eco champions serve as a role model for all of us. Everyone here can be an eco-champion. Let us start by adopting a zero waste mindset, and commit to incorporating the 3Rs into our lifestyle. Make use of every opportunity you have to reduce, reuse and recycle. Today is a good chance to put this into practice.

12 With that, I am pleased to officially kickstart the Fashion3R Eco Fashion Show. I hope you are as excited as I am to see the five eco champions take the stage.

Thank you.

General Surasak Karnjanarat,

Minister of Natural Resources and Environment, Thailand

Dato Lim Jock Hoi,

Secretary-General of ASEAN

Excellencies and Distinguished Guests

1. I would like to thank Thailand for taking the initiative as ASEAN Chair to convene this Special ASEAN Meeting on marine debris pollution. Our climate, livelihoods, food supply, and even recreation are dependent on healthy and resilient marine ecosystems. It is therefore timely for ASEAN to meet and discuss this important issue.

#### Singapore's Efforts

2. For an island city-state like Singapore, the oceans and seas are inextricably linked to our survival and wellbeing. Singapore therefore takes the issue of marine pollution seriously. We address marine litter as part of our holistic approach to tackling pollution and waste. This includes stringent regulations on pollution control and waste management, as well as an integrated solid waste management and collection system to minimise waste at source.

3. Under the Environmental Protection and Management Act (EPMA), discharges of trade effluent, oil, chemicals, and sewage are tightly controlled so that they do not cause pollution to our watercourses. We also enforce strict anti-littering laws under the Environmental Public Health Act (EPHA), and have a comprehensive waste management system to minimise waste at source and collect all waste for proper disposal. Since the 1990s, all municipal waste in Singapore is collected and incinerated at Waste-To-Energy (WTE) plants, with the resulting ash disposed of at our offshore landfill. We therefore minimise the risk of illegal landfilling or dumping in Singapore, which could be sources of pollution that can wash into the ocean. In addition, many of our tidal rivers have been dammed up to form reservoirs as sources of water supply, and do not flow into the sea. For those that continue to flow into the sea, waterway clean-up measures further prevent land-based litter, including plastic waste, from reaching the sea. An average of 280 tonnes of litter is collected monthly from our outlet drains, canals and waterways. Singapore also conducts regular water quality monitoring of inland water bodies and coastal areas to ensure that they meet international water quality standards.

4. Singapore was one of the first countries in Asia to ratify all six Annexes of the International Maritime Organization's (IMO) MARPOL Convention, the main international convention to prevent pollution by ships. MARPOL Annex V in particular prohibits the discharge of garbage, including all types of plastics, into the sea. In our port, as part of our MARPOL obligations, the Maritime and Port Authority (MPA) of Singapore deploys garbage collection craft daily at scheduled timings to collect garbage from ships at the anchorages.

5. Going forward, Singapore will not let up on our efforts to address waste at source. We will be releasing our inaugural Zero Waste Masterplan later this year, which will detail strategies to achieve our vision of a Zero Waste Nation. As part of this effort, Singapore intends to tackle the excessive consumption of all types of packaging waste including plastics. To encourage businesses to minimise their contribution to packaging waste, the implementation of mandatory reporting of packaging data and packaging reduction plans will be brought forward to 2020. This will include single-use plastic packaging. Our National Environment Agency is also studying the feasibility of implementing an Extended Producer Responsibility framework for packaging waste including plastics.

6. However, Government efforts are not enough. Fostering shared ownership in building a sustainable environment and minimising waste is key. This is why we have designated 2019 as our Year Towards Zero Waste. We will partner the People, Private and Public sectors on initiatives that reduce waste generation and promote recycling. Environmental groups help raise awareness and encourage the public to keep our city and watercourses clean. One such environmental group is Green Nudge which conducted a coastal clean-up last week. In just ninety minutes, Green Nudge recovered more than 200 kilograms of contaminated plastics and Styrofoam washed up onto our coast, highlighting how litter in the ocean is a transboundary issue affecting all countries, including Singapore.

#### Addressing Transboundary Marine Litter through Cooperation

7. Tackling transboundary marine litter requires collaboration at all levels. Singapore is playing our part. Under the Singapore Cooperation Programme (SCP), we continue to offer courses on sustainable development through which we share our approaches to tackling waste and pollution. We have partnered Norway under the Third Country Training Programme (TCTP) to conduct a capacity building workshop in 2017 for ASEAN Member States on integrated waste management as a means to reduce marine litter. A re-run of the workshop will take place in Singapore two weeks from now. A similar workshop was also conducted with the UAE as part of the 2019 Abu Dhabi Sustainability Week held in January 2019.

8. Regionally, as the current ASEAN-EU country coordinator, Singapore is working with the EU and ASEAN Member States to convene a policy dialogue on circular economy, marine litter and climate change to exchange best practices and explore collaborative partnership. Internationally, Singapore was privileged to have worked with Portugal to facilitate the negotiations on the "Our Oceans, Our Future: Call for Action" Declaration, which was endorsed by World Leaders in 2017 to support the implementation of SDG14.

This declaration included a strong commitment to accelerate actions to prevent and significantly reduce marine pollution of all kinds. We recognise that by working together, pooling our resources, and forming partnerships, we stand a better chance to succeed in our efforts to protect our oceans and its precious resources.

9. On this note, I would like to congratulate Thailand for convening this Special Meeting, and for giving greater focus to the issue of marine litter through the Bangkok Declaration and the Framework of Action which build on the East Asia Summit Leaders' Statement on Combating Marine Plastic Debris adopted in November 2018 in Singapore. The Declaration and Framework will help add momentum to national efforts and pave the way for greater cooperation to address marine debris pollution.

10. Thank you.

## Introduction

Mr Deputy Chairman, in 2018, which was designated the Year of Climate Action, we rallied individuals and organisations and received more than 340,000 climate action pledges. Collectively, our people, public and private (3P) partners initiated and organised more than 800 climate action events; that is more than 2 events a day! It shows the far-reaching impact of consultation and partnership.

## Working Together Towards a Zero Waste Nation

2. To build on this momentum, we designated 2019 as the Year Towards Zero Waste. We will adopt a circular economy approach to conserve resources for a sustainable Singapore.
3. We will release the inaugural Zero Waste Masterplan later this year. The Masterplan will cover our three priority waste streams of e-waste, packaging waste including plastics, and food waste. We hope that it will align the 3P sectors and the research and development community towards a common vision of a Zero Waste Nation.
4. The Masterplan brings together our collective efforts over several years. Last year alone, NEA consulted more than 250 companies on measures to address our priority waste streams. NEA has also approved 2 Environmental Services Regulatory Sandbox applications since it was launched in July 2018. These efforts co-create our regulations with the industry, ensuring we minimise business costs and enhance sustainable economic growth.
5. To effect our plans, we will be introducing the Resource Sustainability Bill this year to cover management of the three priority waste streams. The Bill also aims to support economic opportunities in innovative circular business models and the rising demand for resource recovery in Singapore and the region.

## E-waste

6. Mr Chairman, I will speak on e-waste first. It is critical that we manage our e-waste properly. First, to avoid contaminating our landfill and water catchment with toxic substances. Second, to protect the health of workers who handle these discarded products. And third, to extract valuable materials that can be recycled into new products. We will do so through the Extended Producer Responsibility (EPR) framework, which makes producers financially and physically responsible for the end-of-life collection and treatment of their products.
7. Mr Louis Ng and Ms Cheng Li Hui asked for details of the framework, which will come into effect in 2021. We have no plans to bring the start date forward. Industry feedback has highlighted that both producers and recyclers need sufficient time to adjust.
8. The framework will apply to electrical and electronic equipment, or EEE, which are categorised as Information and Communication Technology (ICT) equipment, batteries, lamps, solar panels and large appliances. Large appliances will now include electric mobility devices like e-scooters and power-assisted bicycles. Almost 90 per cent of e-waste in Singapore will be covered.
9. Arising from industry feedback, NEA will appoint a single Producer Responsibility Organisation, or PRO, to reap economies of scale. Producers of EEE for the consumer market, such as laptops and mobile phones, will be required to finance the PRO. We will exempt small producers from financing the PRO to avoid imposing disproportionately high costs on them.
10. The PRO will collect and send the e-waste for recycling. NEA will impose collection targets on the PRO. But as a transitional measure, penalties for missing collection targets will not be enforced in the first three years.
11. All producers of non-consumer EEE will be required to take back all end-of-life products for free upon request. This covers commercial and industrial equipment such as solar panels and data servers. We will not require them to finance a PRO, as they have existing take-back processes.
12. Retailers must also offer free 1-to-1 takeback services during delivery; for example, to take away the old refrigerator when delivering a new one. Further, retailers with a EEE sales area of more than 300 square metres must provide in-store collection points. This provides consumers with convenient avenues for

recycling their e-waste.

13. Many retailers and partners already provide such collection points voluntarily. For example, NEA partnered StarHub, DHL and TES to bring the RENEW programme to Best Denki, Courts, Gain City and Harvey Norman. They have collected more than 3,200 kg of e-waste across 20 outlets since June 2018. Altogether, there are currently about 500 e-waste recycling bins island-wide, which can be located via myENV app. I encourage everyone to take advantage of these convenient channels to recycle your e-waste, including rechargeable lithium ion batteries from handphones.

14. Mr Deputy Chairman, with your permission I would like to show some slides. The framework will include new recycling requirements to ensure that all collected e-waste is properly treated to facilitate the recovery of resources, such as gold, and the removal of harmful substances. We note Mr Ng's suggestion on the recovery of Coltan. We are still consulting the industry on the recycling requirements.

15. To support this framework, NEA will actively develop the e-waste industry, such as the skills and capabilities of local recyclers. This will create more good jobs for Singaporeans, including opportunities in the PRO, supply chain management, and e-waste recycling.

#### Packaging Waste Including Plastics

16. Packaging waste, including plastics, is another priority for my Ministry. Packaging waste comprised one-third of domestic waste disposed of in 2018.

#### Mandatory Packaging Reporting Requirements

17. Mr Ng asked for more details on the mandatory packaging reporting framework for businesses, to be introduced in 2020. We will require producers of packaging and packaged products to report to NEA how much packaging they put-to-market annually. They must also submit their plans to reduce, reuse or recycle packaging waste. For a start, we will exempt micro and small enterprises with an annual turnover of \$10 million or less.

18. NEA will monitor the companies' packaging data and 3R plans over the next few years and explore with them ways to reduce packaging waste. NEA will also engage companies to simplify reporting procedures and minimise compliance costs.

#### EPR for packaging waste

19. Mandatory reporting is the first step in our plan to introduce an EPR framework for managing packaging waste, including plastics, by 2025. Similar to e-waste, we are studying how producers can assume responsibility in collecting and treating packaging waste. An EPR framework would incentivise upstream reductions in packaging, an outcome similar to what Mr Ng envisaged through setting mandatory reduction targets.

20. EPR is a more holistic way of addressing packaging waste, including single-use plastics. For example, by voluntarily changing the packaging design and optimising production practices, Nestlé Singapore has saved 2000 tonnes of packaging used for its MILO® products. This is not only good for the environment; it also reduces business costs.

21. We will continue to engage the 3P sector as we develop this EPR framework.

22. Even as we study EPR, we are working with the industry on new initiatives to collect back packaging waste, such as PET bottles and aluminium cans. For instance, we are collaborating with partners to tap on the Towards Zero Waste Grant to roll out 50 reverse vending machines in major malls and the community this year.

23. Associate Professor Daniel Goh suggested a need to address packaging due to the rise in online shopping and home delivery. Supermarkets, which usually offer online retail services and home deliveries, will be covered under the mandatory packaging reporting requirements.

#### Food Waste

24. Mr Liang Eng Hwa asked about the current state of food waste and our measures to manage this. In

2018, we generated 763,000 tonnes of food waste. Of this, only 17 per cent was recycled.

25. We conducted a food waste segregation pilot at Tampines Greenlace estate in August last year. The residents participated actively, with 1 in 3 households depositing food waste in dedicated bins at least once a week. Over three months, more than 4,000 kg of food waste from Tampines Greenlace was recycled into fertiliser. The residents were delighted to receive packets of the fertiliser, a tangible symbol of their efforts in closing the food waste loop.

26. The pilot, which was due to end in October last year, has been extended at the request of residents. We are encouraged by their enthusiasm and are working with Zero Waste SG to explore how we can enhance involvement and ownership by the community.

27. I am also glad that with the support of NEA's 3R Fund, on-site food waste treatment systems have been installed in 23 premises.

#### *Food waste segregation requirements*

28. We are now ready to expand food waste segregation, starting with larger food waste generators. NEA has started consulting the industry on requirements for food waste segregation for treatment.

29. From 2024, we will require commercial and industrial premises that generate large amounts of food waste to segregate it for treatment. Premises include hotel and malls, and industrial developments housing food manufacturers, caterers and food storage warehouses. Existing premises can choose the treatment solution that best suits their operations, including off-site treatment at the upcoming Tuas Nexus.

30. Unlike existing premises, new premises can plan for on-site food waste treatment in their building design. We will require developers of new developments where large amounts of food waste are expected to be generated to cater for on-site food waste treatment to be implemented. These must be included in building plans submitted from 2021.

31. We will continue to provide support for premises and invite interested parties to implement on-site food waste treatment before the mandatory requirements take effect. Premises can tap on funding support, such as the 3R Fund.

32. My Ministry will also work with owners of large public sector buildings with food and beverage (F&B) outlets to segregate food waste for treatment from 2021. We are exploring doing so under the Public Sector Taking the Lead in Environmental Sustainability, or PSTLES, initiative.

33. PSTLES already builds environmental sustainability into Government procurement, which Mr Ng asked about.

#### Other Waste Streams

##### *Mandatory Waste Reporting*

34. Er Dr Lee Bee Wah asked if we proactively identify companies with greater potential to reduce waste. Since 2014, owners and managers of large hotels and malls have been reporting their general waste data and waste reduction plans to NEA. This focuses attention on waste generation by premises and the potential for reduction and recycling. More than 90 per cent of covered hotels and malls have now adopted recycling programmes.

35. From 2020, we will extend the mandatory waste reporting scheme to other large waste generators. These are factories, warehouses and convention and exhibition centres above a certain gross floor area. Disposables

36. Er Dr Lee also spoke about the dilemma of replacing disposables with reusables which require washing. NEA's life-cycle assessment on the environmental impact of carrier bags and food containers showed that reusables had a lower overall environmental impact than disposables. Hence, opting for reusables is better for the environment.

37. Mr Ng asked about the use of disposables for dining in at hawker centres, which is already disallowed in new hawker centres. Since September last year, disposables are also no longer permitted for dine-in

when new cooked food stallholders operate at existing NEA-managed centres. NEA will continue to work with existing stallholders to not use disposables for dine-in.

#### *Construction and demolition waste*

38. Associate Professor Goh asked about promoting the reuse of construction and demolition, or C&D waste. Singapore recycles 99 per cent of our C&D waste. For instance, waste concrete is mostly processed to produce recycled aggregates. This is a good example of the circular economy in action! The Building and Construction Authority has published a Sustainable Construction Guide with useful information on recycled construction materials and their applications.

#### *Medication waste*

39. Ms Irene Quay raised the issue of medication waste. I agree it is important to curb over-prescription of medicine. By not over-buying medication that will be wasted, patients also save money. Some hospitals limit prescriptions to no more than 3 months' supply of normal medicine and no more than 6 months' supply for chronic illnesses. Certain pharmacies put additional labelling on drug packaging to inform patients to return unused drugs. Pharmacists also counsel patients and review their medication supply, to ensure that patients do not take more medication than needed.

40. Generally, household drugs can be safely disposed of together with household waste. All our household waste is collected and safely incinerated before the ash is landfilled at Semakau Landfill.

### **Building a Liveable and Endearing Home Together**

#### After-death facilities

41. Some people may not know this, but my Ministry also oversees the planning of after-death facilities and services, which some may view as a morbid endeavour. Nonetheless, someone has to do it. And indeed, it is, pardon the pun, a deadly serious matter that has to be handled sensitively.

42. Mr Low Thia Kiang asked for an update on the provision of the Inland Ash Scattering (IAS) facilities and the proposed post-death rites facility at Tanah Merah. IAS services are on track to be available at Choa Chu Kang Cemetery by 2020 and Mandai Crematorium and Columbarium Complex by 2021. NEA is working on the designs to incorporate suggestions from consultations with funeral service providers, religious leaders and members of the public. When completed, these secular facilities will be an additional option for bereaved families to lay their loved ones to rest in a dignified and respectful environment.

43. The Environmental Impact Study commissioned for the proposed post death rites facility at Tanah Merah is in progress. We will consider the results of the study and public feedback, before arriving at a final decision.

44. Mr Dennis Tan asked about actions taken against the contractor who had provided quartz instead of marble plaques, when relocating niches from Mount Vernon Columbarium Complex. There was no evidence from NEA's investigation to suggest that the contractor had deliberately provided a different material with the intention to cheat. NEA's checks also showed that the marble and quartz plaques were comparable in price.

45. NEA has required the contractor to remedy the breach of contractual requirements. The contractor has undertaken remedial measures to replace the quartz plaques with new marble ones and will be bearing all additional costs incurred. As a further penalty, the contractor will also bear additional manpower costs incurred by NEA to oversee the niche replacement works. NEA will continue to monitor the replacement works closely. So far, there have been no anomalies detected during laboratory tests and visual inspections.

#### **Hawker Centres**

46. I will now move on to hawker centres. Our hawker centres serve important social objectives of providing affordable food in a hygienic environment for patrons, enabling hawkers to earn a decent livelihood and creating vibrant social spaces to bond our communities.

47. However, hawkers face many challenges today, from changing demographics and customer preferences, to new models of competition such as central kitchens and food delivery services. It can be even more difficult for hawkers in new hawker centres. They face competition from other F&B options in the

vicinity and need time to build up their clientele. This is why my Ministry piloted the Socially-conscious Enterprise Hawker Centre, or SEHC, model – to help hawkers compete better as a Centre.

48. As Mr Liang Eng Hwa said, last year, NEA addressed concerns on contractual terms, such as opening hours and termination notice periods. I visited all seven SEHCs to get feedback from the stallholders on the changes made and am pleased that the majority of stallholders have welcomed them. We will continue to improve the model based on feedback from hawkers and other stakeholders.

#### Sustaining the hawker trade

49. One area of concern is attracting and supporting new entrants to the hawker trade. Without new hawkers, future generations would not be able to enjoy hawker food.

50. It is therefore critical that we imbue new hawkers with key skills to succeed. This is why NEA set up the Incubation Stall Programme (ISP), and worked with PA and ITE to set up hawker training programmes that cover business management and operation, marketing and culinary skills.

51. Mr Gan Thiam Poh asked for an update on the ISP. I am pleased that six new stallholders will be joining NEA's ISP, bringing the total number of incubation stallholders in operation to 10. We are also enhancing the ISP based on experience and feedback from incubation stallholders. To provide greater support for them, NEA has extended the six-month tenure at 50% discount off rental rates to nine months. This is to address feedback that more time is needed to establish their business.

52. We are also piloting the extension of NEA's ISP to SEHCs who can provide guidance to hawkers under the ISP. This leverages their experience and success in supporting hawkers under their own incubation stall programmes, including the provision of mentors for new hawkers.

53. One new hawker joining NEA's ISP is Jim Yeow, who will operate his incubation stall at, Mr Louis Ng will be pleased to know, Yishun Park Hawker Centre, an SEHC, and receive mentorship support from its operator, Timbre. I have tasted his wanton noodles, which are quite exceptional. So please do try it when the stall opens.

54. Indeed, I have gone around to meet many young aspiring hawkers and am inspired by their entrepreneurship, passion and resilience. Many offer their own brand of tasty hawker food and I urge Members of this House, and all Singaporeans to support them.

55. Today, I had specially arranged for Cheng Tng from XX Dessert and Min Jiang Kueh (or pancakes) with Thai Milk Tea filling besides the classic peanut filling from Munchi Delights to be served at the Members Room.

56. Both stalls are located at Yishun Park Hawker Centre. In particular, XX Dessert is run by Yishun Park Hawker Centre's youngest hawker, 23-year-old Peh Zixuan. He started out under Timbre's incubation stall programme after completing National Service. So you could say he truly turned from "Ah Boy to Man". I hope everyone enjoyed these during the tea break. I heard the Min Jiang Kueh literally flew off the trays!

57. Mr Deputy Chairman, in November last year, I had a dialogue with some members of the Hawker Centre 3.0 Committee and other stakeholders, including hawkers. It was suggested that we set up ground-up workgroups to look at issues related to the hawker trade and culture. We are therefore facilitating the formation of two workgroups – one to explore ideas to attract and support new entrants to the hawker trade and another to look at encouraging graciousness and tray return – issues that were also raised by Mr Gan. The two workgroups will comprise hawkers, food advocates and members from various fields.

#### Supporting hawkers with operating costs

58. As part of our productivity efforts, we want to encourage existing hawker centres to adopt measures such as automated tray return stations integrated with centralised dish washing (CDW) services. At Blk 163 Bukit Merah Central, hawkers and cleaners enjoy a reduced workload and 40 per cent reduction in water bills due to the productivity measures.

59. Currently, stallholders at existing hawker centres receive two years of subsidies under the Productive Hawker Centre Grant to ease the transition to such productivity measures. These will help hawkers realise manpower and cost savings in the longer-term.

60. Stallholders have raised concerns about the increase to the full costs of CDW at the end of two years. To help them as well as encourage more centres to take up CDW, I am pleased to announce that we will provide an additional two years of subsidies, at a stepped down rate of 50 per cent and 30 per cent in the third and fourth year respectively.

#### New hawker centre

61. To ensure Singaporeans have continued access to affordable food at hawker centres, we are building 20 new hawker centres by 2027. So far, we have completed seven.

62. I am pleased to announce the site of the Bukit Batok hawker centre. It will be co-located with the MND-MOH assisted living residential flats pilot in Bukit Batok Town, bounded by Bukit Batok West Avenues 6 and 9, and Bukit Batok Street 41. When completed, this new hawker centre will provide an affordable food option to residents in the area.

#### **Growing a Vibrant Agri-Food Industry Together**

63. We welcome the newly-minted Singapore Food Agency or SFA to the MEWR Family come April and look forward to working with the agri-food industry to help forge a great future for the industry from farm-to-fork.

64. Mr Desmond Choo asked what we will do to ensure market-friendly regulations without compromising on food safety. These two objectives are mutually-reinforcing as food safety is key to developing a thriving agri-food industry. The industry has been supportive of the formation of SFA and have given feedback on how SFA can partner them to support both objectives.

65. One suggestion was the harmonising of licensing standards and streamlining licensing conditions for food businesses along the food value chain. For example, we are looking into how premises carrying out both central kitchen and catering operations can obtain a single licence instead of two.

66. To further develop our agri-food industry, we need to transform it. We will be reaching out to stakeholders in a visioning exercise in the coming months to co-create the future of the agri-food industry together. A better understanding of the emerging challenges facing it will allow us to identify opportunities for collaboration among stakeholders. There are also opportunities in areas such as digitalisation of food tracing using block chain technologies and innovations in the production of new foods.

#### **Partnering Singaporeans for a Sustainable Singapore**

67. Mr Deputy Chairman, there is an African proverb: "If you want to go fast, go alone. If you want to go far, go together." Realising the ambitions of our Zero Waste Masterplan to build a sustainable Singapore will require strong partnerships to co-create and implement new solutions.

68. I will conclude with a call to action in two areas for the Year Towards Zero Waste.

69. First, I urge everyone to participate in the public consultations for the Zero Waste Masterplan, which Mr Ng and Ms Cheng asked about. Waste and resource management are issues which will impact everyone, and your views matter. We will launch online consultations this month. We will jointly organise focus group discussions in April with Zero Waste SG and LepakInSG. These will form the final phase of our ongoing consultations on the Masterplan.

70. Last month, I also met more than 20 green groups. Many are driven by young and passionate environmentalists, such as those from Ground-Up Initiative and Foodscape Collective, who have been championing for the environment and promoting sustainable living. They see the urgency of changing mindsets and rallying everyone to do his or her part for the environment. Many of these eco-champions are brimming with ideas and keen to work together to achieve our vision of a Zero Waste Nation.

71. Even what I'm wearing today is a product of our eco-champions' passion and innovation. This dress is created by The Fashion Pulpit for the Fashion 3R initiative, which promotes sustainable fashion. It is upcycled from two different second-hand dresses to give them a brand new lease of life.

72. Second, in conjunction with the #RecycleRight Movement, I invite interested individuals and

organisations to partner us to better educate Singaporeans and others, including domestic helpers, on recycling properly. This is not merely about consulting or conducting focus group discussions. We want to co-create effective recycling solutions together.

73. Let's start our journey of co-creation to reduce the contamination of our recycling bins, including possibly co-creating legislation. Today, 40 per cent of what is placed in our blue bins cannot be recycled or are contaminated with food waste. Let us aim to reduce this to 30 per cent, 20 per cent or even 10 per cent.

74. Deputy Chairman, as Minister Masagos said earlier, "We are not done building a sustainable Singapore". We will need everyone to play their part, to conserve our resources, embrace the 3Rs and adopt a circular economy approach so that we can continue to build a sustainable Singapore for Singaporeans.

## **A MEWR Trilogy: Our Food and Environmental Stories Develop from Our Water Story**

### ***Introduction***

As a small island state, Singapore's survival and success is a miracle. We have too little land to cultivate food meaningfully, no natural resources to enrich ourselves and remain, one of the most water-stressed countries in the world. We must never forget that the 1961 and 1962 Water Agreements ensured a supply of water from Johor to meet Singapore's needs, and were so sacrosanct that they were guaranteed by both Singapore and Malaysia in the Separation Agreement. Sacrosanct, to this day.

2. Yet we were determined to build a successful, thriving and liveable home and by pursuing sustainable development from the word go. We overcame our challenges through two key approaches.

3. First, long-term planning. Even as the Government tackled current problems, it scanned the horizon for threats and opportunities and planned decades ahead. Decades, not years.

4. Second, the ability to implement policies and plans effectively. Faced with a challenge, we start small; learn from others; harness technology; invest in R&D. Keep on trying, until we get it right. Then, we take our solutions and scale up to benefit the whole nation.

5. In doing so, we also grow our enterprises and create good jobs for Singaporeans.

6. This is the essence of our Water Story. We now welcome the Singapore Food Agency into our MEWR family. It is with the same understanding that food security is an existential issue, just like water, that we are writing our Singapore Food Story.

### ***Water Story – From Survival to Success***

7. But first, Mr Deputy Chairman, let me dwell on our Water Story. Since independence, there has been the perception that water could be used as leverage against Singapore. Indeed, there have been threats to cut off our water supply.

8. It was against this backdrop of needing to ensure the security and resilience of Singapore's water supply that we set out to create drinking water from used water. We started pilot testing in the 70s, but it took us more than two decades before we were ready to scale up production of NEWater. We built a demonstration plant, started water quality measurement programmes, and rallied the entire nation's support.

9. It is a feat to be proud of – that we have integrated our used water into the water system in a closed loop, safely and reliably. Drugs disposed of, in sinks or toilets will be substantially removed through the water reclamation process. Our NEWater technology is so reliable that the Reverse Osmosis process will effectively remove any remaining pharmaceutical compounds, when treated used water is channelled into the NEWater production.

10. PUB's constant monitoring showed that pharmaceutical compounds were not detected in our drinking water. I hope that will put to rest Ms Irene Quay's concerns about PUB's treatment capabilities in removing drugs from used water.

11. Every time I describe to an international audience how we as a nation drink and use water from this system with full confidence of its safety and hygiene, I cannot help but beam with pride. Today, NEWater is a national tap that is recognised internationally for its high quality and sustainability.

12. Er Dr Lee Bee Wah asked about new developments in the water sector. PUB is not done with R&D. We are pushing on. The Research, Innovation and Enterprise Council (RIEC) allocated PUB \$200 million for

R&D, which includes pursuing breakthrough technologies. We will pose what we call 'Big Hairy and Audacious Goals' to the scientists, such as producing desalinated water with energy use of 1 kWh/m<sup>3</sup> (kilo Watt hour per metre cube) at the system level.

13. We already have the electro-deionisation technology that can potentially halve the energy required today in conventional reverse osmosis desalination. We are ready to scale up and deploy this technology at one of the process trains in PUB's Tuas Desalination Plant from 2020.

14. The gains from R&D go beyond solving our water problems. Over the years, we have developed a thriving water industry, with over 200 companies and more than 25 R&D centres. Our investments in the past decade have created some 14,400 good jobs and economic value-add of over \$2.2 billion annually, far more than our 2006 target of 11,000 jobs and \$1.5 billion value-add. Singapore is now one of the best and busiest hydrohubs, where companies come to prove their patents and scalability in a live water system.

15. Our R&D efforts also allow PUB to grow our local enterprises when it partners the industry to develop innovative solutions. One example is EnvironSens. PUB worked with them to develop an early warning system that detects illegal discharge of heavy metals into the sewerage system. EnvironSens has already attracted investments to manufacture and market their products in countries such as the US, China, and India.

### ***Climate Change Brings New Existential Threats***

16. We have come a long way in our Water Story, but we cannot rest on our laurels. Climate change is bringing new and wicked problems. It is no coincidence that we are building more desalination and NEWater plants – we need to produce water almost at will, regardless of whether the rains will come.

17. On the other hand, climate change also brings more frequent intense storms, which could mean more floods, as noted by Dr Chia Shi-Lu. As a low-lying island, Singapore is particularly vulnerable to sea level rise that can exacerbate flooding problems. You may have seen the Straits Times' interactive graphic that shows "Singapore Underwater". This is already a reality in the Pacific Ocean where at least eight islands have disappeared under the sea.

18. To enhance our flood resilience, we completed the Stamford Diversion Canal and Stamford Detention Tank last year. Upgrading works at two major waterways, the Bukit Timah First Diversion Canal and Sungei Pandan Kechil, will be completed this year. We will commence drainage upgrading works at another 16 locations this year.

19. As Er Dr Lee Bee Wah noted, climate change must be tackled at regional and global platforms. In the meantime, we must press on to transform our economy towards a low carbon future and do our part for the planet. This year, the carbon tax takes effect. The Government is prepared to spend more than the \$1 billion to be collected over the next five years in tax revenues, to help companies become more energy-efficient.

20. We will step up solar adoption as highlighted by Ms Cheng Li Hui. PUB is studying the deployment of floating solar photovoltaic systems at four reservoirs – Bedok, Lower Seletar, Upper Peirce and Tengeh. EDB is also exploring the possibility of a commercial floating solar system at Kranji Reservoir.

21. Together, these systems potentially have a capacity to power 40,000 four-room HDB households a year –about half the size of Tampines. It gets more exciting: we are also exploring such floating PV systems off Singapore's coast, as well as integrating solar PV into our building facades to maximise solar energy generation.

22. Promoting sustainable transport and managing vehicular emissions are also key. Professor Walter Theseira asked about our plans to manage transport emissions. We promote cleaner vehicles through emissions standards and encourage the early replacement of older and more pollutive vehicles, such as through the Early Turnover Scheme. More than 40,000 commercial diesel vehicles have switched to cleaner vehicles under this scheme.

23. We also work with MOT to encourage adoption of cleaner vehicles, and regularly engage the industry, such as commercial electric vehicle fleet owners like HDT and BlueSG, on their plans. As my one of my colleagues, a Minister of Environment quipped, "There is a link between carbon monoxide and carbon dioxide. You aim for cleaner vehicles to reduce pollution, you will also solve greenhouse gases that will help with climate change."

24. The preceding examples are what we call climate mitigation. But that is not enough. The Government is also planning ahead to protect Singapore against climate change impacts.

25. Er Dr Lee Bee Wah asked about our initiatives to build climate resilience. My colleagues in MND spoke at length on this. To guide our policies, though, in fortifying Singapore against climate change, we must build up our knowledge of climate science. Indeed, because there is limited literature on climate change effects in the tropics. We can lead. This is why we set up the Centre for Climate Research Singapore, or CCRS, in 2013. We are stepping up investment to build capability in CCRS and the local scientific community. This year, CCRS will embark on the National Sea Level Programme to better understand sea levels around Singapore, so that we can develop robust projections and plans for the long term.

### ***Ensuring Our Water Security***

26. Mr Deputy Chairman, we will also press on to ensure water security. When Marina East and Jurong Island Desalination Plants are completed next year, we will have a total of five desalination plants. Works on the Deep Tunnel Sewerage System Phase 2 are on track. We will continue to build up our desalination and NEWater capacities, to ensure that our water supply is secure and resilient in the long-term.

27. Water security is an existential issue for Singapore. We will continue to do what it takes to ensure it. Members would be aware that earlier this week, PUB issued a Default Notice to Tuaspring Pte Ltd, or TPL, the Hyflux subsidiary that owns and operates the Tuaspring Integrated Water and Power Plant.

28. As updated previously in this House, we have been closely monitoring developments and will not allow our water security to be compromised. We are concerned that TPL has been unable to fulfil various contractual obligations, in particular by failing to keep the plant reliably operational as required. In addition, TPL has not been able to produce financial evidence to demonstrate its ability to keep the plant running for the next 6 months. Hence, PUB has decided to exercise its rights under its contract with TPL, and initiate the necessary proceedings to safeguard the continued operations of the plant. This action is to safeguard our water security.

29. Over the past five decades, we have worked hard to diversify our water resources and build up our four national taps. We saw how the Linggiu Reservoir stock level plummeted to 20 per cent in 2016. It has yet to recover fully even after more than two years. While stock levels had gradually increased to 72 per cent by end 2018; after just two months this year, it has dropped again to 64 per cent. That is why our weather resilient NEWater and desalination taps are integral to our water security.

### ***Water Conservation***

30. Mr Deputy Chairman, even as we secure our water supply, we cannot ignore water conservation. Over-consumption is a challenge in many countries. In Qatar, where water is provided for free, daily consumption is around 500 litres per person.

31. In Singapore, we have worked hard to embed water conservation in our national DNA. Our domestic water consumption decreased from 148 litres per capita per day in 2016, to 141 litres in 2018. But we agree with Mr Amrin Amin that we must do more, to reach our goal of 130 litres by 2030.

32. To this end, we help consumers make more informed purchasing decisions, such as through the Mandatory Water Efficiency Labelling Scheme.

33. Similarly, for the non-domestic sector, PUB is working with the Singapore Environment Council to develop a Green Labelling Scheme for commercial equipment such as commercial dishwashers. PUB also

supports businesses through its Water Efficiency Fund. One beneficiary is Hoya Electronics Singapore, which reduced its NEWater consumption by 75 per cent!

34. Last weekend, President Halimah officiated Singapore World Water Day, marking the start of a year-long conservation campaign. PUB is launching the inaugural #GoBlue4SG movement, to rally the community and celebrate our collective actions to conserve water. One of the highlights – City Turns Blue – will see more than 20 buildings light up Singapore’s skyline on 22<sup>nd</sup> March. I am heartened that over 150 schools will undertake water rationing exercises to drive home the value of water. I encourage all of us to ‘Make Every Drop Count’.

#### ***Safeguarding Singapore’s Essential Resources, Beyond Water***

35. The impact of climate change goes beyond water. Indeed, the destinies of two other agencies under my Ministry – environment and food – are also tied to the impacts of climate change, like water.

36. Resource scarcity is set to become the new normal. And with it, cascading impacts such as disruptions to supply chains that fuel our economies, and increased risk of global conflict.

37. We must therefore apply a strategic lens to Singapore’s resource resilience. As I mentioned in my opening remarks, to meet this new challenge of securing our food and other resources, we can apply the lessons from our Water Story.

#### ***Year Towards Zero Waste – Shift Towards Circular Economy Approaches***

38. Singapore designated 2019 as the Year Towards Zero Waste. We want to break away from the linear economy, where we take, make, use and toss without a second thought, because this is not sustainable. Therefore, we must make a paradigm shift towards circular economy approaches.

39. Beyond protecting the planet, circular economy approaches can enable Singapore to overcome resource constraints and strengthen overall resilience. Many may not realise this, but NEWater embodies the circular economy. We use a resource, in this case water, for as long as possible, and ensure that what can be reused is put back into the system.

40. This shirt I received recently at the Special ASEAN Ministerial Meeting on Marine Debris is another good example of the circular economy. This polo shirt is made with 12 PET bottles, but I encourage us to use reusable bottles. This upcycling lets us keep using what we have within our systems. In essence, we keep using what we have within our systems.

41. This same thinking applies to every other resources. For example, lithium ion batteries found in almost all our electronics: handphones, laptops and even electric vehicles. Global demand is soaring, but mineral sources for lithium, cobalt and coltan are finite and costly to mine. And continuously exploiting these minerals may harm the gorillas that Mr Louis Ng spoke about.

42. But we can collect these used uncontaminated, electronic wastes in meaningful amounts, and apply R&D and new technologies to extract the precious minerals. This will increase our resource resiliency, and avoid harming the environment.

43. Businesses are alive to the opportunities of the circular economy. Among them is our home-grown e-waste recycling company, TES. TES recovers treasure from trash, extracting gold, silver and palladium from e-waste. TES has plans to expand its lithium ion battery treatment process facility. Recyclers like TES are important as they ensure that heavy metals from e-waste do not contaminate our environment, but are instead recovered as valuable resources to power our economy.

#### ***Turning Trash into Treasure – R&D to Power Enterprises and Create Jobs***

44. Let me focus on how we will recreate our Water Story in the environmental sector. Our vision is to close the waste loop through circular economy approaches and turn trash into treasure. This will also help to extend the lifespan of Semakau Landfill as Ms Cheng Li Hui highlighted.

45. To do so, we need to invest in R&D in close partnership with industry and research institutions. Just like how we have grown our water industry and research eco-system to tackle our water challenge. This will allow us to overcome technological barriers in our drive towards a zero waste nation.

46. NEA set aside \$45 million under the "Closing the Waste Loop" R&D Initiative to fund projects adopting circular economy approaches. Promising projects include Singapore Polytechnic's development of green chemistry technology to recover precious metals in e-waste, and Nanyang Technological University's method to rapidly convert food waste into high grade bio-fertilisers.

47. The result of such R&D means more opportunities for our enterprises, and consequently, more jobs for Singaporeans. Take Singapore Polytechnic, which after developing a recycling process for solar panels that can potentially recover up to 90 percent of useful materials, signed a memorandum of collaboration with Sembcorp Industries to develop a pilot recycling plant for used PV panels.

48. Another company that has seized such opportunities is Westcom Solutions. Westcom got its researchers to help improve processes, to scale up and transition from being a company that distributes food waste digesters to one that manufactures them.

49. I look forward to the day when our stores carry home food digesters that are compact, economical and easy to use, something we can put in our own homes, to convert our food waste into compost to grow plants and even food at home. This also reduces the need to transport food waste across the island, and keeps our waste system free from pests!

50. As R&D powers our enterprises and creates new opportunities for them, it will also create new jobs for Singaporeans.

51. We need engineers to develop standards for waste management and recycling operations; scientists to study microorganisms for efficient food waste processing; and analysts to study the data created and create strategies for scaling up.

52. We will also partner with other agencies and the industry, to turn trash into treasure through circular economy strategies.

53. JTC, in consultation with NEA, is developing the Multi-Storey Recycling Facility, or MSRF which is expected to be ready in 2021. The facilities will house multiple recyclers, and be located close to other industries. This will present opportunities to reuse waste materials and other industrial by-products, thereby closing resource loops at the local level.

54. Today, we already have NEWater. We are working on creating NEWSand! We are studying how we can turn incineration ash into construction material, instead of landfilling it.

55. NEA is leading this effort and has developed draft standards for the use of treated ash, such as for building roads. NEA has appointed industry players to demonstrate their technologies, with plans to start field trials next year. We will take careful steps though, as two-thirds of Singapore is water catchment that must remain free from pollution.

56. Building a circular economy also requires international cooperation, as value chains are interconnected. Singapore will play a constructive role in this process.

57. We supported the Special ASEAN Ministerial Meeting on Marine Debris two days ago, where ASEAN countries agreed to advance concrete actions on the circular economy. The same conference where Thailand gave delegates this T-shirt to demonstrate the potential of the circular economy. We will continue cooperating with our partners in the region to work towards zero waste.

### ***Our Singapore Food Story: Enhancing Food Security***

58. Mr Deputy Chairman, let me now turn to food, another essential resource. The Intergovernmental Panel on Climate Change estimates widespread declines in crop yields of up to 25 per cent by 2050 due to climate change impacts.

59. Singapore is also exposed to the volatilities of the global food market, because we import over 90 per cent of our food supply. Just last year, Malaysia announced that it was considering limiting exports of eggs.

60. Dr Chia Shi-Lu asked how the SFA's formation will benefit Singaporeans and companies. SFA's mission is to ensure and secure a supply of safe food for Singaporeans.

61. As the lead agency to strengthen food safety and security, SFA will have regulatory oversight across the entire food chain, from farm-to-fork. It will also partner businesses to transform our agri-food industry, and create, again, good jobs for Singapore.

62. Desmond Choo asked about SFA's plans to strengthen our food security. SFA will pursue three broad strategies, called the 3 food baskets – "Diversify Import Sources"; 'Grow Local' and "Grow Overseas" – which I talked about during the second reading of the SFA Bill.

#### ***Grow Local – Achieving "30 By 30"***

63. Today, I would like to focus on our "Grow Local" strategy. Local production will reduce our reliance on imports, and buffer the impact of overseas supply disruptions.

64. SFA has set the target of achieving "30 by 30" - that is, to locally produce 30 per cent of Singapore's nutritional needs by 2030. This is an ambitious multi-fold increase to our current production. Remember, we import over 90 per cent of our food. To get to the "30 by 30" vision, will require our agri-food industry to adopt new solutions to raise productivity, apply R&D, strengthen climate resilience, and overcome our resource constraints. We need new paradigms in the agri-food industry.

65. Supporting our existing farms to innovate and increase productivity is a key pillar of the "Grow Local" strategy. Many of these farms are household names which produce eggs, vegetables and fish. For example, vegetable farms Kok Fah and Ho Ka Clean have been feeding Singapore for over 20 years. The Agriculture Productivity Fund (APF) has supported them to integrate climate control and automation into their operations, thereby raising their capacity and productivity.

66. We will similarly work with our existing coastal fish farms. Singapore Aquaculture Technologies was one of the first coastal fish farms to adopt closed containment aquaculture systems. This protects fish production from sea-borne threats such as algae blooms or oil spills. More than 90 farms have benefitted from the APF, and I encourage all our farms to tap on it.

67. We will also expand production in state-of-the-art indoor farms. Farms such as Sustenir and Panasonic optimise plant growth and increase yield exponentially through high-tech solutions like LED lighting and climate control. By controlling growing variables, these farms are climate resilient, and can maintain high quality. We expect to see more of such farms as successful tenderers in the recent agricultural land tender exercises begin production, and scale up. Farmers of the future will operate computerised control systems in a pleasant environment.

68. SFA will also support the growing interest in urban farming, such as on rooftops. This brings the community together, and attunes Singapore to food security, by involving them directly in food production. Such farms can also be used to test-bed innovative technologies for growing food.

69. We are working with SLA, MOH and ECDA to pilot this concept, re-purposing the former Henderson Secondary School into an integrated space comprising an urban farm, a child care centre, a nursing home and a dialysis centre.

70. Our plans to “Grow Local” also extend to productive and sustainable fish farming. Our vision is to develop Singapore into a tropical aquaculture hub, much like how we are a hydrohub.

71. One area we are studying is deep sea fish farming, which can contribute significantly to local production. A local first mover is Barramundi Asia, which uses large sea cages to culture Asian seabass in the deep waters off Pulau Semakau, our landfill. I recently visited them, and was impressed by their fish vaccination process. Using technology, Barramundi Asia can vaccinate 9000 fish in one hour, compared to just 600 manually. SFA will work with agencies and industry to open up more sites for deep sea farming with technology.

72. Thus R&D will be the key driver, again, to help us achieve our “30 by 30” vision, grow our enterprises and consequently create good jobs. We will grow an ecosystem of R&D players to support agri- and aquaculture industry development.

73. SFA’s Marine Aquaculture Centre will contribute to this effort by sharing its expertise and providing facilities for R&D. The RIEC has also set aside \$144 million for us to write the Singapore Food Story.

74. Mr Desmond Choo asked about how we will prepare Singaporeans for the growing opportunities in the agri-food sector. The agri-food industry will require a workforce with good understanding of urban food production processes and business models, and multi-disciplinary expertise in science, engineering, information communications, and more.

75. To this end, we have worked with Republic Polytechnic and Temasek Polytechnic to launch SkillsFuture Earn & Learn programmes or ELP for fresh ITE graduates, leading to diplomas in Urban Agricultural Technology, and Aquaculture.

76. The ELP will emplace ITE graduates in industry and equip them with the knowledge and skills to become agriculture and aquaculture technicians. We will also partner universities to groom Agri- and Aquatechnologists and culturists, urban farming specialists, and researchers to meet future needs.

### ***Realising Synergies in the Circular Economy: Food – Water – Energy – Waste Nexus***

77. Like every other sector in Singapore, the agri-food sector must embrace sustainability. Some of our farms are already employing circular economy principles. Indoor farm Sustenir is using carbon dioxide, a by-product from the petrochemical industry to enhance vegetable yields. N&N, a layer egg farm, carries out biodigestion using poultry waste to produce energy. This is then used to dry by-products from the food manufacturing industry to produce chicken feed.

78. These examples show that what we see as waste in one sector can be feedstock for another. We will do more to find synergies across different sectors such as food, water, energy and waste, and then scale them up to commercial viability. We will apply the circular economy approach across systems to achieve zero waste and the lowest use of resources. This requires an ambitious R&D programme, integrated upfront planning and design and close collaboration with our industry. This is the future economy, and the Government will invest significant resources to enable Singaporeans to thrive in it.

79. In total, the Government will spend almost \$400 million under RIE 2020 towards research and innovation in water, circular economy and climate change and food. These significant investments will help us to explore greater possibilities across the food-water-energy-waste nexus, achieve new results, and scale up.

80. One early success is NEA and PUB’s successful trial at Ulu Pandan Water Reclamation Plant. It has proven that co-digesting food waste and used water sludge can triple biogas yield compared to treating the used water sludge alone. The biogas is used to generate energy for the facility. This co-digestion technology illustrates the potential in exploiting synergies in the food-water-energy-waste nexus. We are preparing to scale this technology up and adopt it at the new Tuas Nexus, which will be operational by 2025.

### ***Conclusion***

81. The plans we have for the water, food and environmental sectors will open up a variety of exciting opportunities for our enterprises and jobs in our industries. We hope to produce more of the likes of EnvironSens, TES, Sustenir, and Barramundi Asia. We will also need many people with diverse interests and skills to help us tackle our challenges.

82. Let me introduce some of the young Singaporeans who have stepped up in our water, food and environmental sectors.

83. Mr Ahmad Zaki Bin Salleh and Ms Rajakumar Amritha are at the forefront of our efforts to enhance flood resilience and ensure water security. Ahmad Zaki, a senior engineer with PUB, oversaw the planning and construction of the Stamford Detention Tank, while Amritha contributes to the smooth operations at Woodleigh Waterworks.

84. Ms Marie Tan and Mr Lee Yuan Hao are part of our growing agri-food sector to strengthen food security. Marie oversees fish health at Barramundi Asia's nursery while Yuan Hao founded Ding He Agriculture, a vertical indoor vegetable farm.

85. Ms Jade Loh and Mr Heng Kim Soon are contributing to our Zero Waste Cause. Jade and her team at Plaspulp Union Pte Ltd explore recycling solutions for complex waste materials, while Kim Soon conducts R&D on uses for incineration ash. Together with their colleagues in the water, food and environmental sectors, these young people will see our plans through in the decades to come.

86. Mr Deputy Chairman, climate change will bring new existential threats, but also exciting opportunities. We must do as our forefathers did; stay alert and nimble, and continue to plan and prepare for the long term. It took us more than two decades to create NEWater. Likewise, the vision of a reservoir in the heart of the city was only realised many years after our Founding Prime Minister mooted the idea. We have ambitious plans for our water, waste and food sectors, but the road ahead is long and winding. We will persevere, for we are not done building a sustainable Singapore.

87. I now hand over to SMS Dr Amy Khor.

His Excellency Marc Abensour  
Ambassador of France

Prof Subra Suresh  
President of Nanyang Technological University

Mrs Laurence Piketty  
Deputy CEO of the French Alternative Energies and Atomic Energy Commission (CEA)

Mr Tan Meng Dui  
CEO of the National Environment Agency

Distinguished guests,  
Ladies and gentlemen,

1. Good afternoon. I am pleased to be here today for the opening of the “Singapore-CEA Alliance for Research in Circular Economy” (SCARCE), a joint research and development centre between the Nanyang Technological University (NTU) and the French Alternative Energies and Atomic Energy Commission (CEA), co-funded by NTU, CEA and the National Environment Agency (NEA).

2. SCARCE represents CEA’s first formal collaboration with NTU, and indeed, with Singapore. In fact, I understand that this research centre is CEA’s first-ever outside of France. This collaboration symbolises the strong bilateral ties and partnership for innovation between our two countries. The inauguration of this centre marks a most fruitful Singapore-France Year of Innovation. My Ministry and NEA are happy to play a part in supporting and realising this collaboration.

**Working Together Towards A Zero Waste Nation**

3. Singapore has designated 2019 as the Year Towards Zero Waste. In mid-2019, we will be releasing our inaugural Zero Waste Masterplan, which will align the People, Public and Private sectors, including the research community, towards our common vision of a Zero Waste Nation.

**NEA’s R&D Strategy on the Circular Economy Approach towards Zero Waste**

4. A total of \$45 million has been set aside since December 2017 for the Closing the Waste Loop, or CTWL, R&D Initiative to fund research projects aligned towards Zero Waste. This significant investment falls under the energy and waste pillar of the NEA technology masterplan. Under this plan, *waste-to-energy* and *waste-to-resource* are two key initiatives aligned to circular economy concepts. NEA has traditionally been strong in the waste-to-energy area, having made significant investments in and operating waste-to-energy incineration plants for almost four decades now. In line with our thrust towards Zero Waste, NEA will be placing greater focus and resources into waste-to-resource R&D programmes in the years ahead.

5. This is why, under the CTWL, waste-to-resource is a key R&D focus area. One way to turn waste into resource is by innovating residue management, where a key programme seeks to turn the bottom ash from our incineration plants, otherwise destined for landfilling, into NEWSand to be used for construction. This has been in the news

recently. If we succeed, we would have truly closed the waste loop, like we have done for water. The other key focus will be to turn our waste into treasure, in the key priority waste streams of e-waste, packaging waste including plastics, and food waste. Among these, e-waste is a front-runner waste stream, and this is where SCARCE will have a significant role to play.

6. SCARCE is the first and largest single recipient of funding from the Closing the Waste Loop R&D Initiative to date, with NEA committing \$12.5 million towards this \$20-million centre. I am pleased to note that the remaining investments have been pledged by NTU and CEA as a clear commitment to this important undertaking. Under SCARCE, NTU, CEA, and other partners will co-develop innovative and environment-friendly solutions in the recycling and recovery of resources from e-waste, such as lithium-ion batteries, silicon-based solar panels, printed circuit boards and plastic parts found in e-waste.

#### **NEA's Plans for E-Waste**

7. This is a significant and timely development. After all, e-waste is one of Singapore's fastest growing waste streams, in which about 60,000 tonnes are generated annually. It is critical that we manage our e-waste properly so as to avoid contaminating our landfill and water catchments with toxic substances such as lead and mercury. We should also seek to offer a safe working environment to protect workers who handle these discarded products and to extract valuable materials that can be recycled or reused in making new products.

8. NEA will thus be adopting the Extended Producer Responsibility (EPR) framework for e-waste by 2021, which places responsibility on producers for the life-cycle of their products, including their disposal and treatment. This motivates producers to design longer-lasting or more easily recyclable products and drives green growth in the industry sector.

9. The EPR framework for e-waste will apply to electrical and electronic equipment (or "triple E"), which are categorised as Information and Communication Technology (ICT) equipment, batteries, lamps, solar panels and large appliances. Large appliances will now include electric mobility devices such as e-scooters and power-assisted bicycles.

#### **Multi-Pronged Approach, with Benefits to Jobs and Industry**

10. The EPR framework for e-waste is part of a multi-pronged, holistic approach that we are taking to overcome our waste management challenges and bring us closer to our vision of becoming a Zero Waste nation. Our approach involves complementing legislation with citizen and stakeholder engagement and communication, as well as with upstream efforts to spur industry innovation and development through R&D.

11. Through R&D into Zero Waste and Circular Economy approaches, new opportunities for our industry will be created. NEA has launched the Environmental Services Industry Transformation Map, where various R&D initiatives were introduced to strengthen our industry's future-readiness and resilience in waste management.

12. NEA will actively develop our e-waste industry, by uplifting skills and capabilities in e-waste recycling and supply chain management. We are investing in R&D in close partnership with industry and research institutions to overcome technological barriers.

13. For example, SCARCE aims to develop "green chemistry" methods to recycle lithium-ion batteries, and extract up to 75 per cent by weight of valuable materials such as lithium, cobalt, manganese and their binders, which can be processed for producing new lithium battery products. The promise of the ambitious research outcomes of this and

other projects has led to enterprises expressing interest to pursue industry research partnerships with SCARCE. I am very pleased to witness the signing of Letter of Intent between NTU and the companies this afternoon.

14. As R&D powers our enterprises and creates new opportunities for them, it will also create highly skilled jobs for our citizens. Scientists will generate breakthroughs in waste recycling processes, engineers will develop blueprints and standards for systems and operations, while analysts will create strategies for efficient scale-up and operational management.

15. Therefore, I am heartened by the partnership between NTU and CEA in working towards our goal of strengthening innovation and enterprise through R&D. I strongly believe that the efforts by SCARCE will lead to new capabilities for a vibrant e-waste recycling industry in Singapore, necessary to support our goal towards a circular economy.

**Conclusion**

16. On this note, I congratulate NTU and CEA on the opening of the SCARCE research centre, and look forward to the R&D work bearing fruit, as Singapore strives towards Zero Waste.

17. Thank you.

Mr President, Excellencies and distinguished delegates,

1. Allow me to begin by expressing my deepest condolences to families and loved ones of the victims of the ill-fated flight ET302.
2. I will first deliver Singapore's national statement, followed by the Asia Pacific statement arising from our meeting in January.
3. We must take urgent action to protect our planet for future generations.
4. To develop sustainably, we need a paradigm shift by changing our production and consumption patterns from the linear 'take-make-throw' approach, to a circular one that reuses resources endlessly.
5. This circular approach is supported by 3 pillars.
6. First, reducing our production and consumption with the support and participation from all stakeholders.
7. Second, building a strong foundation in science and innovation to turn waste into resource, and generate new economic spin-offs for our people.
8. Third, enhancing global and regional cooperation to accelerate the shift of economic systems towards more sustainable trajectories.
9. Let me share how Singapore is building on these pillars.
10. The key to achieving sustainable consumption and production, is to reduce what we produce and consume. This is why Singapore has designated 2019 as the Year Towards Zero Waste.
11. The aim is to imbue a greater awareness of resource scarcity and to mobilise the nation to protect our resources and environment by consuming and producing less.
12. We also need innovative solutions to maximise resource efficiency and do more with less.
13. This year, Singapore will begin construction of a world-first integrated facility for used water and solid waste treatment. It leverages circular economy principles to reap synergies from the water-energy-waste nexus.
14. To encourage others to find new ways to turn trash into treasure, we launched a S\$45 million 'Closing the Waste Loop' initiative to fund research supporting circular economy approaches.
15. National efforts are critical, but insufficient to address global environmental challenges.
16. Partnerships and dialogue through global platforms, such as UNEA, help accelerate the seeding of new ideas, adoption of innovative environmental solutions, and implementation of collaborative projects.
17. On a regional level, Singapore recently hosted the 3rd Forum of Ministers and Environment Authorities of the Asia Pacific as part of our efforts to galvanise regional action.
18. I will now present a statement on the outcome of the 3rd Forum of Ministers and Environment Authorities of Asia Pacific, held in Singapore in January this year.
19. I had the honour to chair this Ministerial meeting of 41 countries in the Asia Pacific region. The meeting saw a record turnout of over 35 high-level representatives, including a Head of State, a Head of Government, and Ministers.
20. In the interest of time, I will read out a summary of the four key outcomes of the Forum.
21. First, the Forum identified priority issues on sustainable consumption and production in this region. Delegates also shared their national actions and experiences on implementing solutions related to sustainable consumption and production, and discussed progress within the region on attaining the SDGs.
22. Second, the Forum noted the positive progress on regional implementation of resolutions and decisions

of the last UN Environment Assembly. The Forum further requested UNEP to scale up work on marine litter and plastic management, raise awareness on air pollution at national level, promote circular economy and resource efficiency.

23. Third, the participation of UNEA-4 President Siim Kiisler and his interaction with delegates on the draft Ministerial Declaration was appreciated. The Forum expressed support for a declaration that was ambitious but practical, reflecting the differences in national circumstances. The meeting also stressed the importance of providing technology, capacity building and financial support for developing countries.

24. And fourth, one common theme that emerged from the Forum was the need to have new forms of economic growth, such as the approach of circular economy in transforming waste into resources. Circular economy also requires strong research and development and innovation. Further, there is a need for a coordinated regional approach to promote a regional circular economy.

25. Overall, the Forum provided a useful opportunity for the countries in the Asia Pacific to exchange views and coordinate approaches. We look forward to the next Ministerial meeting to be hosted by the Republic of Korea.

26. The full version of the regional statement will be submitted to the Secretariat.

27. Thank you.

Ms Isabella Loh,

Chairman of the Singapore Environment Council

Distinguished Guests,

Ladies and Gentlemen,

Good morning. I am pleased to join you today to recognise some of the best Asian journalists and celebrate their journalism for the environment in Asia.

2 Indeed, our media play an important role to educate and build awareness on the impact of our actions on the environment. There are some issues that our region and the whole world face today. Therefore, the work that journalists do will be part of how we solve this problem. In the past, we used to think that environmental issues affected us alone; but we now know that environmental issues affect the whole world in one way or another. Some of the good work displayed today include local media Channel NewsAsia's report on the oil spill that occurred off Pulau Ubin in January 2017, following a collision between two container vessels. This beach has now been cleaned up and reopened, but there is still an impact on the ecosystem, coastal habitats and mangroves. Your stories have the power to remind the public of the importance of environmental protection and its long-term impact, and to rally the public to take action.

3 This year, the Singapore Environment Council (SEC) received submissions from journalists from 22 countries. They cover a wide range of environmental issues, some very unique to their countries, which include impacts that have come about from climate change, pollution, biodiversity as well as environmental innovation. I am happy to present awards to 15 outstanding journalists from Asia today.

#### **Pursuit of sustainable development**

4 Asia is home to some of the fastest growing economies, and is a region with high population growth. It is challenging for regulatory frameworks to keep up with environmental conservation as it also pursues economic development. We always have to balance economic development and make environmental trade-offs, but it does not always have to be bad trade-offs. Some of these issues have been highlighted by the journalists receiving the awards today.

5 Singapore has also faced these challenges. From when we first started nation-building, we have always believed that we must never sacrifice environmental sustainability even though economic development was important and crucial for us. This principle has guided Singapore and borne fruit over the years. Indeed, I am always proud to share that Singapore was one of the first countries in the world to have a Ministry of the Environment in its early days. I had the privilege of sharing Singapore's sustainable development journey at our High Level Political Forum on Sustainable Development last year in the UN.

6 Today, in the face of climate change, the pursuit of environmental sustainability has become imperative. Singapore designated 2018 as the Year of Climate Action and we were one of the first in the world to do this. The purpose is to raise awareness for the public to take action against climate change, as it is not something for the government to act on alone. We are the first country in Southeast Asia to implement a carbon tax, but we are not implementing the carbon tax to raise revenue for fiscal purposes. We will use the \$1 billion collected over five years to transform our industries to become more energy-efficient, and to co-fund their projects so that they need and use less energy.

7 Internationally, we also organised the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and involved other partners from China, Korea and Japan in the Expanded-SAMCA to bring together resources and abilities for our ASEAN Member States. At the same time, we launched the Climate Action Package to help fellow ASEAN Member States to keep up with the challenges that they need to face in addressing climate change.

8 Singapore is working closely with the ASEAN community on other environment initiatives, which include: (i) courses on sustainable development under the Singapore Cooperation Programme (SCP), where Singapore shares our approach to tackling waste and preventing pollution; (ii) a workshop conducted with

Norway on integrated waste management as a means to reduce marine litter; and (iii) a policy dialogue on circular economy, between ASEAN Member States and the EU to exchange ideas and best practices and to explore collaborative partnerships.

9 Our 3P partners also play an important part. For example, SEC's Singapore Green Labelling Scheme (SGLS) for pulp and paper has steered the industry toward sustainable practices. The enhanced criteria under the SGLS demands pulp and paper companies to provide a full disclosure of the companies' supply chain and a zero-burning policy as part of their fire prevention and peatland management systems. As of February 2019, nine companies have achieved the certification.

### **Year Towards Zero Waste**

10 Another serious environmental issue that the world faces, is the growing problem of waste. This is why my Ministry has declared 2019 as the Year Towards Zero Waste for Singapore. Like climate action, it is to raise awareness of the challenges we will face as a nation in addressing waste problems and to take action together. In 2017, we generated 7.7 million tonnes of waste. At this rate, our only landfill, Semakau landfill, which was designed for long-term use, will now be filled up by 2035. Therefore, it is important for us to build a strong culture of reducing, reusing and recycling.

11 We will release our inaugural Zero Waste Masterplan later this year. The Masterplan will detail our plans to manage three key waste streams: (i) Food waste; (ii) Packaging waste, including plastics; and (iii) Electrical and electronic waste. In developing the Masterplan, we intend to engage our stakeholders - the People, Private and Public Sectors to gather a broad diversity of ideas, so that we move Singapore towards a zero waste nation together. I welcome you to participate in the current online public consultation at [www.towardszerowaste.sg](http://www.towardszerowaste.sg) which will close on 29 Mar 2019.

12 At the Committee of Supply (COS) debate earlier this month, I shared about how Singapore should break away from a linear economy, where we 'take, make and dispose', because it is not sustainable. We need to reuse and recycle our resources right at every stage of the product lifecycle. When doing so, there is opportunity for us to turn trash into treasure. We can only do that when we close the waste loop, like how we closed the water loop. This will help us overcome resource constraints, because we can keep what we have within our economy and reuse it. There is no need for us to exploit the environment. We can then create economic opportunities, new jobs and good enterprises that can participate in the circular economy.

### **Conclusion**

13 Climate change, pollution and waste are some of the common and growing environmental challenges that we face acutely in Asia, and also globally. There is an urgent need for us to combat these challenges and build a more resilient and sustainable future for our countries. Our media play an important role. They need to inspire and galvanise action so that we can resolve these issues in each of our countries and also collectively.

14 Let me congratulate the journalists who are winning the awards today on the excellent work you have done in reporting on the environment and shaping public opinion on the urgency to take action today for a better tomorrow. I urge you to continue on this important mission and to rally our society to make an impact for positive change. I wish you an enjoyable afternoon.

Thank you.

1 Good evening. It's a pleasure to be here with all of you at the first ever GoBlue4SG Night Carnival. Today is also World Water Day, a day designated by the United Nations to focus global attention on the importance of water and to advocate sustainable management of water resources.

### **GoBlue4SG Movement**

2 Singapore celebrates World Water Day in March every year, by holding a series of activities such as water rationing exercises in schools, roadshows, and walkathons involving diverse community groups to build awareness of the importance of water conservation.

3 This year, PUB started the GoBlue4SG movement to rally the public and businesses to support and champion the water cause, as well as to build a strong water-conscious culture in Singapore. I am glad that the movement has garnered strong support from the community. Retailers are offering products and promotions or "blue deals" in support of the movement. PUB's community partners have also taken the lead to organise initiatives to engage employees, customers, and members of the public on the importance of water conservation in Singapore. To demonstrate their commitment to water conservation and support for the water cause, close to 30 buildings and bridges island-wide will be lit up in blue tonight, more than double the number last year! You can see some of them from here, such as Gardens by the Bay, Marina Bay Sands and the Singapore Flyer. Even the Permanent Mission of Singapore to the United Nations in New York has joined us in going blue.

4 Close to 800 community partners from various sectors – schools, grassroots, NGOs, and corporates – have come on board to join our water cause this year. This is a marked increase from 698 partners in 2018. I would like to commend PUB for its efforts to engage stakeholders and recruit more partners to the water cause.

### **Green Labelling Scheme**

5 Water demand is projected to double by 2060, and we will need all stakeholders, from both the domestic and non-domestic sectors, to join us in efforts to conserve water and reduce water demand. By doing so, we can help to ensure a reliable and adequate water supply for future generations.

### Domestic measures

6 I'm heartened that Singapore's daily household water consumption has decreased from 148 litres per person in 2016 to 141 litres per person in 2018. PUB's multi-pronged approach, which includes public engagement and regulatory measures such as the introduction of minimum water efficiency standards and the mandatory water efficiency labelling of water fittings and

appliances, have helped households in Singapore to become more water-efficient.

7 In particular, we have progressively expanded the Mandatory Water Efficiency Labelling Scheme to cover more water fittings and appliances, and phased out the less water-efficient products. This helps all of us to choose more water-efficient products for our homes.

8 Showers account for the largest usage of water in our households, making up about one-third of total usage! To reduce water usage during showers, PUB launched a demonstration project with HDB last year to install smart shower devices that offer real-time data of water usage, in almost 10,000 new BTO flats. We hope to empower more households with such devices to change their showering habits to save water. Let us all strive to use less water in our homes so that we can achieve the target of 130 litres per person by 2030!

#### Non-domestic measures

9 It is also important that the non-domestic sector steps up their efforts to conserve water. PUB has introduced a number of initiatives such as the Mandatory Water Efficiency Management Plan (MWEMP) and Water Efficient Building Certification to encourage facility owners to identify ways to use water more efficiently. PUB also helps by co-funding water efficiency projects within organisations through the Water Efficiency Fund.

10 PUB is now working with the Singapore Environment Council (SEC) to develop a voluntary Green Labelling Scheme for commercial dishwashers, commercial washer extractors and high pressure jet machines in Singapore. This will enable non-domestic customers such as hotels, F&B outlets and town councils to make informed purchasing choices on the water efficiency of the equipment used in their business operations.

11 Besides water efficiency, the criteria for the Green Labelling scheme will include energy efficiency, waste management, recyclability and environmental guidelines. Details of the scheme will be finalised and announced shortly.

#### **Conclusion**

12 To conclude, I would like to thank all the partners and participants who have organised and joined the various water conservation activities. I hope we can keep the spirit of the GoBlue4SG movement going – to love and value our water every day, and to make every drop count.

13 To everyone else, thank you for being here tonight to show your support. I hope you will actively encourage your friends and family to save water, and remind everyone that water conservation is a lifelong habit and commitment.

Together, we can build a strong water-saving culture in Singapore, which is critical for our long-term water security and sustainability.

14 I wish you all a pleasant evening. Thank you.

Good morning!

1 I am glad to join all of you here today for the launch of Eat Shop Play, and to celebrate Hawkers' Day 2019.

2 As some of you may know, my mother used to run a stall selling local desserts like tau suan, soon kuay and choo bee png. For many years when I was young, I helped her in her trade. Today, I visit hawker centres frequently with my family, and have become friends with hawkers whose stalls I have patronised for decades. Our hawker culture is close to my heart, and I am very glad that various stakeholders such as Eat Shop Play and its business partners, hawker associations and public agencies have come together to dedicate a day to celebrate our hawkers.

3 My story is not unique. Hawkers and hawker centres have become integral to the lives of many Singaporeans over the years. Not only are hawker centres destinations for well-loved and affordable local food, they enable our hawkers to earn a decent livelihood. Hawker centres are our community dining rooms where Singaporeans gather with friends and neighbours, regardless of race, language or religion, to bond over food. They are a distinctive and defining part of Singapore's local culture.

4 This is why we have nominated our hawker culture to be inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity. Earlier this week, we announced the submission of our nomination dossier to UNESCO. The nomination has received strong support from Singaporeans from all walks of life. More than 850,000 have pledged their support so far. Over the past eight months, we have seen our fellow Singaporeans expressing what hawker culture means to them. These heartfelt and inspiring stories show that hawker culture is truly central to our Singaporean identity. We have to preserve this so that it can be passed down to many generations to come.

5 The government will continue to develop and support the hawker trade. At the recent Committee of Supply debate, I announced that we are enhancing our Incubation Stall Programme to attract new hawkers to the trade. We have extended the 50 per cent off rental rates for the incubation stalls from six to nine months. The Productive Hawker Centres grant for stallholders in existing centres will be extended from the current two-year grant period to four years, with step-down funding of 50 per cent and 30 per cent in the third and fourth year respectively.

政府将继续支持与发展小贩行业。我在今年的政府拨款委员会辩论中，宣布政府将进一步优化“培训新手摊贩计划”，以吸引更多人加入小贩行业。我们将把新手摊贩所享有的百分之50租金回扣，从现有的6个月延长至9个月。另外，为了进一步帮助在现有小贩中心营业的摊贩，我们将把小贩中心生产力资助金的实行期从两年延长至四年。在这项计划下，小贩们在第三及第四年里将可分别获得百分之50以及百分之30的资助。

6 The preservation of our hawker culture must go beyond the efforts of the Government. Our hawker culture is defined by all of us, and we must do our part to support the trade. Eat Shop Play is a good example of a ground-up initiative to promote our hawker culture, and help it to evolve with changing needs. Based on data from IMDA, 84% of Singaporeans are Internet users. And according to the annual survey by We Are Social in 2018, 91 per cent of Singaporeans used smartphones. Hence, hawkers can benefit by tapping on digital platforms to reach a wider group of patrons and market their food, in order to increase footfall and sales.

我们多年来的饮食习惯还有生活方式塑造了我国独特的小贩文化。要确保小贩文化代代相传，不能单靠政府的努力。大家必须各尽一份力，支持小贩行业。这项由社区发起的《吃喝玩乐在邻里》计划就是很好的例子。这项计划将推广小贩文化，并帮助小贩迎合顾客需求的改变。根据资讯通信媒体发展局（所公布的数据，有百分之84的国人使用互联网。另外，根据社交媒体顾问公司 We Are Social 在 2018 年进行的统计，有百分之91的国人使用智能手机。因此，小贩应该抓紧商机使用数码平台向更广泛的顾客群推销美食，以吸引更多顾客来光顾。

7 The Eat Shop Play app will enable hawkers to connect with their customers and promote their food to a digital audience. Customers will be able to find information such as stall addresses, and opening hours

of hawker centres. Such features would enhance their hawker centre experience because they would not end up making “wasted” trips to hawker stalls that are closed, and can easily search for hawker centres in the vicinity, wherever they are. Customers can also use the app to explore new hawker centres if they find the stalls listed in the app interesting. I am glad that 25 hawker centre associations have agreed to join this platform.

《吃喝玩乐在邻里》的应用程序,不但能让小贩们与顾客交流,也是小贩们的宣传平台。顾客可利用应用程序查询小贩中心的地址与营业时间,弹指间就可轻松地搜索附近的小贩中心,并查询他们喜爱的小贩摊位是否有开档营业,不会白跑一趟。我很高兴已有25个小贩中心商联会同意加入这个平台。

8 Eat Shop Play has also collaborated with ITE to develop their website and to organise this launch today. The passion and hard work put in by everyone behind the scenes is evident. I would like to express my appreciation to Ms Tan Puay Hoon and Ms Nicole Lim for taking the initiative to come up with Eat shop Play, and organising Hawkers’ Day 2019. I would also like to commend the ITE lecturers and students for a well-organised event, and a creative online platform.

9 Let me conclude with some trivia. About a 12-minute drive from here is Chomp Chomp Food Centre. Opened in 1972, Chomp Chomp Food Centre’s unique name is an English adaptation of the older Teochew name “Tiong Tiong”. For those unfamiliar with Teochew, it means “loyalty and righteousness”. Our hawkers embody these traits – some choose to remain at their original locations to loyally serve their regular customers, and others are righteous in keeping their dishes affordable while staying true to their original recipes. I hope you will be inspired to find out more about our rich hawker heritage, and support hawkers by patronising their stalls with your families and friends. Together, we can safeguard our hawker culture for generations to come. Thank you.

Dr George Jacobs, President, Centre for a Responsible Future

Esteemed speakers and panellists,

Ladies and gentlemen,

Good morning. Thank you for inviting me to speak today. I am glad that the event is certified zero waste, which is in line with our Year Towards Zero Waste. In a few days, the Singapore Food Agency will be set up, and it will join the Ministry of the Environment and Water Resources family. They will be in charge of everything related to food, from farm to fork. This Summit is a good opportunity for me to share with you our Singapore Food Story.

### **Singapore Food Story**

2 All of you would know that Singapore is famous as a food haven. Our hawker food recently even took centre stage in one of the memorable opening scenes for the Hollywood film, Crazy Rich Asians. But our food supply stories are lesser known. More than 90 per cent of the food we consume today is imported, from 180 countries. Although our local food production output has been rising over the years, only a small amount of food is produced locally today – to be precise, 13 per cent of leafy vegetables, 9 per cent of fish and 24 per cent of eggs. Despite that, Singapore has been ranked top in the world by the 2018 Global Food Security Index in ensuring our citizens have access to safe and nutritious food at affordable prices.

3 However, our reliance on food imports makes us vulnerable to global trends that impact food supply and safety around the world. Climate change, growing complexity in food systems, new business models and food products, urbanisation, and resource depletion, are challenges that we must address to ensure a sustainable food supply. Our Singapore Story has been about turning adversity into opportunity. One of the most well-known aspect is our Water Story. Our Singapore Food Story can be similar, as we seek to turn our food challenges into opportunities and a strategic advantage, to ensure and secure a supply of safe food for all.

### **Achieving our “30 by 30” vision**

4 To build up our food security, Singapore intends to pursue three strategies. First, we will continue to work with food importers to diversify our import sources. Second, we will increase our local food production. Third, we will continue to support our companies to expand and grow overseas so that their produce can be exported back to Singapore. These three Food Baskets will assure we have a resilient food supply, just as we have four National Taps for our water supply.

Innovations into alternative proteins, such as plant-based meat, can contribute to Singapore's food security through the second and third Food Baskets.

5 As announced by Minister Masagos Zulkifli earlier this month, we have an ambitious plan to produce 30 per cent of our nutritional needs by 2030. The Singapore Food Agency, which will be set up on 1 April, will lead our drive to realise this "30-by-30" vision.

6 Let me explain. Many of you may be familiar with the concept of the healthy plate, as a guide to planning and serving a well-balanced meal. Under our 30-by-30 vision, we aim to ramp up our local production from less than 10 per cent today, to produce 30 per cent of our nutritional needs by 2030. 10 per cent will be protein foods, and 20 per cent will comprise fruits and vegetables, adding up to 30 per cent. To achieve this, we will need to develop and transform our agri-food industry to harness research and development, or R&D, become highly productive, and employ climate-resilient and sustainable technologies to grow more food with less resources.

7 R&D into break-through technologies to intensify food production within a small footprint and in a controlled, climate-resilient environment will be crucial to achieving our "30 by 30" goal. Through the Singapore Food Story R&D Programme, \$144 million of research funding will be made available to enable R&D in sustainable urban food production, future foods, and food safety science and innovation. We plan to launch the grant calls for the Singapore Food Story R&D Programme in the second half of the year. Industries such as the alternative proteins industry will benefit from it. Technological innovations in this industry can potentially help us to boost our local production capabilities, and improve our food security.

8 There is much opportunity for the growth of innovative food products and alternate proteins here in Singapore. The growth of our agri-food ecosystem also represents an economic opportunity to establish Singapore as a regional and global leader in innovative new food technologies. Events such as this Disruption in Food and Sustainability Summit provide a platform for our companies to showcase their innovations in food products. I look forward to seeing more innovative products from our agri-food industry.

9 Demand from consumers for innovative food products will be important to sustain a healthy and vibrant agri-food ecosystem. From the Government's point of view, it is important to maintain a well-balanced and healthy diet. Dietary preference, however, remains a personal choice as both plant and animal-based diets can help us to meet our nutritional needs. Nonetheless, among others, the Health Promotion Board does promote the consumption of a variety of quality protein foods such as tofu and legumes, as these are linked to better health outcomes. Given the variety of legumes available in the market today such as

dried peas and beans, there can be diverse ways to prepare them and add interest to our diet.

## **Conclusion**

10 At the beginning of my opening remarks, I commented that Singapore is a food haven. As we write our Singapore Food Story, I hope we will be successful in finding new ways to grow food within the constraints we face as a small urban city state that is water stressed. Then by 2030, we may become known not just for our passion for good food, but also for our passion in finding new and interesting ways of growing food.

11 Let me wish all of you a fruitful Summit ahead. Thank you.

Ladies and Gentlemen,

## **Introduction**

1. Good morning. We are here today to witness a new beginning — the official launch of the Singapore Food Agency, or SFA, a new statutory board under the MEWR family.

2. Over the past year, many of our officers across agencies have worked tirelessly to integrate relevant functions across the Agri-Food & Veterinary Authority (AVA), Health Sciences Authority and National Environment Agency (NEA), while ensuring that essential services continue without disruption. I have sat through briefings to understand the new food portfolio, and am very impressed with the passion and commitment of our people. Welcome to the MEWR Family. I am looking forward to working with all of you to write the next chapter of the Singapore Food Story.

## **The Singapore Food Story**

3. Just like water security, food security is an existential issue for Singapore. Both water and food security are integral to Singapore's national security. Despite Singapore's lack of natural resources and agricultural land, our officers have worked hard over the years to ensure that we have a secure supply of safe food. Singapore was ranked number 1 in the world in the Global Food Security Index last year.

4. But challenges lie ahead. The global agri-food landscape is changing rapidly. By 2050, global food demand will rise by 60 per cent with growth in the global population. Vital resources, such as water and energy will be increasingly scarce. The Intergovernmental Panel on Climate Change estimates widespread declines in crop yields of up to 25 per cent by 2050 due to climate change. As we import over 90 per cent of our food, Singapore's food supply could be at risk.

5. We also need to manage the risks from the growing complexities in global food supply chains. While the AVA together with other agencies have worked well together over the years to address food security and safety issues, we must ensure that our regime continues to stay well ahead of the curve.

## **Ensuring food security and safety from farm to fork**

6. The formation of SFA will consolidate NEA and AVA's capabilities in licensing, compliance management and investigation, and HSA's expertise in testing. This is the Government's commitment to strengthen food security and food safety from farm to fork. SFA will seize opportunities by turning the challenges into strategic advantages, just like what we have done for water. There is immense potential to transform our agri-food industry, develop our local enterprises and provide good jobs for Singaporeans.

7. At the Committee of Supply debate this year, I announced our ambitious plan to produce 30% of our food by 2030. Today, we produce less than 10%. To achieve our "30-by-30" vision, we will require our agri-food industry to adopt innovative solutions to raise productivity, apply R&D, strengthen climate resilience, and overcome resource constraints.

8. All these efforts to ensure and secure a supply of food will be futile, if food is unsafe for consumption. With the consolidation of capabilities, SFA will be overseeing food businesses across the supply chain. This will include more than 60,000 food manufacturers, central kitchens, caterers, restaurants and others. It will not be realistic for SFA to inspect and regulate every single entity. We have to partner the industry to harness technology and data, so as to make our regulatory regime more effective and efficient. This could include digitalisation of food tracing using blockchain technologies. We must also work towards greater accountability of the food industry for hygiene standards at their premises.

## **Unlocking new synergies in the MEWR family**

9. With 2019 being the Year Towards Zero Waste, it is timely to think of new ways to adopt a circular economy approach across the food-water-energy-waste nexus. I visited the Marine Aquaculture Centre, or MAC, on St John's Island in February. I noticed similarities between the water treatment technologies adopted at MAC's hatcheries to remove fish waste, and those adopted in PUB's water reclamation plants.

This is one example of an area where we can develop synergistic partnerships within the Ministry. Another example is the possible use of heat from our incineration plants to optimise water temperature for aquaculture purposes. Tropical marine fish grow better in warmer water temperatures, but it is expensive to heat up water. By applying the by-products from our incineration processes to fish breeding, we reap opportunities from harnessing circularity principles. We will continue to explore possibilities that can be unlocked through R&D, integrated upfront planning and design, and close collaboration with our industry partners.

## **Conclusion**

10. To conclude, SFA will take on a pivotal role in ensuring and securing a supply of safe food for Singapore. SFA will be well-placed to work with stakeholders to transform the agri-food industry, seize opportunities in the future food landscape, and provide good jobs for Singaporeans.

11. I encourage everyone to harness the business and employment opportunities offered by the agri-food industry, and support our home-grown farmers by consuming local produce.

12. Together, we can do our part to write another glorious chapter of the Singapore Food Story.

Thank you

Mr Jagadish, CEO of SSMC

Senior Members and Employees of SSMC

Distinguished guests

Ladies and gentlemen

### **Introduction**

1 Good afternoon. I am happy to be here to launch the Sustainability Week 2019 for Systems on Silicon Manufacturing Company (SSMC). The launch today marks the start of workshops and booths set up this week to generate greater awareness of the importance of sustainability, and to mobilise action. When you heard Mr Jagadish speaking about the vision of SSMC just now in terms of going green, adopting green practices as well as embarking on corporate social responsibility, many of you would have felt his passion for this cause. Let us give him and his employees a round of applause.

### **Building Sustainable Norms**

2 Indeed, SSMC has been a strong advocate of environmentally-friendly practices for many years. It has in place a five-year EcoVision programme to reduce waste generation and carbon emissions at source. It has also implemented 3R practices of Reduce, Reuse and Recycle throughout their operations. When I first stepped into the company, I could see all the awards that they have received for their corporate social responsibility and green practices, such as the Watermark Award in 2013 and the President's Award for the Environment in 2015.

3 SSMC has also actively supported the annual Singapore World Water Day, setting up exhibits on water saving tips at their office premises to educate their employees, and encouraging them to pledge to make every drop count. They also took part in the "Walk for Water" event, to demonstrate their strong commitment towards water conservation.

4 Beyond what it is doing internally, SSMC also engages the public through its corporate social responsibility efforts. They have engaged people of all ages in their efforts. One example is a recent workshop with Park View Primary School, where students were taught how to upcycle. In fact, some of these efforts can be seen at the booths here today. The end products were given to PCF Sparkletots Preschools. I am sure their efforts were much appreciated by the children.

5 SSMC's approach towards environment sustainability is commendable, and they have won multiple accolades for their efforts, including the prestigious President's Award for the Environment in 2015.

6 To effect the magnitude of change that we need for a sustainable Singapore, it is imperative that we build sustainable norms in industry practices, in our communities and in our everyday lives. I hope that through exemplary examples from SSMC, more companies will also come on board.

### **Towards a Zero Waste Nation**

7 This year, we designated 2019 as the Year Towards Zero Waste – to rally Singaporeans to build a strong culture of Reduce, Reuse and Recycle, and adopt a circular economy approach to resource management. In essence - to turn trash into treasure.

8 Let me explain why this is important. In 2018, Singapore generated about 7.7 million tonnes of waste. This amount is a seven-fold increase from 40 years ago, and is enough to fill 15,000 Olympic-size swimming pools. Even though we incinerate most of our waste to minimise what we send to our only landfill, we are

generating so much waste that we will run out of space on Semakau Landfill by 2035. We cannot continue like this. Otherwise, we will have to build another landfill and more incineration plants within our limited land.

9 The Ministry of the Environment and Water Resources has been working on our inaugural Zero Waste Masterplan. The Masterplan will detail our upcoming policies to address three key types of waste – food waste, electrical and electronic equipment waste, and packaging waste (including plastics). We have consulted widely on the Masterplan. Last year, the National Environment Agency consulted more than 250 companies. Last month, we did a public consultation online. This month, we will be holding two focus group discussions with partners and members of the public.

10 We are doing this because in order to achieve our vision of a zero waste nation, we will need a whole-of-nation effort. Everyone can contribute. While the government can lead the way by implementing the necessary policies and legislation, we need everyone to work together to reduce our waste, reuse products and materials for as long as possible, and recycle right. We need businesses to explore how they can adopt circular economy principles, to design products which last longer, which can be recycled easily, and which use less packaging.

11 Our 3P partners, with their networks and influence, also play an important role in encouraging positive behavior amongst the community. I am heartened to see more businesses, civil society groups and individuals stepping up to organise ground-up initiatives, like the Sustainability Week by SSMC that we are launching today. Thank you for your commendable efforts in rallying everyone, not only within SSMC, but also the community to be here today.

### **Conclusion**

12 I thank SSMC for organising the Sustainability Week, and hope that the event will inspire everyone involved to care for and protect our environment. Indeed, everyone can make a difference in protecting and conserving our environment.

Thank you.

Distinguished guests,  
Ladies and gentlemen,

1. I am pleased to join you today to mark the commencement of tunnelling works for Phase 2 of the Deep Tunnel Sewerage System, or DTSS. This is another key milestone in one of Singapore's most significant water infrastructure projects.

2. A total of 19 tunnel boring machines will be deployed for this phase of the project. The machines will dig deep underground to create a network of tunnels and link sewers to serve the western and downtown parts of Singapore. Some \$2.3 billion will be devoted to this endeavour. That's nearly a third of the \$6.5 billion price tag for the entire DTSS Phase 2. This is a significant and necessary investment to meet our population's long-term water needs and enhance the sustainability of our water supply.

### **SUSTAINABLE SEWERAGE SYSTEM**

3. For a highly urbanised and densely populated city state like Singapore, a proper wastewater management system is important to protect our environment, public health and water sources. The DTSS allows us to transform our used water system to support Singapore's growing water needs and ensure an effective and efficient sewerage system for Singaporeans. This is why PUB undertook the project.

4. Borne out of a bold vision conceived some 25 years ago, the DTSS is a powerful example of how, by planning decades ahead, and investing in innovative solutions, we can overcome challenges and turn them into opportunities. The DTSS is also an example of how we have applied circular economy strategies successfully in our water system. By conveying used water entirely via gravity to centralised water reclamation plants for treatment and recycling into NEWater, every drop of used water will be continually reused, closing our water loop. The risk of cross-contamination between Singapore's water catchments and used water system will also be minimised.

5. DTSS Phase 1 was completed in 2008 to serve the eastern part of Singapore. Under Phase 2, the DTSS will serve the western and downtown areas, including upcoming developments such as the Jurong Lake District, Tengah Town and the Greater Southern Waterfront. A 100km network – comprising 40km of deep tunnels and 60km of link sewers – will be built. All five deep tunnel contracts have been awarded, and six out of 13 contracts for the link sewers have been awarded.

6. When construction of Phase 2 concludes by 2025, the whole of Singapore will be served by the DTSS, and it will be one of the largest integrated underground sewerage system in the world. It took hard work by many engineers to realise this vision. I am happy that some of the pioneers of the DTSS project are here with us today. Please join me in thanking them for their contributions.

7. The DTSS will bring tremendous economic benefits for Singapore. Existing water reclamation plants and pumping stations, as well as buffer land around the reclamation plants, will be phased out when they reach the end of their economic lifespans, freeing up space for higher value developments. Some 150 hectares of land – about the size of 214 football fields – will be made available.

### **TUAS NEXUS**

8. The deep tunnels and link sewers will convey used water to the future Tuas Nexus. As an integrated used water treatment and waste management facility, Tuas Nexus will harness synergies from the water-energy-waste nexus by co-locating PUB's Tuas Water Reclamation Plant and NEA's Integrated Waste Management Facility. When completed,

the Tuas Nexus facility will achieve high energy self-sufficiency, by co-digesting used water sludge and food waste to improve biogas yield and energy efficiency in used water treatment.

### **SMART AND SAFE SEWERAGE SYSTEM**

9. Besides being part of a sustainable water system, DTSS Phase 2 will also be a smart and safe sewerage system.

10. During construction, the DTSS team will be using a smart monitoring system to monitor and gather real-time information on the construction progress, and location of the tunnel boring machines and pipe jacking machines during the tunnelling works.

11. Once the tunnels are completed, the use of Remotely Operated Vehicles and embedded fibre optic cables will allow for remote monitoring. This minimises the need for officers and contractors to enter the shafts, improving overall work safety. If maintenance is needed, individual segments of the tunnel can be isolated to prevent any disruption to water flow. This is also the first project to use a combination of air jumpers and odour control facilities to prevent odorous air from escaping into the surroundings.

12. These deep tunnels will have enhanced resilience thanks to a special concrete mix that will offer better protection against corrosion from sewage gases. Underwater sections of the deep tunnel at Tuas Bay and Sentosa will have an additional waterproof membrane to ensure the tunnel is water-tight.

### **DEEP EXPERTISE INVOLVED**

13. The construction of DTSS Phase 2 is a challenging project. We will have to navigate the different ground conditions in the Jurong Formation and dig deep to tunnel beneath existing underground infrastructure. But I am confident that our team of skilled engineers are up to the task. PUB's senior engineer Loh Siew Hui, who oversees the planning and construction of one of the deep tunnel segments, is one of them. Siew Hui is an experienced hand when it comes to tunnelling work, having also been involved in PUB's sewer and NEWater pipeline projects. She is an excellent example of how our engineers have acquired the knowledge and skills to take on larger, more complex and world-class projects.

### **CONCLUSION**

14. Tunnelling works for DTSS Phase 2 will commence shortly after today's event. I wish the DTSS team every success, as we work together to enhance the sustainability of our water resource, and write the next chapter of our Singapore Water Story.

Thank you.

Mayor Dr Teo Ho Pin

Mr Amrin Amin, Adviser to Woodlands GROs

Mr David Sim, Chairman of Woodlands CCC

Ladies and gentlemen

1 Good morning. Thank you for joining us today for the launch of the National Dengue Prevention Campaign 2019.

### **Increase in Dengue Cases**

2 Dengue is an ongoing threat, and the effects of climate change will exacerbate this challenge. In the first quarter of 2019, we saw over 2,000 dengue cases in Singapore, with three deaths from dengue fever. The number of cases is more than a three-fold increase from the same period last year. The National Environment Agency, or NEA, has also found from its Gravitrap surveillance system that the mosquito population remains high.

3 This predicament is not unique to Singapore. Indonesia, for instance, has reported a sharp spike in dengue cases in January 2019, with more than 13,000 cases and 133 deaths reported. And in Malaysia, according to their i-dengue website, there were 34,222 dengue cases between 30<sup>th</sup> December 2018 and 23<sup>rd</sup> March 2019, which is more than twice the number of cases reported over a similar period last year.

4 We are fast approaching the warmer months, which has traditionally been the peak dengue season. Warm weather is optimal for accelerated breeding of the *Aedes* mosquitoes, and is likely to lead to an increase in the number of dengue cases. Hence, it is imperative that we be extra vigilant to contain dengue.

### **Dengue Prevention Strategy**

5 NEA has a holistic and rigorous vector control strategy comprising four key thrusts. First, **effective surveillance**. NEA has successfully deployed its Gravitrap surveillance system in all HDB estates. The Gravitrap is a mosquito trap which allows NEA to capture female *Aedes* mosquitoes and their eggs. By deploying them in all HDB estates, NEA is able to get an overview of the mosquito density in different parts of Singapore. This helps our officers to plan the distribution of resources to focus on areas with high mosquito population, thus enabling more efficient deployment of limited manpower resources. The Gravitrap surveillance system has enabled NEA to remove 21 per cent more breeding habitats last year, compared to 2017. Riding on the success of this innovative surveillance technology, NEA will progressively expand the deployment of the Gravitrap surveillance system to landed estates, in the second half of this year.

6 Second, **prevention and control measures to keep the mosquito population low**. You may have heard of 'Project Wolbachia – Singapore'. Under this project, NEA has been studying the feasibility of releasing Wolbachia-carrying male *Aedes* mosquitoes into the community to reduce the mosquito population and lower transmission of dengue. When the male Wolbachia-*Aedes* mosquitoes mate with female *Aedes* mosquitoes, they produce eggs that do not hatch. NEA has seen some very encouraging results from the recently-concluded phase 2 study. In the study at Nee Soon East, we observed that the *Aedes* mosquito population has decreased by about 80 per cent, and in Tampines West, it has decreased by 70 per cent. When I visited the Phase 3 field study at Tampines West in February, my residents welcomed this novel approach to reduce the mosquito population. We are thankful for their support.

7 NEA's collaborations with local and international companies to increase the efficiency of Project Wolbachia are also bearing fruit. One example is the partnership with home-grown Orinno Technology Pte Ltd to develop a launcher that systematically and uniformly releases mosquitoes. Verily – a Google affiliate – has also developed a sorter that accurately separates male mosquitoes using artificial intelligence. These male Wolbachia-*Aedes* mosquitoes, which do not bite, are released at high-rise residential blocks. These innovations have helped Project Wolbachia's progress, and we look forward to more technological breakthroughs.

8 However, we cannot rely solely on science and technology in our fight against dengue. This brings me to the third key thrust, which is **swift and robust outbreak management to break disease transmission**. Whenever there is an outbreak, NEA, together with the Inter-Agency Dengue Task Force and Town Councils, immediately launches intensive source reduction exercises to remove potential mosquito breeding habitats in public areas and housing estates. In 2018, NEA conducted close to one million inspections for mosquito breeding, including about 9,000 checks at construction sites, and it uncovered about 18,000 mosquito breeding habitats.

9 The last, but equally important thrust, is **community vigilance and involvement**. This is the reason why we are gathered here today. The Government can only do so much to fight dengue. To win the war on dengue, we need everyone to be vigilant and to play their part. All of us have a responsibility to remove stagnant water at home. Common breeding spots include pails, dish trays, flower pot plates and vases. All it takes is a 20-cent-sized drop of water for mosquitoes to breed.

10 This morning, Mayors, local Grassroots Advisers, community leaders and Dengue Prevention Volunteers will be visiting neighbourhoods across the island to share with residents some dengue prevention tips, including how to identify potential mosquito breeding areas. The continuous support of our local communities has helped us tremendously in the past, and will continue to be an important part of our war against dengue.

### **Conclusion**

11 Let me conclude by thanking all our grassroots leaders, volunteers and residents who have partnered us in our dengue prevention efforts. Let us continue to stay vigilant, and practise the five-step Mozzie Wipeout to protect ourselves and our loved ones. Thank you.

Teachers,  
Students,  
Partners,

Good afternoon. It is my pleasure to join you again for Youth for the Environment Day, or YED.

### **Sustaining the Climate Action Momentum**

2 At YED 2018, which took place in our Year of Climate Action, I called on schools and students to reduce our carbon footprint by consuming less and recycling more. The responses have been encouraging. Schools have organised more than 60 climate action-related projects tapping on the National Environment Agency's Environment Fund for Schools. One example is Broadrick Secondary School, which organised school-wide activities to collect used paper and e-waste for recycling. We can reuse the materials from the e-waste collected.

3 With the collective efforts of all Singaporeans, we collected more than 340,000 climate action pledges. In fact, we are the first in the world to declare a Year of Climate Action. We reported this at the United Nations last year, and several countries have told me that they are thinking of embarking on similar efforts to mobilize their populations to fight climate change. But our climate action efforts must not stop here. We cannot have a campaign for a year and lose the momentum after. An area where we can do more, is waste management.

### **Becoming a Zero Waste Nation**

4 We are facing a growing waste problem. Our population is growing and our economy is doing better. As a result, we are consuming and throwing more. In 2018, we generated 7.7 million tonnes of waste. This is equivalent to the weight of close to 530,000 double-decker buses. At the current rate of waste generation, our only landfill, Semakau Landfill, will run out of space by 2035. This is not a long time from now. We have to make Semakau Landfill last as long as possible by being responsible consumers and disposing of our waste properly.

5 This is why we designated 2019 as our Year Towards Zero Waste. We need to work together as a country to Reduce, Reuse and Recycle Right, and adopt a zero waste mindset. We have to re-think how we produce and move away from a linear economy, where we take from nature, make something of it, use it, and throw it after. In a circular economy, we manage our resources, reusing them again and again, for as long as possible. After we open a can of food for a meal, we should rinse the can and bring it to the blue recycling bin so that it can be processed for reuse. If we do not finish our food, we can collect the leftovers and turn them into compost for the community garden. This is what we mean by the

circular economy approach, where we actively reuse and recycle materials. If we do that, our trash will turn into treasure. We can derive a lot of reusable minerals or materials from waste, instead of throwing them. We can turn Singapore into an urban mine. This will bring us towards sustainable production and consumption.

6 Moving towards a circular economy will mean more opportunities for our enterprises. It also means new jobs for you by the time you finish school. We need designers to design products that minimise environmental impact while maximising product life cycle and recyclability. We need engineers to develop standards for waste management and recycling operations. We need scientists to study microorganisms for efficient food waste processing. Instead of having to bring your food waste into schools and shopping malls, we can have such processing done at home, so that the compost can be used to grow food right within your home. We also need analysts to study the data collected and strategists to think about how we can scale it up. Upcycling our materials will also involve engineering, chemistry, design and a whole set of other skills and expertise. We can have a whole new economy for the environment. We have done this for water, where we have closed the loop, producing 14,000 jobs and generating an annual value-add of 2.5 billion dollars for our economy.

## **Efforts in Moving Towards Zero Waste**

7 Circular economy efforts are not entirely new in Singapore. Since 2017, 10 schools have been participating in Love Your Food @ Schools, an NEA project that help students to understand why they need to segregate their leftover food. ITE College Central, our venue host and co-organiser of YED event, has also been a strong advocate in promoting a Zero Waste culture. Last month, ITE College staff initiated a “One Less Straw” Campaign on campus to reduce the use of disposables. Other programmes include a joint e-waste recycling drive with Hewlett Packard, and a collaboration with The Food Bank Singapore to reduce food waste.

8 Another advocate of environmental sustainability is Ms Amanda Chow from Temasek Secondary School. Amanda and her juniors demonstrated that environmental engagement must go beyond campuses. They taught senior citizens and preschoolers how to make handicraft from recycled materials, and encouraged them to reduce their use of plastics. She is here with us today. Let us give Amanda, ITE College staff and all our environmental champions a round of applause.

## **A Zero Waste Nation begins with you**

9 To convince others to change, all of us must walk the talk. We must show our friends and families what it means to become responsible consumers, and tell producers to become responsible producers. There are many ways that you

can help reduce our waste — order only the amount of food you can finish, and bring a reusable bottle and bag with you. Our water is amongst the cleanest in the world. It is ready to drink straight from the tap. Bring your own bottles, put the water into your bottle, and bring it everywhere for you to drink. Stop buying PET bottles so that we do not have to dispose of them. Make sure your items are suitable for the blue recycling bin by checking the label on it. Not everything should be thrown in the recycling bin. Recycle right by not contaminating recyclables with food and liquid.

10 Earlier this month, NEA launched the “Towards Zero Waste Challenge”. It calls on schools and students to adopt environmentally-friendly practices to reduce wastage. Let us do our part. Eliminate single-use plastic bottles and disposable cutlery at your events.

### **Conclusion**

11 You are the youths of today and leaders of tomorrow. You have a very important role to play. We need you to rally the community to care for our environment. Let us lead by example with our positive actions. Together, we can bring Singapore closer to a Zero Waste Nation.

Thank you.

Mr Loh Chin Hua

CEO of Keppel Corporation

Mr Tan Swee Yiow

CEO of Keppel Land

Ladies and Gentlemen,

1 Good evening. I am encouraged to see so many of you at tonight's screening. This shows that there is a lot of interest in sustainable development and circular economy.

2 Singapore has always believed that environmental sustainability can and must complement economic development. This unwavering principle has guided our policies and enabled our people to live in a clean and green environment, with good jobs and education.

3 But challenges lie ahead. Climate change will have an increasing impact on our environment, food and water supplies. According to a 2018 World Bank report, rapid urbanisation, population growth and economic development will see global waste increase by 70 per cent over the next 30 years.

4 In Singapore, waste disposed has increased seven-fold over the past 40 years. In 2018, we generated 7.7 million tonnes of waste. This is equivalent to the weight of 530,000 double-decker buses. This is not sustainable. If we continue with our current rate of waste generation, Semakau Landfill, our only landfill, will run out of space by 2035. We cannot keep building new landfills.

5 This is why we have designated 2019 as our Year Towards Zero Waste. We need to reduce our waste and move towards more sustainable consumption. But beyond that, we should adopt a circular economy approach to the way we use our resources. Our vision is to turn our trash into treasure, and reuse and recycle our resources for as long as possible.

6 To do this well, we need to invest in R&D. The National Environment Agency has set aside \$45million under the "Closing the Waste Loop" R&D initiative to fund projects adopting circular economy approaches. Such

investments will bring about new opportunities for our enterprises, and consequently, more jobs for Singaporeans.

7 At the individual level, we can also try closing the waste loop in our own homes. For example, instead of throwing our food waste down the rubbish chute, we can convert them into compost and use them to grow vegetables that we can eat. If enough of us do this, we can reduce the number of rubbish trucks needed to transport our rubbish to the incinerator. This will reduce carbon emission, and help mitigate climate change. In short, there are immense possibilities to make a difference.

8 I understand that today's documentary explores five key strategies for achieving circularity – reduce, reuse, recycle, renew and reinvent. It will showcase successful models from around the world, and feature insights from experts. I hope the documentary will inspire you to do your part for the environment. Every positive action counts, and collectively, we can build a sustainable Singapore.

### **Conclusion**

9 To conclude, I would like to thank Keppel Corporation, Singapore Botanic Gardens and their partners for organising this event today.

10 I wish you a wonderful evening.

Mr Gan Thiam Poh  
Deputy Chairman of the GPC for Environment and Water Resources

Ladies and Gentlemen

1 Good afternoon, residents of Seng Kang. Today we are here to launch a community initiative on a topic that is close to the hearts of Singaporeans — food.

## **Food Waste**

2 Singaporeans enjoy their food, be it at home, at a hawker centre, or in a restaurant. Unfortunately, our love for food has also contributed to a high volume of food waste, which is a key concern for my Ministry. In 2018, we generated 760,000 tonnes of food waste. This is equivalent to two bowls of rice per person per day.

3 This is why we have designated 2019 as our Year Towards Zero Waste. We want to encourage Singaporeans to Reduce, Reuse and Recycle, and make Singapore a Zero Waste Nation. How do we do this? Let me share two simple ways you can make a difference in helping to reduce food waste.

4 First, when eating out, try to do three things: i) Order only what you can finish; ii) Ask for less rice or noodles if you are not going to finish them; and iii) Say 'no' to side dishes that you won't eat.

5 Second, if you cook at home, try to buy and cook only what you can finish. Rice, noodles and bread are the most commonly wasted food items in households. And one quarter of households throw away spoilt or rotten food because they either bought too much or did not realise they had food hidden at the back of their fridge. This kind of waste is preventable, and will save you money if you are able to reduce it.

## **Compass One's Support of Food Waste Reduction**

6 Achieving our vision for zero waste will require a whole-of-nation effort. Businesses also play an important role. I am pleased that Compass One has pledged support for The Food Bank's "Food Wastage Reduction & Fight Hunger" movement.

7 This is the first time that a shopping mall is partnering tenants and shoppers to donate excess cooked food and fresh produce to The Food Bank, which manages and distributes donated food to over 300 charity organisations and beneficiaries in Singapore. This is a commendable effort, and I hope that other shopping malls and buildings will be inspired to do the same.

8 Apart from reducing food waste, Compass One is working with community partners to collect e-waste, plastic bottles and clothes for recycling and distribution. I hope the residents in Sengkang will participate actively in these efforts.

9 Becoming a Zero Waste Nation is not an impossible dream. Let us all do our part to Reduce, Reuse and Recycle, because every positive effort counts.

Thank you.

Ladies and gentlemen,

## **Introduction**

1 Good afternoon, everyone. I thank all of you for joining us today, to talk about an environmental issue that is of growing concern, and that is waste.

## **Need for a Circular Economy Approach to Resource Management**

2 The amount of waste disposed in Singapore has increased seven-fold over the last 40 years. Last year, we generated close to 8 million tonnes of waste. That is equivalent to the weight of close to 530,000 double-decker buses. This is a waste of precious resources, and is not sustainable. If we continue at this rate, we will fill up the Semakau landfill, our only landfill, in about 15 years' time – by 2035. We would also need to build new incineration plants, which will be a challenge for a land-scarce nation like Singapore.

3 This is why we have designated 2019 as our Year Towards Zero Waste. All of us should reflect on how we can reduce, reuse and recycle our resources better, as individuals, households, businesses and organisations. We need to move from a linear approach of make, use and throw, to adopt a circular economy approach of reusing and recycling resources for as long as possible. This will require us to rethink how we live, work and play, and adopt a zero waste mindset.

4 The benefits will be immense. Pursuing circular economy strategies involve turning trash into treasure. This is much like what we have done for water. We turn waste water into ultra clean, potable water. We are also hoping to close the waste loop. We are investing significant resources to do this. For example, we have committed \$12.5 million towards a joint research and development centre set up by the Nanyang Technological University and the French Alternative Energies and Atomic Energy Commission (CEA). The centre, called the "Singapore-CEA Alliance for Research in Circular Economy", or SCARCE, will develop innovative and environmentally-friendly solutions for recycling e-waste such as lithium-ion batteries and printed circuit boards.

5 By pursuing a circular economy approach, we will conserve our resources, and generate new jobs and business opportunities for our people.

## **Co-creating Zero Waste Solutions with Stakeholders and Public**

6 Last month, I mentioned in my speech at the Committee of Supply debate that realising the ambitions of our Zero Waste Masterplan will require strong partnerships to co-create and implement new solutions. This is why we have been consulting widely. Your views matter.

7 We have been engaging stakeholders including companies, NGOs, research and educational institutions on our zero waste plans. For example, last year, the National Environment Agency consulted more than 250 companies on measures to address our key waste streams. Our online public consultation last month and today's focus group discussion are part of the final phase of our consultation process.

8 Beyond hearing your views, we want to partner you to co-create and implement zero waste initiatives. Today's event is a good example. It is the first time my Ministry has teamed up with partners from the 3P sector – Zero Waste SG and LepakInSG – to co-organise a focus group discussion. I am confident that the insights and ideas we gather today will go a long way in helping us to formulate an actionable and sustainable Masterplan.

### **Strong Support for Zero Waste Initiatives**

9 Some of you were among the 1,300 respondents who participated in our online consultation last month. Let me share some of our key findings.

10 Most of the respondents supported initiatives that enhance convenience to practise the 3Rs. For instance, 73 per cent supported making it more convenient for people to donate excess food that is not expired, in order to reduce food waste. And 86 per cent supported making it more convenient to recycle electrical and electronic equipment.

11 Many of the respondents also agreed that changing habits, and proactive steps by the general public are important. Close to 90 per cent of the respondents supported initiatives to encourage people to “Bring Your Own”, or BYO, reusable bags and bottles.

12 To support behaviour change, over 70 per cent of respondents also supported the redesign of labels on the blue recycling bins to provide more information on recycling. Currently, 40 per cent of what goes into our blue bins cannot be recycled because they are either non-recyclables, or because they have been contaminated by food or liquids. This is why “Recycle Right” will be the theme for our next focus group discussion on 29 April.

13 We are grateful to the respondents who took time to share their views with us. More than half made the effort to provide additional suggestions, which was helpful. For example, there were suggestions to encourage composting in the community. There were also suggestions on leveraging technology to optimize waste collection and understand waste habits. There were also suggestions for more public education, especially that which is targeted at the young, on recycling.

14 Another interesting finding from the online consultation is that 85% of the respondents are below 45 years old. To me, this bodes well because it indicates that the young ones are concerned about environmental issues and are keen to take actions. The actions and decisions of our young will have the most impact on the sustainability of our future.

### **Conclusion**

15 I urge all of you to share openly during the discussions later. By bringing different stakeholders together, we hope to get multi-faceted perspectives on how we can collectively chart our path towards a Zero Waste Nation and a sustainable environment for our future generations.

16 Thank you and I wish all of you a fruitful session.

Ladies and gentlemen

Good morning. I am happy to see all of you here with us today.

**Current Situation**

2 Two weeks ago, the National Environment Agency launched this year's National Dengue Prevention Campaign to kick-start an intensive dengue outreach effort across Singapore. We had 2,457 dengue cases in the first 3 ½ months of 2019. This is more than three times the 678 cases we had in the same period last year. NEA has also seen from its Gravitrap surveillance system that the mosquito population remains high.

3 We are fast approaching the warmer months of the year, which is traditionally the peak dengue season. The warm conditions are conducive for mosquito breeding. Hence, it is imperative that we remain extra vigilant to prevent the breeding of mosquitoes to mitigate the risk of dengue.

### **Community Vigilance and Involvement**

4 Following the national dengue campaign launch on 7 April, 69 divisions across Singapore have organised more than 190 dengue prevention events and activities. Mayors, Grassroots Advisers, Community Leaders and Dengue Prevention Volunteers (DPVs) have visited residents to share dengue prevention tips, including how to identify potential mosquito breeding habitats. The continuous support of our local community has helped us tremendously, and will continue to be an important part of our war against dengue. More outreach activities and events are planned for the next two months to remind residents to be vigilant. I understand that NEA has also conducted a Dengue Prevention Volunteer (DPV) mass training session this morning. To the volunteers, thank you for stepping up to join us in the fight against dengue.

5 Source eradication of mosquito breeding habitats remains key to dengue prevention and control. I urge all residents to do their part by doing the 5-step Mozzie Wipeout. If you have not heard of the 5-step Mozzie Wipeout, please take some time today to find out more from our friendly Dengue Prevention Volunteers (DPVs).

### **Conclusion**

6 The government's efforts alone will not be enough to stem dengue transmission. Every one of us needs to keep our homes and surroundings free of stagnant water to prevent mosquito breeding. Remember, all it takes is a 20-cent sized drop of water for mosquitoes to breed in, and this will jeopardise all the efforts that we have put in place.

7 One additional dengue case is one too many. Let's all take action today to fight dengue, and protect ourselves and our loved ones. I wish all residents a wonderful weekend.

Thank you.

Mr Andrew Chan  
President of Singapore Pest Management Association (SPMA)

Speakers and Delegates

Members of SPMA

Ladies and Gentlemen,

Good morning, and a warm welcome to our friends from overseas who are here to add to the learning and experience sharing today.

#### **Singapore's clean and green journey**

2. Singapore has come a long way in our quest to be clean and green. Those who are old enough like myself will remember that in the 1960s, we were a dirty and polluted city. In fact, we had very poor sanitation as well. Over the years, we have put in place waste and vector management systems, and this has helped to safeguard our health and protect our environment. Indeed, we should be proud that within just one generation, every home has a toilet, everyone has access to clean sanitation and water.

3. Today, Singapore enjoys a global reputation of being a clean and liveable city, thanks to the work of people like yourself, and those who came before us. We have a very high standard of public health as well. Our founding fathers worked very hard so that we are now enjoying what they thought would be useful to put in place even before developing Singapore. And indeed, yourselves too - in pest management sector – play a very important role.

#### **Challenges in the Pest Management Sector**

4. But we cannot rest on our laurels. Things are changing in our environment in ways that even the pest management sector must take note of. Firstly, as our economy and consumption continues to grow, service demands and public expectations over performance standards will increase. Climate change, which can affect everything we do and how we live, will also lead to escalation of pest and vector problems. We may see a higher incidence of vector-borne diseases when higher temperatures are on us. Therefore, pest management businesses and employees must innovate continuously for a changing and challenging environment, use new technologies, improve efficiency and for in particular for Singapore due to our declining population, increase productivity.

#### **Transforming the Pest Management Sector**

5. I am encouraged to see that several of you in our pest management sector have begun embracing innovation and technology. Firms such as Anticimex Pest Management and Pestech Holding use sensors and data analytics to better monitor rodents and place traps effectively. So it is not just an art of putting things around and hoping that through experience, one will know how and where to put the traps, but also to use science to enhance this ability and effectiveness. Companies are also training their employees in insect biology and behaviour to tackle pest infestation upstream. Your partner, the National Environment Agency (NEA), has also collaborated with local and international companies to develop creative solutions to support the production and release of male *Wolbachia-Aedes* mosquitoes. In fact, five intellectual property patents have been filed from the innovations. These are good results, but we must do more.

6. To help companies transform, my Ministry launched the Environmental Services Industry Transformation Map, or ES ITM, in December 2017 for the cleaning and waste management sectors. Both sectors have since made good progress in innovation and productivity. The pest management sector shares similar market characteristics and challenges with these two sectors. I am pleased to announce that we will now include the pest management sector in the ES ITM. With this integration, businesses will be able to synergise cleaning, waste management and pest management services to reap greater efficiency and productivity. The NEA will conduct a manpower study later this year to support the integration. We will share more details when ready.

7. To raise performance and public health standards in the pest management sector, the NEA has consulted the industry on how we can enhance the licensing regime for vector control operators, technicians and workers. The NEA will also assess feasibility of extending the Environmental Control Officer scheme to shopping malls. The move will better support pest management efforts at these premises. The shopping malls have high pedestrian traffic and other risk factors such as a rising number of food and beverage outlets and potentially more food waste generated. These moves will uplift overall standards in environmental management and also offer additional pathways to environmental services professionals.

#### **Conclusion**

8. To conclude, there is immense potential to transform our environmental services and pest management sector. This not only presents opportunities to develop our local enterprises and provide good jobs for Singaporeans, it will also ensure Singapore remains clean and green for our future generations.

9. On this note, I thank Singapore Pest Management Association for working with NEA and other stakeholders to uplift the professionalism of Singapore's pest management industry. I also congratulate the

Executive Council and members for staging this Singapore Urban Pest Management Forum. I wish all of you a fruitful experience at the forum.  
Thank you.

His Excellency Mr Li Ganjie, Minister of Ecology and Environment  
His Excellency Mr Miao Wei, Minister of Industry and Information Technology

His Excellency Mr Cong Liang, Secretary-General of the National Development and Reform Commission

Distinguished Guests,

Ladies and Gentlemen,

Good afternoon,

I thank Minister Li Ganjie for inviting me to speak on the inaugural green development of the Belt and Road Initiative (BRI). I also warmly congratulate the Ministry of Ecology and Environment for initiating this important BRI International Green Development Coalition (BRIGC).

2 I am happy to hear the vision of the preceding speakers, and their commitment to spur development around the world with environment integrity in mind. Asia has made tremendous progress over the decades. China alone has lifted more than 500 million of its citizens out of poverty. Countries in Southeast Asia have also developed and progressed.

3 But the rate of our current consumption and production trajectory is not sustainable. Our planet's resources are finite. Our population is growing. Strong urbanisation pressures continue to mount. Climate change is posing new risks.

4 To ensure our current and future generations continue to benefit and enjoy high standards of living, we need to develop sustainably. Everyone knows this. We also need to make the right development decisions today, so that our investment choices will not result in long-term ramifications that we will regret.

5 The BRI is a major undertaking for human development. Millions of people will stand to gain from better livelihoods and opportunities, made possible by new modes of connectivity and collaboration.

6 To take the BRI to the next level and secure its long-term success, we must work together to ensure that it is done ultimately to improve the lives of people and the well-being of the planet at the same time. As we launch the BRIGC today, it is important to work constructively together to find common solutions on the basis of equality and mutual respect.

7 Let me share how we can advance green development of the BRI through “three-builds”, or in Chinese “三大建设” (san da jian she): **build sustainably, build innovatively, and build partnerships.**

### **Build Sustainably**

8 First, we must **build sustainably**, taking a pragmatic approach that focuses on outcomes, not ideology. The BRIGC should deliver tangible benefits for our peoples and planet. It should adopt a pragmatic and action-oriented agenda towards delivering the 17 Sustainable Development Goals.

9 To grow sustainably in a resource and carbon constrained world, we need a paradigm shift. We cannot just think around a 'take-make-throw' approach. We have to change that to a circular one where we can reuse resources endlessly.

10 Singapore is doing our part to address a resource-constrained world and the challenges posed by climate change. For example, we implemented an economy-wide carbon tax without exemption to incentivise the shift towards a low-carbon economy. We have also designated 2019 as Singapore's Year Towards Zero Waste. Our vision is to close the waste loop and turn trash into treasure. Let me give you one example:

- By 2027, we will have a plant called Tuas Nexus. It is the first facility in the world to co-digest wastewater sludge and food waste. It will produce three times more biogas than we would have done separately. Through the integration of water-energy-waste loops, more than 200,000 tonnes of carbon emissions will be saved every year.

### **Build Innovatively**

11 Second, we need to **build innovatively**. Technology and innovation will unlock transformative solutions. They will help us overcome resource constraints and achieve a sustainable future.

12 Singapore's water story is a good example. With a long-term vision, political determination, we successfully closed the water loop by recycling used water into NEWater – ultra-clean, high-grade reclaimed water. Today, NEWater and desalinated water provide Singapore with weather-resilient sources. We are pressing on with R&D in electro-deionisation technology and biomimicry, where we can potentially produce desalinated water with half the energy we use today.

13 Beyond water, we are also carrying out R&D to address the urban heat island effect.

### **Build Partnerships**

14 Third, we need to **build partnerships**. In a globalised world, we need to pool our resources, learn from each other, and forge closer relationships as sovereign equals for green development.

15 The public and private sectors can co-create solutions together. Every two years, Singapore convenes the Singapore International Water Week, World Cities Summit and CleanEnviro Summit Singapore to provide platforms for knowledge sharing and technology exchange on sustainable development. We also offer grants and other incentives to encourage innovative and sustainable solutions. For 'Closing the Waste Loop', for example, \$45 million has been set aside to fund research.

16 The Sino-Singapore Tianjin Eco-city, the second Government-to-Government project between Singapore and China, is a successful partnership project which exemplifies the portability of solutions. After ten years of hard work, a barren, saline wasteland has become a low-carbon, liveable and vibrant smart city for more than 100,000 residents and close to 7,000 companies. The Tianjin Eco-city is already being replicated in China, and can be a case study beyond. By adopting the best practices in Tianjin Eco-city, the BRI can propagate environmentally-friendly and resource efficient urban development.

17 The BRIGC provides the collaborative platform for governments, enterprises, research institutes and the civil society to shape the green BRI. Singapore stands ready to support BRIGC in developing capacity and skills. Since 1992, the Singapore Cooperation Programme (SCP) has trained more than 120,000 officials from around the world on what we can do to develop a green city.

## Conclusion

18 Let me conclude. As a Co-Chair of the Coalition, I look forward to working with my fellow Co-Chairs and members in supporting the green development of the BRI. We must seize this golden opportunity to secure the future of our peoples and planet. The international community must remain committed to a rules-based international order and multilateral partnerships to deliver on the Sustainable Development Goals and Paris Agreement.

Thank you.

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新加坡环境及水源部长马善高  
在“绿色之路论坛”上发表的演讲  
2019年4月25日，中国国家会议中心

生态环境部长李干杰阁下，  
工业和信息化部长苗圩阁下，

国家发展和改革委员会秘书长丛亮阁下，

贵宾们，先生，女士们：

下午好。

感谢李干杰部长邀请我分享对“一带一路”绿色发展的看法。我也衷心祝贺生态环境部发起成立“一带一路”国际绿色发展联盟 (BRIGC) 这个重要的组织。

## 机会与风险

2

我很高兴早前发表演讲的贵宾们所分享的愿景，都认同我们必须以不损害环境为基础，进行发展。这几十年来，亚洲发展神速。单单中国就成功地使5亿多人民摆脱了贫困。东南亚国家也在这期间有显著的发展和进步。

3

然而，我们当前的消费和生产轨道却是不可持续的。我们的地球资源有限，但人口却不断增长，我们继续承受着城市化的巨大压力。气候变化也正带来新的风险。

4

为了确保我们这一代和后代子孙能继续享有高素质的生活，我们的发展方式必需是可持续的。这是众所周知的。我们需要作出正确的发展决策，因为我们现今的投资将有深远的影响。

5

“一带一路”是人类发展的一项重大事业，通过新的互联互通与合作模式，为千百万人提供更好的生活和机遇。

6

为了让“一带一路”更上一层楼，并且取得长期的成功，我们必须共同努力，确保“一带一路”最终能改善人类的生活，也同时把地球变得更美好。今天，我们启动“一带一路”国际绿色发展联盟(BRIGC)，我们必需在平等和相互尊重的基础上，展开建设性的合作，寻求共同的解决方案。”

7 在此，我想与大家分享能推进“一带一路”绿色发展的“三大建设”：  
可持续性的建设、创新的建设、以合作为基础的建设。

### 可持续性的建设

8 首先，我们需要有可持续性的建设，采取务实的方法，注重结果而不是意识形态。“一带一路”国际绿色发展联盟(BRIGC)应该为人类和地球带来实在的利益。联盟应该采纳务实并以行动为主导的纲领，落实17项可持续发展目标。

9

为了在一个资源短缺和碳排放受到制约的世界中实现可持续的发展，我们需要改变生产和消费模式，从线型的“获取-制造-扔掉”(take-make-throw)模式，转变为循环型的模式，永恒无止地重复使用资源。

10

新加坡正在尽自己的一份力量，以应对气候变化所带来的挑战，以及世界的资源变

得有限的问题。今年，我们在全中国经济领域实施无豁免权的碳税，以鼓励经济发展转型为低碳经济。我们也将2019年定为新加坡“迈向零废弃年”。我们的愿景是通过循环的方式，把废物和垃圾变成实用的资源。请让我举例说明：

- 到了2027年，我们将建成世界第一个将废水污泥和食物垃圾混合消解的污水垃圾综合处理厂，Tuas Nexus。这家综合处理厂将能比分开处理产出超过三倍的沼气。在这个融合了“水-能源-废物”的循环计划下，我们每年将减少20多万吨的碳排放。

## 创新的建设

11

第二，我们需要创新的建设。技术和创新将帮助我们开启革新的解决方案，克服资源限制，实现可持续的未来。

12

新加坡的水源故事就是一个很好的例子。我们以长远的眼光，坚定的政治决心，成功地将使用过的水回收利用，把它变成超清洁、高品质的新生水。今天，新生水和海水淡化为新加坡提供了不受气候影响的水源。我们正在加紧电解离技术和生物模拟技术的研发工作，这可能会将海水淡化所需的能源减半。

13 除了开发水源，我们也正在研究和开发解决城市热岛效应的方法。

## 以合作为基础的建设

14

第三，我们需要有以合作为基础的建设。在全球化的背景下，我们要共享资源，相互学习，并在主权平等的基础上建立更紧密的关系，共同展开绿色发展。

15 政府和私营企业可以共同创建解决方案。新加坡每两年举办一次“新加坡国际水资源周”、“世界城市峰会”和“新加坡清洁环境峰会”，这些项目提供各国分享可持续发展的知识和进行技术交流的平台。我们也提供补助金和奖励，以鼓励创新和可持续的解决方案。例如，我们拨出4500万新元资助在“固体废物资源化科研项目”(Closing the Loop Initiative)下启动的相关研究工作。

16

中新天津生态城是新加坡与中国政府之间的第二个旗舰性合作项目，这个成功的项目验证了解决方案是可以转移的。经过10年的努力，这片原本贫瘠的盐碱地已转化为一个低碳、适宜居住、充满活力的智慧城市，拥有超过10万居民和近7千家企业。天津生态城的模式已在中国复制开来，也可供中国以外的城市参考。若“一带

一路“采用天津生态城的最佳实践，这将能大规模的实现环保与资源节约的城市发展。

17

“一带一路”国际绿色发展联盟（BRIGC）为各国政府、企业、研究机构和民间社会搭建绿色“一带一路”的合作平台。新加坡随时准备支持“一带一路”国际绿色发展联盟（BRIGC）开拓能力和技能。自1992年以来，我们便以通过“新加坡合作计划”（SCP）培训了全世界超过12万名官员，帮助他们吸取有关发展绿色城市的知识和经验。

结论

18

让我总结一下。作为联盟的联合主席之一，我期待跟各位联合主席和成员一起努力，支持“一带一路”绿色发展。我们必须抓住这一宝贵的机会，保障各国人民和地球的未来。国际社会一定要继续致力于建立以规则为基础的国际秩序和多边伙伴关系，以实现可持续发展的目标和《巴黎协定》。

谢谢大家！

Ladies and Gentlemen

Good afternoon. Thank you for joining us today for the launch of 'Keep Clean, Singapore!' 2019.

## **Introduction**

2 We all remember that the Keep Singapore Clean Campaign was started by our founding Prime Minister Mr Lee Kuan Yew in 1968. At the launch of the campaign, Mr Lee said that "no other hallmark of success will be more distinctive than that of achieving our position as the cleanest and greenest city in South Asia." The focus on becoming a clean and green city guided many of our policies, and is aligned with our pursuit of sustainable development. Today, I'm proud to say that Singapore is one of the cleanest and most liveable cities in the world.

3 But the hard truth is that we are still dependent on our army of 58,000 cleaners who clean up our housing estates, roads, public walkways and waterways, every day. How confident are we that we will remain clean without them? It is important that we continue to build a culture of reducing our waste, cleaning up after ourselves, and binning our litter properly.

4 Today, I am pleased to kick off the Public Hygiene Council's (PHC) annual Keep Clean Singapore! campaign 2019. This year, PHC will partner 350 organisations to conduct over 500 clean-up activations across the nation. These will be done around housing estates, parks, beaches, offices and hawker centres. Through these activations, we hope to reinforce the message that everyone needs to take personal responsibility to keep our public spaces clean.

## **New initiatives to strengthen the Keep Singapore Clean Movement**

5 To strengthen the Keep Singapore Clean Movement, the PHC will be launching three key initiatives this year.

6 First, it is establishing a Champions Network named R.I.S.E. This stands for Reach-Inspire-Synergise-Empower. This network comprises 24 NGOs, student eco groups, uniform groups and public agencies. The organisations will work together for a cleaner Singapore. They will conduct regular clean-up activities in various locations such as housing estates, beaches, parks, waterways and even our reefs. They will collect data on waste and litter to promote greater appreciation and understanding of these issues. They will share their experiences and engage the greater public to take more personal responsibility for our common spaces. We expect the R.I.S.E. network to grow and expand in numbers, scope and impact over the coming years.

7 The second initiative is the Sustainable Bright Spots programme aimed at encouraging residents to keep their housing estates clean. Twelve estates have already committed to becoming Sustainable Bright Spots. Awareness campaigns and activities will be implemented in these estates to encourage anti-littering and proper waste disposal.

8 Last but not least, a CleanSG Day will be designated in the month of May. PHC's Sustainable Bright Spots, NParks, grassroots organisations and businesses such as McDonald's and Kopitiam will be participating. On this day, cleaners will be given a rest, as a gesture of appreciation for the hard work they put in every day. Residents, patrons and employees of these organisations will be encouraged to take part in clean-up activities. They will also be encouraged to engage their friends, neighbours and colleagues to do the same.

## **Keeping our blue bins clean**

9 As part of the Keep Singapore Clean Movement, I would like to urge you to keep our blue recycling bins clean and properly used. Many people are still using the blue bins as rubbish bins. This is the wrong thing to do. They throw in food and drinks, and we even find things such as dirty diapers inside them. This creates two problems: 1) It contaminates the recyclable items in the blue bins; and 2) As we put food into the bins, it attracts pests, making the bins smell terrible. Such inconsiderate behaviour wastes the efforts of everyone who wants to recycle. So remember: the blue bin is not our rubbish bin. It is only meant for

recyclable items. We can only make items recyclable if we do not commingle it with food and liquids. Do not throw in your food waste, as part of what we can do in this Year Towards Zero Waste.

## **Conclusion**

10 Keeping Singapore Clean is an imperative that will benefit all of us. It will keep our environment liveable. As all of you can see around us today, it is why we have a good environment to live in. Part of that has been someone cleaning after us. Let us encourage a culture of cleaning up after ourselves, and at the same time, use our bins properly. If we do this right, it will become a place which we can be proud of — not because it is a cleaned place, but because it is a clean place. Let us all do our part to keep our living and shared spaces clean, not just for ourselves, but especially for our loved ones.

Thank you.

My parliamentary colleagues, ladies and gentlemen,

## **Introduction**

1 Good morning, everyone. Thank you for taking time out to join us this morning.

2 Today's focus group discussion is part of a series of consultations on the Zero Waste Masterplan. The Ministry of the Environment and Water Resources and the National Environment Agency have engaged widely over the past year, and gained many useful insights from the community, businesses and NGOs. Some of you would have taken part in our online public consultation last month. We thank you for your ideas and suggestions, which will help us formulate an actionable and sustainable Masterplan to become a Zero Waste Nation.

## **Circular Economy and Recycling**

3 Two weeks ago, at an earlier focus group, I spoke about the need to go beyond the 3Rs and for a circular economy approach to manage and conserve our resources. We explored ways to encourage a zero waste mindset, and to reduce food waste, packaging waste and e-waste; because reducing waste is a key part of our journey towards zero waste.

4 Today, we want to talk about one of the key enablers of the circular economy, and that is recycling. It is through recycling that we can collect back items which might otherwise have been trashed. We can convert these into useful products such as construction materials and furniture, or extract valuable resources such as precious metals from e-waste. Recycling enables us to turn trash to treasure. It allows us to keep our precious and finite resources in use for as long as possible by extending their lifespan thus helping us to close the waste loop just like we have closed the water loop.

5 To better understand households' recycling behaviour, MEWR and NEA conducted two public surveys between June 2018 and February 2019. Let me share some key findings with you.

## **60 Per Cent of Households Recycle Regularly**

6 About 60 per cent of Singaporean households surveyed indicated that they recycle regularly. This is very encouraging. The most common channel used for recycling was blue recycling bins. 56 per cent of those who recycle regularly use the blue bins at least once a week. The next most common recycling modes were charity or social programmes that collect recyclable items, followed by the karang guni man.

7 Convenience was one of the most commonly cited reasons for recycling regularly. In addition, habits, encouragement by the Government, moral concerns about being “wasteful”, and the feeling that one should match others’ recycling efforts were also important motivators of recycling.

8 Among those who were not recycling regularly, the top reason cited was that they had too few items to recycle. Other commonly cited reasons were that they did not usually think about recycling, or they were too busy or tired. These findings will be useful as we think about how we can encourage more households to recycle.

## **The Need to Recycle Right**

9 Beyond getting more households to recycle, we also need to ensure that we recycle right. About 70 per cent of respondents thought that contaminated items such as soiled paper food packaging are recyclable. Significant numbers of respondents also thought that non-recyclables such as styrofoam, toys and ceramics can be recycled. These misconceptions help explain why 40 per cent of items collected from our blue recycling bins cannot be recycled. This is even more so when the top items recycled were paper materials like newspapers and magazines which are susceptible to contamination by food and liquids.

10 Clearly, we must continue to raise awareness of what can and cannot be recycled. In our public online consultation, 70 per cent of respondents supported the redesign of labels on the blue recycling bins to provide more information on recycling. NEA is working on redesigning the blue bin label and testing it with users; and the new label will be introduced later this year.

## **Co-creating Solutions**

11 Moving towards zero waste will require strong partnerships and a whole-of-nation effort. Today’s focus group is a good opportunity for us to delve deeper into possible ways to address our challenges in recycling. By bringing together multiple perspectives and harnessing our different strengths, we will be in a better position to co-create effective solutions.

12 After today's discussions, we intend to organise a citizens' workgroup to get Singaporeans involved in the development and implementation of #RecycleRight solutions. We want citizens to not just identify issues or propose solutions, but to work with us to implement the recommendations. The workgroup will have access to resource persons who can share their expertise and experience to enrich the group's discussions. This way, Singaporeans will be involved in working alongside with us to encourage households to recycle more and recycle right. More details will be announced in the coming months.

## **Conclusion**

13 As long as we work together, I am confident that we will make great strides towards our vision of a Zero Waste Nation. I look forward to your valuable contributions.

14 Thank you and I wish you a fruitful discussion.

Her Excellency Teresa Kok, Malaysia Minister for Primary Industries,  
Associate Professor Simon Tay, Chairman of the Singapore Institute of International Affairs,  
Distinguished Guests,  
Good morning,

I am pleased to join you today. To our friends from overseas, I hope you have an enjoyable stay in Singapore.

### **Lessons from the Past**

2. Singapore's sustainability story is an ever evolving one. What Singaporeans enjoy today - a generally clean, green and sustainable environment is no accident or coincidence. On the contrary, our sustainability journey were initiated by our founding fathers more than 50 years ago, who understood the importance of sustainable development for land and resource scarce Singapore. It is our collective responsibility – government, businesses and community - to build on this strong foundation for our present and future generations.

3. Through the past fifty years of Singapore's development, we hoisted two key learning points.

4. First, economic growth need not sacrifice environmental sustainability or social inclusion. Instead of “*grow now, green later*”, Singapore embarked on a “*green as you grow*” strategy. Our development plans are centred on ensuring the well-being of our people and the security of their livelihood. This requires us to carefully balance our social and environmental needs, even as we pursue economic development. Long-term integrated planning is essential.

5. What we have in Singapore is not just a vibrant economy, but also a City in a Garden. According to the 2018 Sustainability Cities Index, Singapore is Asia's most sustainable city and fourth globally. Singapore was also ranked third on the Global Competitiveness Index in the World Economic Forum's Global Competitiveness Report 2017-2018. This underscores that sustainability and economic competitiveness can be complementary.

6. Second, vulnerabilities and constraints need not inhibit growth, but can be transformed into strategic advantages. Out of sheer necessity, we have had to work hard to manage our water supply and demand, and to implement our four national taps to ensure resilience of our water supply. We have closed our water loop by recycling used water into NEWater, which is Singapore's brand of ultra-clean, high-grade reclaimed water. Only one in the world where we have closed the loop and reuse our water again and again. But beyond this, the water industry has also generated economic spinoffs, generating \$2.2 billion to our annual GDP and creating 14,400 jobs.

### **New Global Challenges**

7. Looking ahead, there are two challenges that could affect not just Singapore, but countries in our region and around the world. If not properly handled, these challenges could potentially unravel the progress we all have made. What are they?

8. First, climate change has emerged as a clear and present danger. We are witnessing more extreme climate-related disasters around the globe. They have claimed lives and rolled back decades of progress. Singapore is particularly vulnerable. By 2100, end of century, Singapore could experience sea level rise of up to 1 metre. As a low-lying island nation, we have nowhere to go. Even today, Singapore is experiencing longer dry periods and more intense weather patterns.

9. Second, rapid urbanisation and unbridled consumption has increased competition for scarce resources. The latest UN report by the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) has catalogued how the human species have plundered the planet and damaged its capacity to renew resources such as clean air, clean water and arable land. According to this report, since 2014, an area of tropical forest five times the size of England has been destroyed, mainly to service the global demand for beef, biofuels, soya bean and palm oil. We risk ecological catastrophe if we do not change our consumption and production patterns.

### **Vision for the Future**

10. What is our response to these pressing global challenges? We need to forge a new consensus for development and cooperation. It requires stronger collective action globally and regionally, and also from all segments of society. I would like to suggest three key focus areas.

#### Integrate Systems Better

11. First, we need to integrate our systems. To maximise our resources and reduce our carbon footprint, we can no longer afford to operate in silos. Instead, we must think, plan and implement holistically to find new synergies across different sectors such as waste, water, energy and food.

12. Let me cite one example from Singapore. For over 30 years, Singapore has operated our incineration plants and water reclamation plants separately. We are seeking to realise synergies from co-locating these plants. When completed in 2027, the Tuas-Nexus plant will be the world's first facility to co-digest wastewater sludge and food waste into biogas which, in turn, will help power the co-located waste-to-energy and water reclamation plants. The integration of processes at Tuas-Nexus will save more than 200,000 tonnes of carbon emissions annually – equivalent to reducing 42,500 cars on the road. By planning

with a systems-level approach, we achieve better outcomes for everyone. Actually we will also be producing three times more biogas if we produce it separately.

13. In a resource and carbon constrained world, resources can no longer be taken as “single-use” which we “take, use, then toss” without hesitation. Things are only waste if they are wasted. By developing circular economy approaches, we can keep our resources in use for as long as possible. In Singapore, our aim is to transform trash into treasure, so that we can become a Zero Waste Nation. This is why we have designated 2019 as Singapore’s Year Towards Zero Waste.

#### Integrate Global Cooperation

14. Second, we need to integrate global cooperation as part of our national agenda. No one country can address the new and pressing challenges alone. An effective global response is needed. Unfortunately, the resurgence of isolationism, protectionism and xenophobia is straining the multilateral system. We believe that the UN, as the only universal, inclusive, and multilateral forum, is best placed to manage and deal with the global commons, such as climate change, transboundary pollution, and environment degradation.

15. We must therefore forge a stronger global consensus of cooperation in support of all multilateral environment agreements, notably the 2030 Agenda for Sustainable Development and the Paris Agreement.

16. Singapore will do our part. Last year, we underwent our first Voluntary National Review on the implementation of the Sustainable Development Goals (SDGs) at the High-Level Political Forum to share best practices and to learn from others. We also played active roles at the climate negotiations to secure realistic and achievement goals at the Paris Agreement in 2015 and the Katowice Climate Package in 2019. While not perfect, these agreements will establish a virtuous cycle of climate actions by all countries. The onus is now on everyone to take action and implement the Paris Agreement.

17. As a responsible international citizen, we have put forward an ambitious climate pledge under the Paris Agreement, and implemented a suite of mitigation measures to steer Singapore toward a low-carbon future, including a carbon tax which has come into effect on 1 Jan 2019. Last year, as ASEAN Chair, Singapore worked with other ASEAN countries to drive regional development around environment and climate action by convening the first ever Special ASEAN Ministerial Meeting on Climate Action. Singapore launched a new sustainability initiative called the ASEAN Smart Cities Network. We will also work with Thailand, the current ASEAN Chair, on its theme “Partnerships for Sustainability”. As the development of regional and global circular system is inevitable, demand for cross-border trade of clean and valuable recycled fractions will increase. As ASEAN-EU coordinator, Singapore will further explore this with ASEAN and EU countries.

18. Singapore is also happy to exchange our development experiences. Last year, we launched a Climate Action Package to support fellow developing countries build capacity in areas such as climate change adaptation strategies, disaster risk management and green climate financing.

19. With regard to transboundary haze pollution, ASEAN has enjoyed clear skies in recent years thanks to the strong leadership and determined efforts of President Jokowi and Minister Siti Nurbaya. Singapore and other ASEAN countries are appreciative of these efforts. We must remain vigilant. The recent incidents of fires in northern ASEAN indicates warmer and drier weather ahead. Singapore was glad to be part of the international fire-fighting assistance effort in 2015. We are ready to assist Indonesia with technical resources for firefighting assistance should the need arise again.

#### Integrate Ground-up Initiatives

20. And finally, third, we need to integrate ground-up actions from all stakeholders. Governments alone cannot drive sustainability. As the saying goes, “if you want to go fast, go alone. If you want to go far, go together.”

21. For example, businesses can support more sustainable consumption and production practices, by integrating Environmental, Social and Governance (ESG) principles into their decision-making, and by establishing industry standards on sustainability. The Singapore Environment Council has established the enhanced Singapore Green Labelling Scheme (SGLS+). Eight companies have already been certified under this scheme. I am also pleased that 17 companies have pledged to use sustainable palm oil under the Singapore Alliance for Sustainable Palm Oil (SASPO). I hope more companies will be certified under the SGLS+ and SASPO.

22. Civil society groups too have a role to play. I am happy to note that civil society organisations, such as PMHaze, Lepak in SG and Zero Waste Singapore, have been working hard to encourage consumers to change their consumption patterns and behaviour.

23. Looking ahead, we need to work with all stakeholders to co-create solutions for sustainability. The Singapore government will do its part, and support innovation in sustainability solutions. For example, we have launched a S\$45 million ‘Closing the Waste Loop’ initiative to fund research supporting circular economy solutions.

24. Finally, it would remiss to not mention the efforts of the SIIA, which has been advocating greater sustainability through this platform, as well as its work. I commend the SIIA for making the Singapore Dialogue on Sustainable World Resources a permanent feature on Singapore’s annual calendar of events on sustainability.

**Conclusion**

25. Let me conclude. The world is at a critical turning point. Dealing with the impact of climate change and fundamentally transforming the way we produce and consume has become more urgent than ever. We must adopt a more integrated approach in the way we develop our economy; cooperate with other countries in the region and globally; and work together as a society to build a sustainable and endearing home for all. Only then can we safeguard our planet for future generations.

26. Thank you.

Mr Ang Pow Chew, Principal, National Junior College,

Distinguished guests and partners,

Fellow NJCians,

Good morning everyone. It is my pleasure to be here with you on this joyous occasion of our 50<sup>th</sup> College Day.

### **Service with Honour**

2 National Junior College (NJC) was established in 1969, shortly after Singapore's independence. From past to present, NJC's community of leaders, teachers and alumni has consistently attained academic excellence, success in many fields and, most importantly, contributed to the well-being of Singapore. Today, all of us can celebrate NJC's Golden Jubilee with pride, as we reflect on our achievements over the years.

3 Service with honour – NJC's motto – has guided me since 1980, when I joined the college. I have fond memories of being in the NJC Band, and I am so happy that I met Mr Ho Hwee Long, who is still conducting the band today. It was in the NJC Band that I learnt about leadership. As Quartermaster, I had to check the instruments and equipment to ensure that they were in tip-top condition for my fellow band members as we prepared for concerts and competitions. When band members leave the event venue, it is also the Quartermaster who makes sure to clean up after them, putting the tables and trash away so that the facilities are ready for the next group of students. I suppose that is why I am now the Minister for the Environment and Water Resources. I served the Quartermaster role to the best of my ability, and with great pride. Today I continue to do the same, but in Government, and for our people. What we were trained to do in school, we do it even more in our real life. To our current batch of NJCians, I hope that this motto will serve you well in life, just as it has served your seniors before you.

4 To fulfil her mission, NJC provides comprehensive and varied programmes to develop her students holistically. NJC's new Agri-Tech Research Facility, which opens today, is the latest initiative that empowers students and teachers with knowledge and skills to contribute towards national development.

### **Singapore's**

### **Food**

### **Story**

5 The launch of the Agri-Tech Research Facility is timely. For the longest time, Singapore has thought that we can rely on diversifying our food supplies around the world. Today, we import 90 per cent of our food. We now see that there are new challenges which we need to address, to avoid dire consequences. Climate change is a challenge we have to think about. By the end of this century, Singapore will face higher temperatures, as much as 4 degrees Celsius higher than current levels. Sea levels will rise by about 1 metre. I may not experience

this in my lifetime but you certainly will. We have to prepare for it now. Relying solely on diversifying our food supplies will not work anymore. We have to start thinking about how to grow food within Singapore, in an environment which is resilient to changing weather patterns.

6 To further build up Singapore's food security, we have an ambitious plan to produce 30 per cent of our nutritional needs locally by 2030. We term this our "30-by-30" goal. This is part of our strategy to grow Three Food Baskets by: 1) Diversifying import sources; 2) Growing local; and 3) Growing overseas.

7 Growing more locally will require significant amounts of water, energy and land. Like other sectors in Singapore, the agri-food sector must develop in a sustainable manner. Some of our farms are already employing circular economy principles. Indoor farm Sustenir is using carbon dioxide, a by-product from the petrochemical industry, to enhance vegetable yields. N&N, which owns an egg-laying farm, carries out biodigestion using poultry waste to produce energy.

8 As we grow more food, we also produce more waste. We have to think right from the start about how we manage the waste. We must do more to find synergies across different sectors such as food, water, energy and waste. I went to the Netherlands and saw how they are working hard to produce food with as little energy as possible. They do not worry about water because they have it in abundance. I also went to the Middle East, where they are trying to grow food with as little water as possible — they have a lot of energy. In Singapore, we have to produce food with as little water and energy as possible, and to add to the challenge, with as little land as possible. We can do it, and I hope you will be part of the solution. Our future economy will be powered by an ambitious R&D programme. To solve the complex challenges facing us, we have to invest in building capacity and skills, to help us plan, design, and produce solutions that will not just be useful to us, but also for export. The Government will invest almost \$400 million under RIE 2020 on research and innovation in water, circular economy, climate change and food. These significant investments will help us to explore greater possibilities, while achieving zero waste in the process. We do not want to just produce by taking, making, using, and throwing; we want to take, make, use, and put resources back into our ecosystems, just like what we did for our water. In the process, we will produce good jobs for all of you in future, while growing our local enterprises.

**NJC's**

**Agri-Tech**

**Research**

**Facility**

9 I am glad that NJC is contributing in this area. Your Agri-Tech Research Facility is the first of its kind in a Junior College. Supported by the Singapore Food Agency and food technology start-up Life3 Biotech, NJC's facility will develop agri-tech solutions to overcome challenges of land, energy, and water constraints, while maximising food production and improving food quality.

10 As we work on transforming our agri-food industry, we need a new generation of local talent with the right skills to grow and support our agri-food ecosystem. Our future farms will be different from the traditional farms that we are familiar with today – with backbreaking hours under the sun, and subject to the vagaries of weather. Some of our farms are already adopting high-tech solutions to increase their yields exponentially while maintaining the high quality of their produce. Rather than engaging in labour-intensive outdoor activities, new-age farmers will work in state-of-the art climate-controlled facilities, operating computerised control systems.

11 NJC's new Agri-Tech Research Facility will allow our younger generation to have a feel of urban agriculture and new technologies. You will have the opportunity to create and innovate solutions for sustainable food production. I hope you will take advantage of the learning opportunities offered by the new facility. At the same time, please do not forget to give back to the community, because this is how we can become a better society. I am glad that net proceeds from the facility's harvested crops will go towards under-privileged youth.

**2019**                      **Year**                      **Towards**                      **Zero**                      **Waste**

12 Beyond producing food, it is also important to not waste food. We waste an average of two bowls of food per person per day, but only recycle 17 per cent of the total food waste generated. This is one of the reasons why we designated this year our Year Towards Zero Waste. We want to encourage Singaporeans to reduce, reuse and recycle right, and make Singapore a Zero Waste Nation. You can play a part in reducing food waste by ordering only what you can finish, asking for less rice or noodles if you are not going to finish them, and saying 'no' to side dishes that you won't eat. We will be publishing our inaugural Zero Waste Masterplan later this year to detail our upcoming policies and plans to move Singapore towards zero waste. I encourage you to go to our website [towardszerowaste.sg](http://towardszerowaste.sg) to find out more.

## **Conclusion**

13 In closing, let me thank the principals, teachers and staff of NJC, past and present. They have put in 50 years of hard work to nurture students and grow the college from strength to strength. We could not be here today to celebrate NJC's Golden Jubilee without your dedication. To fellow NJCians, remember and continue to uphold the school spirit and serve with honour, and strive for greater heights.

14 Thank you and have a great future.

Chairperson

Excellencies

Distinguished delegates

I would like to thank the Government of Japan for the warm hospitality and hosting of the G20 Agriculture Ministers' Meeting, and to Saudi Arabia for leading this breakout group. We are happy to contribute to the discussions.

#### Changing global landscape and SDGs

2 Based on United Nation's estimates, the global population is expected to grow by 32% to 9.7 billion in 2050, and global food demand is projected to rise by 50% from 2013. Resources vital to food production, such as water and energy, will be increasingly scarce.

3 As such, collectively achieving the Sustainable Development Goals (SDGs), in particular Goal 2 on ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture are particularly important. Given the importance of this, each country will need to take action, according to our own circumstances. Allow me to share Singapore's experience in this.

#### Singapore's agri-food landscape and approach towards transformation

4 As a city-state that imports more than 90% of its food, Singapore is exposed to global price and supply fluctuations as well as possible food supply disruptions, due to climate change and disease outbreaks. To bolster our food security and contribute to SDG 2, we will pursue three broad strategies – grow local, grow overseas and diversify import sources. Our "30-30" vision is to meet 30% of our nutritional needs locally by 2030. It is paramount that we make efficient use of scarce resources such as water and energy, and leverage on technology so that our local food production is sustainable and resilient against climate change.

#### Leveraging on Technology and Circular Economy Approaches

5 To overcome our constraints and transform our agriculture sector to one that is high-tech, innovative and sustainable, Singapore has been leveraging on science and technology innovations to grow more with less. For example, the Singapore Food Agency (SFA) has been tendering out land to farms that innovate and adopt technology to raise production sustainably. This pushes our farmers to optimise the use of land, and adopt technology and automation to reduce manpower and resource needs.

6 We have been helping our farmers to adopt novel approaches, such as vertical indoor farming and use of smart technologies. They can reduce reliance on manpower, increase resource efficiency and decrease vulnerability to environmental risks. In doing so, we can leverage on market driven approaches, where there the Government supports the private sector by providing an enabling environment through correct policies and incentives, such as grants for research to overcome constraints in energy, water and space to achieve productivity. We expect the private sector to innovate for solutions for more sustainable food production through circular economy approaches.

7 For example, N&N Agriculture, one of Singapore's egg farms, has adopted technologies to convert waste into green energy. By using an anaerobic digester, the egg farm converts chicken manure to biogas, which is used to generate electricity. This is carbon neutral compared to burning fossil fuels. The solid by-product of anaerobic digestion is then used as compost for growing vegetables. The farm generates no waste that needs to be incinerated or landfilled. Another example is Sustenir, an indoor vegetable farm, which re-channels carbon dioxide, a by-product from the petrochemical industry, to enhance vegetable yields. Within the region, we have also seen a move towards more sustainable production of agriculture, such as in palm oil production.

#### Engaging Citizens

9 Beyond technology, every citizen can play a part to bolster local food production and reduce food waste. We have been supporting community urban farming, such as on rooftops. We also encourage people to reduce food waste, and will require commercial and industrial premises, where large amounts of food waste are generated, to segregate their food waste for treatment from 2024. The on-site treatment of food waste reduces associated costs, such as carbon emissions, involved in the transportation of food waste to off-site facilities for treatment. To support a national effort towards zero waste, my Ministry has designated 2019 as our Year Towards Zero Waste.

#### Conclusion

10 To conclude, the SDGs represent the collective aspirations of our global community. Through our efforts to grow local, adopt circular economy approaches and co-create innovative solutions to enhance food production and be more resource efficient, we will contribute to the SDGs. To succeed in our effort to ensure a stable supply of food for all, we need to work together to support the 2030 Agenda and promote a rules-based, open and non-discriminatory multilateral trading system under the World Trade Organisation (WTO). Singapore is committed to working with the G20 and other countries to implement the SDGs and to enhance our collective food security.

**Opening Remarks By Mr Masagos Zulkifli, Minister For The Environment  
And Water Resources, At The Launch Of Kimberly-Clark Corporation's  
Solar Roof 'Switch-On' Ceremony, 22 May 2019**

Mr Achal Agarwal, President of Kimberly-Clark Asia Pacific

Ms Stephanie Syptak-Ramnath, Chargé d'Affaires, United States Embassy  
Singapore

Ladies and Gentlemen

Introduction

1. Good morning. It gives me great pleasure to be here for the launch of Kimberly-Clark Corporation's solar roof. I understand this solar roof will be one of the largest for a manufacturing plant in Singapore. It will replace up to 15 per cent of conventional energy used at the plant, and reduce its greenhouse gas emissions by about 1,600 metric tons per year.

2. I commend Kimberly-Clark Corporation for taking this major step towards renewable energy. Businesses and industries are among our largest carbon emitters. You can have a substantial impact on mitigating global warming and climate change, when you make the transition to environmentally-sustainable operations.

Moving toward solar energy

3. Solar energy is Singapore's most promising renewable energy source. We have an ambitious target to install 350 Megawatt peak (MWp) of solar capacity by 2020, and 1 Gigawatt peak (GWp) beyond 2020. This will go towards helping us achieve our pledge under the Paris Agreement, to reduce emissions intensity by 36 per cent from 2005 levels by 2030, and stabilise emissions with the aim of peaking around 2030.

4. We have been taking active steps to promote solar deployment in Singapore. The SolarNova Programme, which aggregates solar energy demand across all public sector bodies, is one such initiative. The Housing & Development Board (HDB) is currently the largest stakeholder in the installation of solar photovoltaic (PV) systems in Singapore, with a solar PV capacity of 230 MWp. The solar energy harnessed is used to power common services in the HDB estates like lifts, lighting in common areas and pumps.

Addressing Challenges

5. The International Renewable Energy Agency (IRENA) has reported that in 2018, 171 Gigawatts (GW) of new renewable energy capacity was added globally. More than half of this – 94 GW – came from solar installations. This is an encouraging trend.

6. However, challenges remain. For one, solar energy is intermittent, and affected by environmental factors such as changing weather and cloud cover. There is a need to ensure the stability of our grid as we integrate more solar into our energy landscape. In Singapore, we are developing system-level solutions

such as solar output forecasting, advanced energy management systems and energy storage. We are also investing in energy research, development and deployment (RD&D) to develop cost-competitive solutions that can be deployed to support the growth of our clean energy industry.

7. Another challenge is that solar infrastructure requires a huge land area. Singapore has come up with creative solutions to overcome our space constraints, by utilising our reservoirs. We are studying the deployment of floating solar photovoltaic systems at five of our reservoirs. Together, these systems potentially have the capacity to power 40,000 four-room HDB households a year – about half the size of Tampines town. These efforts will enhance Singapore’s energy resilience and climate action.

#### Conclusion

8. Let me conclude. Effective mitigation of climate change will require the efforts of not just government, but also businesses and the community. If we can rely more on renewable energy sources, we will reduce our carbon emissions, and potentially reduce costs for enterprises as well. In other words, it is possible to “do good” and “do well” at the same time.

9. I am heartened by the significant stride that Kimberly-Clark Corporation is making today, and I encourage more companies to emulate such good practices and invest in environmentally-sustainable operations.

10. Thank you, and I look forward to our discussion later.

Mr Yong Teck Meng, National Director of the Habitat for Humanity Singapore  
Mr Edward D'Silva, Chairman of the Public Hygiene Council  
Ladies and Gentlemen,

Good morning. I am pleased to join you today at your inaugural Litter Rally.  
2 Today as I was coming in, I met some volunteers who had just finished collecting trash and rubbish in this beautiful park. I understand 600 of them responded to Habitat for Humanity's call to come to pick up trash around us. The first group I met was from Singapore Polytechnic. Six of them came after getting an email from their school asking them to come and volunteer. I asked them if they were from an eco society, and they said no. They just wanted to respond.

3 I really appreciate your time and effort to keep our environment clean.

### **Keep Singapore Clean Movement**

4 In 1968, Singapore launched our first Keep Singapore Clean Campaign. This has been one of the longest running campaigns in Singapore. Some campaigns have come and gone, but this campaign stayed on.

5 Mr Lee Kuan Yew was the man who started it all. He was so concerned about the environment that Singapore was one of the first countries in the world to have a Ministry of the Environment. The environment was not something that everyone worried about then, but Mr Lee Kuan Yew had the foresight to think, from the very beginning, about keeping our environment clean and hygienic.

6 Today, the Keep Singapore Clean movement is spearheaded by the Public Hygiene Council (PHC), and it rallies the public to look at what we can do together to keep Singapore clean. The Government has done such a good job that we always have cleaners picking up the trash for you if you don't clean up. But what we really need to do is to get everybody involved in not littering in the first place. We need to find some way for us to take ownership of the problem and work together.

7 This culture of cleaning up after ourselves is something that Mr Lee Kuan Yew wanted us to have. I remember picking up litter every day after recess when I was in school. That was the habit instilled in us. Today when I have litter I just put it in my pocket if I can't find a bin.

8 The Singapore Management University recently undertook a Public Cleanliness Satisfaction Survey with a sample of over 2,000 Singapore residents. Ninety-five per cent of the respondents agreed that Singapore is a clean city, and around 90 per cent agreed that Singaporeans take pride in keeping Singapore clean. This is good news. The survey also found that Singaporeans are adopting prosocial behaviours such as picking up and disposing litter in public spaces. Around 70 per cent said they hold on to their litter when there is no rubbish bin in sight, until they are able to dispose it properly. This is very good news too.

9 Last month, I was at Bedok Town Square to launch the annual 'Keep Clean, Singapore!' campaign 2019. Since then, close to 500 clean-up activations have been conducted. These efforts would not have been possible without the leadership of the PHC, and the support and participation of organisers, and volunteers like yourselves.

10 Today's event marks the closing of the month-long 'Keep Clean, Singapore!' campaign, but I hope the end of the campaign will not mean we stop doing what we are

supposed to do every day. Continue the good habit. Encourage people to pocket their litter. Don't throw it anywhere just because you cannot find a bin.

### **Year Towards Zero Waste**

11 As you know, the real issue is not just about binning our litter. It is about reducing our waste. Today we generate almost 8 million tonnes of waste a year in Singapore. That is equivalent to the weight of 530,000 double-decker buses! All of us must play a part to reduce this waste.

12 Use less disposables. Use reusable bags. Use reusable bottles. I don't see why we need to buy bottled water. All you need is a reusable bottle. Fill it with clean PUB water. It is much cheaper too.

13 We have designated this year as Singapore's Year Towards Zero Waste. We are serious about it. We think we can go towards zero waste, and recover precious materials from the waste that we throw.

14 The first thing we have to do is to recycle right. We must make sure our blue bins have only usable recyclables. If we throw food or containers contaminated with food into the blue bin, everything inside becomes unrecyclable. Let's be responsible. Do not contaminate recyclables in the blue bin with things which make them unrecyclable. In the process, you waste the efforts of others who are doing their part for the environment. Empty out your containers and rinse them out if necessary, before putting them in the blue bin. Keep our blue bins clean.

### **Conclusion**

15 Let me conclude. Let's continue to keep this Keep Singapore Clean Campaign alive. This is one heritage that we can all be proud of. It is something we started, something we continued, and something we can leave for our children.

16 But there is more we can do. We must reduce our reliance on our efficient cleaning force. Let's reduce the amount of litter we generate. Let's increase the amount of recyclables we can collect. Let us work together to keep Singapore clean, and protect our environment for our generations to come.

17 Thank you.

Professor Subra Suresh

President of Nanyang Technological University

Mr Tan Meng Dui

CEO of the National Environment Agency

Distinguished guests,

Ladies and gentlemen,

Good morning.

1. I am honoured to officiate the opening of the Nanyang Technological University (NTU) Waste-to-Energy Research Facility today. It is the culmination of many years of conceptualisation, discussion, planning and collaboration between NTU, the National Environment Agency and our many partners and stakeholders.

2. I graduated from NTU over 30 years ago, and I am heartened to see the progress the University has made in championing scientific and technological research and development over the past decades. Thanks to the tireless efforts of faculty members and staff, NTU's R&D capabilities and achievements have grown in leaps and bounds, and today it hosts world-class scientific research.

3. The opening of this Facility showcases the University's focus on the science of sustainability, and your commitment to our national effort towards a cleaner and greener Singapore. This Facility fills a gap in the local waste-to-energy research landscape, by providing a platform for scientists and companies to demonstrate or test-bed their innovations and prototypes in an actual operating environment. It also provides hands-on education and practical training that will help grow our local expertise in waste-to-energy processes.

4. This Facility can take in up to 11.5 tonnes of waste a day, and will treat all municipal waste generated by the University. This is aligned with NTU's aspiration of becoming a zero waste campus, through harnessing energy and recycling slag and metals from its waste. I am proud that my alma mater has placed such a serious emphasis on sustainability, and I encourage all NTU staff and students to also play your part by practising the 3Rs of Reduce, Reuse and Recycle in your everyday lives. We have launched the Recycle Right movement this year, and by participating and learning to keep our recyclables clean, dry and free from food, you will make a big difference in our national journey towards becoming a Zero Waste Nation.

### **Year Towards Zero Waste and a Circular Economy**

5. 2019 is our Year Towards Zero Waste, and as we launch this cutting-edge facility, it is timely to reflect on how our waste management landscape has evolved tremendously since our Nation's independence. As a densely urbanised city with scarce land, we started to move away from landfilling our waste towards incineration as early as the 1970s. Today, our four Waste-to-Energy plants treat about 8,000 tonnes of waste per day and are self-sufficient in energy, supplying excess electricity to the national grid amounting to between two to three percent of our total national electricity demand.

6. Nevertheless, even though incineration reduces the volume of waste by 90%, at our current rate of waste generation, Semakau Landfill will be filled up by 2035. To minimise the amount of waste headed for the incineration plants, we have gone one step further. We will recover value from ash or treated waste to optimise our remaining landfill, and keep it open as long as we can. MEWR and NEA have thus worked with the waste management industry to co-create sustainable, circular solutions to turn trash into treasure. For instance, we are working on turning Incineration Bottom Ash (or IBA) into NEWSand that can be used as construction material, instead of sending it to the landfill. NEA has developed provisional environmental standards for the use of treated ash in roads and footpaths, and has engaged industry players to demonstrate their ash treatment technologies.

7. Likewise, NEA has channelled \$1.5 million under the Closing the Waste Loop R&D Initiative to support a research project that aims to recover metals from incineration ash which can then be used in catalytic converters for vehicles. This project is led by researchers from NTU, who are collaborating with scientists from the University of Warwick as well as Johnson Matthey, an international chemicals company.

### **Innovation in Slagging Gasification**

8. Beyond incineration and recovering value from ash, slagging gasification is another promising technology to turn our waste to valuable resources. It involves heating waste or ash to temperatures much higher than traditional mass-burn incineration, in an oxygen limited environment. The slag produced by this process is inert, giving it great potential as an aggregates replacement, akin to NEWSand, that could be used in road pavements and concrete.

9. To fully develop the potential of slagging gasification, NEA contributed \$12 million towards developing this Waste-to-Energy Research Facility. It is the first of its kind in Singapore to employ high temperature slagging gasification as the platform technology, where experiments can be conducted to treat diverse mixed waste streams and convert them to inert slag. The Facility incorporates various plug and play features to facilitate test-bedding different aspects of gasification technology. For example, it can host experiments on cleaning syngas from waste gasification to increase energy recovery. The facility could also be a platform to develop novel membrane separation technology to produce enriched oxygen air to sustain high furnace temperatures needed for melting ash into slag. With this facility in place, Singapore will be able to host sophisticated slagging gasification research, and develop our local expertise in waste-to-energy processes. NEA will explore plans to further support research activities here, such as providing funding for the research community and industry to conduct test-bedding.

10. This is akin to PUB's hydrohub, where more than 180 companies come together in a plug and play environment to experiment processes and contribute to the water ecology. This facility could be an ash or incineration hub, a plug and play facility which I hope would address our waste-related concerns. Therefore, I would like to invite our local industry players to make use of this facility, to work closely with academia to develop solutions that will serve their business needs. This facility is meant to be an open platform to spur collaboration and help translate lab-scale technologies into commercially deployable products and services. Researchers and companies will be able to demonstrate their prototypes in an actual operating environment, and tap and extract product samples for analyses and experimentation.

11. We are investing in waste-to-energy and waste-to-resource R&D to not only tackle our waste challenges at home, but also help companies gain a new competitive edge, and export innovative solutions to overseas markets. On this note, I am glad to see that JFE Engineering Corporation, which built this facility, has set up an Innovation Centre for Environmental Technology with the support of EDB. They are collaborating with NTU on gasification-related R&D areas, such as exploring the use of slag as a secondary material for building footpaths.

12. I hope we will also address Big Hairy Audacious Goals, or B-HAGs, such as what we had done with water, specifically halving the amount of energy required for desalination. I hope this research facility will produce breakthrough technologies that would address problems faced all over the world, for urban set-ups like Singapore. With the research work we will embark on in this brand new Facility, and our other ongoing efforts to reduce waste, recycle, and maximise resource efficiency, Singapore can become a hub for advanced waste management science and technology. Together, we can make our vision of becoming a 'Zero-Waste' Nation a reality.

Thank you.

Excellencies  
Distinguished Guests  
Ladies and Gentlemen

1. Good afternoon. It is a pleasure to be here with you today to talk about opportunities in adopting circular economy strategies for sustainable development.

### **Changing Global Landscape**

2. According to the United Nation's estimates, the world's population is growing by 1.1 per cent every year, and expected to reach an astounding 9.8 billion in 2050. More than half of the world's population now reside in cities, and this is projected to grow. By 2050, seven in 10 people will live in cities.

3. This trend is of concern because cities account for over two-thirds of global resource usage, more than 70 per cent of greenhouse gas emissions and about 2 billion tonnes of municipal solid waste generated annually. There is an urgent need to change current practices on a global scale, if we do not want to risk depleting finite resources, and worsening the climate crisis.

### **Circular Economy Approach**

4. Singapore is committed to doing our part to achieve the United Nations Sustainable Development Goals, in particular Goal 12 on responsible consumption and production. As a city state that is land- and resource-scarce, we are keenly aware of the need to develop sustainably. We are particularly aware of the limited space we have left in our only landfill. At our current rate of waste generation, Semakau Landfill is expected to run out of space by 2035.

5. This is why we declared 2019 Singapore's Year Towards Zero Waste. This campaign seeks to rally our households and industries to treasure our limited resources and make it a norm to reduce, reuse and recycle. Later this year, we will be launching our inaugural Zero Waste Masterplan. It will detail our upcoming policies and plans to close our waste loop and move Singapore towards becoming a Zero Waste Nation.

6. Some of you may be familiar with our water story and how we have closed our water loop. We did this by collecting and treating every drop of wastewater and transforming it into NEWater – our ultra-clean, high-grade reclaimed water. We intend to close our waste loop the same way, by adopting a circular economy approach, and reusing our resources for as long as possible.

7. We will do this by pursuing strategies which have worked for us in the past. First, we will invest in research and development, and harness technology. Second, we will enable companies to try out innovative solutions.

### **Harnessing Technology**

8. In December 2017, we introduced the Closing the Waste Loop Research and Development Initiative to fund innovative waste management technologies. The Initiative fosters collaboration between institutes of higher learning, research institutes and private sector partners. The aim is to develop technologies and solutions to tackle challenges posed by increasing waste generation, scarcity of resources and land constraints for better waste

management. This would include the development of solutions to extract resources from key waste streams like plastics, food and e-waste and residues such as incineration bottom ash.

9. We have successfully concluded two grant calls. Two projects have been awarded to the Institute of Chemical and Engineering Sciences and Temasek Polytechnic to treat and extract resources from plastic waste. Another two projects have been awarded to the Nanyang Technological University and Republic Polytechnic, to explore the reuse of incineration bottom ash. I look forward to seeing the outcomes of these projects.

### **Regulatory Sandbox**

10. To enable companies to try out innovative solutions, the National Environment Agency, or NEA, introduced a Regulatory Sandbox for the environmental services industry in July 2018. With our fast evolving landscape and the emergence of new disruptive technologies, regulation can sometimes stifle promising innovations, especially where it is less clear whether a new technology or solution complies with the existing regulatory requirements. The Regulatory Sandbox enables companies to innovate in a safe environment with relaxed regulations, without compromising public health and safety. Once an experiment has been successfully conducted in Singapore, companies can scale up and fully commercialise locally, or use it as case reference in their efforts to internationalise.

11. One company that has taken this up is Alpha Biofuels, one of Singapore's clean energy companies. It has developed Singapore's first digital platform for reverse logistics, and is leveraging its logistic partners' vehicles to collect used cooking oil from food and beverage operators during their usual delivery runs. This could potentially encourage the recycling of good used cooking oil, reduce vehicular emissions and enable efficient tracking of used cooking oil.

12. Another company that is trying out an innovative solution is the Singapore Power Group, or SP Group. It piloted a Micro Auto Gasification System, or MAGS, for onsite waste-to-energy treatment at Gardens by the Bay. The system harvests energy from the treatment process to produce heated water which is used by F&B tenants at Gardens by the Bay. It also generates solid carbon material for possible horticultural R&D. The system reduces carbon footprint by reducing the transportation of waste to the incineration plants. This is a good example of how waste can be converted to usable resources. I hope more companies can seize the opportunities offered by the Regulatory Sandbox to put forth innovative ideas.

### **Environmental Services Industry Transformation Map**

13. Investing in R&D and enabling innovative solutions are key building blocks for a circular economy. For us to succeed, however, we must also transform the waste management sector and the environmental services industry. The industry today is labour intensive, low in productivity and unable to attract enough talents. This is clearly unsustainable, given our manpower constraints.

14. This is why my Ministry launched the Environmental Services Industry Transformation Map, or ES ITM, in December 2017. We want to help the industry move towards higher productivity, and equip its workers and businesses with the capabilities to meet future challenges. This will enable us to create better jobs to attract talents to join the sector.

15. The implementation of the ES ITM is progressing well. One of the newest initiatives is the launch of a \$30 million Productivity Solutions Grant or PSG, by NEA last year. The Grant

provides companies with support to adopt commercially available and proven technologies to reduce manpower reliance and achieve operational efficiency and productivity. NEA has approved 32 applications with a total grant commitment of about S\$1 million; another 24 applications are under evaluation. This could bring the total potential grant commitment to about \$2 million. Examples of solutions supported include smart waste compactors and workforce management digital solutions.

16. To ensure the industry remains relevant, NEA is also expanding the list of equipment considered for the grant to include solutions such as the ride-on carpet extractor and industrial crusher cum shredder. I encourage the ES industry to tap on this grant to adopt solutions to increase productivity.

### **Conclusion**

17. Let me conclude. Singapore is accelerating our transition towards a circular economy by investing in R&D, trying out innovative solutions, and transforming the waste management sector. We will also play a constructive role in working with the international community to build a circular economy at the global level.

18. We have many distinguished speakers and participants here today, to share with us the potential of a circular economy for innovation, job creation and economic development. I wish you fruitful discussions on how we can all work together to further the global circular economy.

19. Thank you.

Distinguished guests

Ladies and Gentlemen

### **Sustainability as a Cornerstone of Singapore's Development**

1. A warm welcome to the Ecosperity Conference 2019, Temasek's annual sustainability conference. The Ecosperity Conference takes place during the broader Ecosperity Week, which combines several sustainability-related partner events. These include PUB's Singapore International Water Week Spotlight, NEA's CleanEnviro Singapore Catalyst, World Bank's Innovate4Climate conference and the FutureChina Global Forum organised by Business China Singapore, which focuses on sustainable development this year.
2. "Ecosperity" twins the words "Ecology" with "Prosperity". This reflects the belief that companies can do well for their businesses, and do good for the environment and community.
3. This has also been Singapore's experience. Economic development and sustainability *must* go hand in hand. The City in a Garden that Singapore is today is testament to the principle that development should not come at the expense of our living environment.

### **The New Reality: A Resource and Carbon Constrained World**

4. Singapore and, indeed, the world must continue on the path of sustainable development. But how we pursue sustainability today must be transformed, given the challenges we face. Growing population, rapid urbanisation, over-consumption of resources as well as the intensifying effects of climate change are all megatrends that we are grappling with.
5. In May, scientists at Hawaii's Mauna Loa Observatory measured how atmospheric carbon dioxide levels have reached historic highs. The past five years have been the warmest years since data was first collected in the late 1800s. Hokkaido, where temperatures never exceed 35 degrees Celsius in May, is experiencing a heatwave where temperatures reached almost 40 degrees Celsius.
6. These effects will have a real impact on our daily lives. We have already lost one third of the world's arable land due to ecological changes. The effects of extreme weather phenomena, such as floods and droughts, will further strain the world's critical resources, such as food, energy and water. Our region's rice-bowl, the Mekong Delta, is threatened by rising sea levels that increase the salinity of inland rivers and destroy rice fields.
7. We must act fast. In the words of UN Secretary-General Antonio Guterres, "the transition to a cleaner, greener future needs to speed up." We must fundamentally change the way we use resources, so that we can thrive in a low-carbon and resource-constrained future.

### **Three "Resiliences" To Sustain Singapore's Future**

8. Singapore takes these challenges seriously. We are a low-lying island state, and the effects of climate change, notably sea level rise, are existential threats. So is the lack of space for landfill, which though not an imminent issue, is always in the horizon and something we have to address in the not-too-distant future. To ensure that future generations can continue to enjoy a vibrant and liveable city, we are working to build up "Three Resiliences" in Singapore:

**(1) climate resilience;**

**(2) resource resilience; and**

**(3) economic resilience.**

Let me elaborate.

### **Climate Resilience: Coping with the Effects of Climate Change**

9. **First, climate resilience** entails taking steps to protect ourselves from the effects of climate change.

10. We have taken decisive steps to build Singapore's climate resilience. Since 2011, we have raised minimum reclamation levels for newly reclaimed lands to at least four metres above the mean sea level. We are building future developments, such as Changi Airport Terminal 5, at higher platform levels. We have also invested heavily in technologies such as water reclamation and desalination to enhance our water security and resilience.

11. More will be done. Sea level rise will pose one of the most complex, long-term challenges for Singapore. Recent scientific studies indicate that, by the end of the century, sea levels may potentially rise faster and higher than what we had previously assumed. Work is ongoing to assess the risks and impacts of long-term sea level rise on our coasts and on flooding. The Centre for Climate Research Singapore will launch a research programme on sea level rise this year. The Government is developing a national framework for coastal protection and studying long-term plans to protect vulnerable areas along our coasts. Protecting our coasts will involve significant infrastructural investments, which must be balanced against other fiscal and land use demands. But preparing for climate change is a long-term investment in our future. We need to plan holistically and back up our plans with hefty resources. We will take decisive action to ensure Singapore remains vibrant and liveable.

12. As one of the countries that are most vulnerable to climate change impacts, Singapore is committed to doing our part to fight climate change. The Government's strategy to fulfil our Paris Agreement pledge is outlined in our Climate Action Plan. This details our efforts to reduce carbon emissions across all sectors, encourage energy efficiency and adopt cleaner forms of energy.

13. Singapore is the first country in Southeast Asia to implement a carbon tax which came into force this year. It is a significant step in our climate action, and complements Singapore's suite of mitigation measures to incentivise emissions reduction across all sectors and transition to a low-carbon economy.

14. But the Government cannot address climate change on its own. Singapore designated 2018 as the Year of Climate Action to raise awareness on the urgent need for climate action and spur individual and collective action. Altogether, we received more than 340,000 climate action pledges from individuals, organisations, institutions, civil society and businesses. We hope this momentum will continue through ground-up, community-led efforts – such as this Ecosperity Conference.

15. Ultimately, climate change requires a global solution. Singapore is actively working to galvanise regional and global climate action. In 2018, we hosted a Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and Expanded SAMCA (E-SAMCA) to bring together Ministers from ASEAN and the Plus Three countries to discuss ways to step up regional climate action. At the international level, we participate actively in climate negotiations. We are happy that the international community has successfully adopted the rules to implement the Paris Agreement in Katowice, Poland, last December. While the agreed measures are not entirely perfect, they are a good start. Collectively, they will help to establish a virtuous cycle of climate action by all Parties of the Paris Agreement.

### **Resource Resilience: Sustainable Production and Consumption through a Circular Economy Approach**

16. We need a second resilience, "**resource resilience**", to help us grow in a resource and carbon constrained world. Singapore must secure our critical resources, including energy, water, food and materials. We must also maximise our resources by producing and consuming sustainably, and recovering resource from waste.

#### **Adopting a circular economy approach and closing our resource loops**

17. We need a paradigm shift to regard waste as a resource. We must move from a linear 'take-make-throw' approach, to a **circular economy approach** that reuses resources for as long as possible. This reduces our environmental footprint and strengthens our resource resilience.

18. Many of you would be familiar with how Singapore has closed our water loop by recycling used water into "NEWater". We are looking at closing other resource loops. The National Environment Agency (NEA) has started preliminary work to turn incineration bottom ash into construction material, or what we call "NEWSand". NEA has developed provisional environmental standards for the use of NEWSand, and field trials will start next year.

19. Closing individual resource loops is only one piece of the puzzle. Singapore will leverage our strengths in long-term planning to adopt a systems-level approach and harness synergies across different resource loops. Let me share some examples with you.

a. **First**, we will harness synergies between the food and waste resource loops by converting food waste into agricultural inputs. Food is a major source of waste, and improper disposal leads to odour and pest nuisance. Singapore is tackling this problem by segregating and treating food waste into products such as compost, which can be used by local farms. This contributes to our ambition of producing 30 per cent of Singapore's nutritional needs locally by 2030.

b. **Second**, we will harness synergies between the water and energy resource loops by deploying floating solar PV panels on our reservoirs. With the sun as the main source of power, floating solar systems do not require fuel or natural gas to power their operations. This makes solar photovoltaic an environmentally friendly source which is not susceptible to fuel price fluctuations. Our reservoirs will serve not only as a key source of drinking water, but also as a source of clean energy.

c. I am pleased to announce that PUB will be launching a Request for Proposal to invite private sector companies to design, build, own and operate, for 25 years, Singapore's first large-scale floating solar photovoltaic system on Tengeh Reservoir tomorrow. At 50MWp, the solar system will be one of the largest single floating solar PV systems in the world when it is completed. PUB will also deploy two other smaller 1.5MWp floating solar PV systems at both Bedok and Lower Seletar Reservoirs in the second half of this year. PUB hopes to generate green energy to power water treatment and reduce its carbon footprint.

d. **Third**, we will harness the synergies between water, waste and energy by co-locating a water reclamation plant with an integrated waste management facility. We call this the **Tuas Nexus**. The Tuas Nexus will co-digest food waste with used water sludge to triple biogas yield. The biogas produced will generate more than enough energy to power the Tuas Nexus. We estimate that this will reduce carbon emissions by more than 200,000 tonnes a year – equivalent to taking 42,500 cars off the road.

20. We will support innovation by putting in place facilitative regulations. NEA launched a regulatory sandbox last year under the Environmental Services Industry Transformation Map. This will provide a safe space for companies to trial new solutions. Singapore Power Group (SP Group) is testing an onsite gasification system at Gardens by the Bay. The system has the potential to close the waste loop by converting waste into solid carbon material which can be used for horticulture at Gardens by the Bay. Waste heat is recovered to provide hot water for F&B outlets. Besides value recovery from waste, such a localised waste management solution also reduces the carbon footprint from transportation of waste to the incineration plants.

### **Economic Resilience: The Vital Role Businesses Play**

21. Businesses play a key role in our third "resilience", **economic resilience**. In a resource and carbon constrained world, companies must develop the capabilities to thrive through embracing circular economy solutions.

22. The Australian company, "Close the Loop", developed a new recovery process that turns old printer cartridges and soft plastics into new materials to lay roads. These road surfaces last up to 65 per cent longer than traditional asphalt. Close the Loop is literally "paving the road" to a more sustainable future.

23. Keppel Corporation accumulated \$55 million in cost savings last year by redesigning their office to be energy and environmentally sustainable. Some features include photo sensors that dimmed perimeter lighting when there is sufficient daylight, and printing features in their copier machines to reduce paper wastage.

24. It is also encouraging to see young, local entrepreneurs innovating solutions for sustainability. Rayner Loi, an undergraduate in the Singapore University of Social Sciences, developed a smart food waste tracker which uses artificial intelligence to measure, identify and record food waste going into bins. The data collected is used to provide insights to businesses such as hotels to reduce food waste. Rayner said that he has seen his clients' food waste fall, on average, by 30 to 40 percent, and their food costs go down by 3 to 8 per cent.

25. We encourage all businesses to adopt such circular economy approaches. Allow me to suggest a few areas.

26. **First**, set targets. Setting targets is the first step in driving actions within the company. For example, you can aim to improve the carbon efficiency of your operations. Apart from signalling that you are serious about addressing climate change, reducing carbon through energy efficiency and renewables will also help reduce costs. One example is Singtel, which is one of few companies in Asia to set absolute carbon reduction targets that have been approved by the Science Based Targets initiative (SBTi).<sup>[1]</sup> You could also set recycling targets. Unilever, for instance, has committed to ensuring that 100 per cent of their plastic packaging will be designed to be fully reusable, recyclable or compostable by 2025. To help create an end market for this material, Unilever will increase the recycled plastic content in their packaging to at least 25 per cent by the same year. These targets are reshaping their production and innovation framework.

27. Another way would be to adopt a triple bottom line framework to evaluate performance. This means looking at the environmental, social and financial results of the business. The SGX Environmental, Social and Governance (ESG) indices is a good place to start, and can serve as a guide for a company's decision-making processes. For example, DBS Bank has declared that it will cease the financing of new coal-fired plants beyond its existing commitments and step up financing for renewables. A triple bottom line will sustain a company's performance and profits.

28. **Finally**, businesses can co-create innovative solutions with the government to drive sustainability. Two weeks ago, I officiated the opening of a Waste-To-Energy Research Facility in the Nanyang Technology University (NTU), which is a multi-stakeholder collaboration among NTU, JFE Engineering Corporation and the NEA. Besides serving as a platform for scientists and companies to test-bed their innovations and prototypes in a real operating environment, the facility can take in up to 11.5 tonnes of waste a day. It will treat all municipal waste generated by NTU. Almost all waste going into the facility is recyclable and are converted into energy or slag, which can be used for road construction. The Government will partner and support the private sector, such as through grants and incentives to encourage ground-up solutions. For example, we have launched a S\$45 million 'Closing the Waste Loop' initiative to fund research supporting circular economy approaches.

## **Conclusion**

29. Let me conclude. It is clear that the status quo in the way we consume our resources and grow our economy is not sustainable. The impacts of climate change respect no geographical or national boundaries. Only by building the 3 "Resiliences" – climate, resource and economic – can we secure our collective future.

30. We will need to work together. It is not a coincidence that many sustainability related events are taking place during the Ecosperity Week. I hope that all of you will find these events useful to learn best practices from around the world.

Thank you.

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[1] The Science Based Targets initiative is a partnership between CDP, UN Global Compact, WRI and WWF to recognise organisations aligned with the Paris Agreement's goal to keep temperature rise below 2°C.

Distinguished guests

Ladies and Gentlemen

1 Good morning. It is my pleasure to be here to launch the “Say YES to Waste Less” campaign. I would like to thank IKEA for hosting the event and all partners for joining us today.

### **Towards a Zero Waste Nation**

2 Singapore faces a growing waste problem. In 2018, we generated 7.7 million tonnes of solid waste, enough to fill approximately 15,000 Olympic-size swimming pools. At the current rate of waste disposal, Semakau Landfill, our only landfill, will run out of space by 2035. As most of us are aware, building more landfills is not a sustainable option for our land-scarce nation.

3 My ministry designated 2019 as the Year Towards Zero Waste to build greater awareness among Singaporeans and those who live and work here, on the urgent need to treasure our precious resources and protect our environment. To achieve our vision of a Zero Waste Nation, we need to make it a habit to Reduce, Reuse and Recycle Right, or what we call the 3Rs, and adopt a zero waste mindset in everything that we do.

### **The Problem with Disposables**

4 There are many ways in which we can practise the 3Rs. One area where we can certainly do more in, is reducing the use of disposables such as plastic bags and takeaway containers.

5 In 2018, disposables made up about 164,500 tonnes of domestic waste. This is about 10 per cent of domestic waste disposed of, and approximately equivalent in volume to 300 Olympic-size swimming pools. These were mostly used once and not recycled. While we incinerate them at our waste-to-energy plants, the process of doing so increases our carbon footprint. The resources that go into producing and transporting disposables also contribute to carbon emissions, which compounds the problem.

6 Many people use paper-based disposables such as paper bags and cups, as well as bio- or oxo-degradable alternatives as they perceive these to be eco-friendly alternatives to plastic-based disposables. However, the fact is that the

production and disposal of all materials have some degree of environmental impact.

7 Hence, the issue is not the type of disposable bags or containers to use. Instead, we should avoid all kinds of disposables as much as we can, and opt for reusable options. According to a study released last year by the Singapore Environment Council, consumers in Singapore take 820 million plastic bags from supermarkets each year, or two to four plastic bags per person per trip<sup>[1]</sup>. Now, imagine the number of disposable bags we can cut back on if each of us chooses to use reusable bags instead, and get our friends and family members to do the same.

8 Another disposable which we can reduce our usage of is straws. As part of the World Wide Fund for Nature's Plastic ACTion, or PACT, initiative, more than 270 local food and beverage outlets here will stop providing plastic straws by 1 July unless requested. I commend WWF and its partners for this initiative. Riding on this initiative, we can do even more. Regardless of the material they are made of, we should try to avoid using straws to cut wastage of resources and reduce our carbon footprint. Simple changes to our lifestyles like these can make a significant difference to our environment.

### **Reducing PET bottles**

9 PET bottles are another cause for concern. According to the SEC study, about 467 million PET bottles are used in Singapore each year. This means each person uses one to three PET bottles each week on average.

10 A common use of PET bottles is bottled water. But in Singapore, the quality of our tap water actually exceeds minimum World Health Organization (WHO) and US Environmental Protection Agency standards. It is perfectly safe to drink. If we carry a reusable bottle and fill it up with drinking water from the tap when we are on the go, we can easily reduce the use of PET bottles, while saving money at the same time. And there are health benefits too. By consuming less bottled beverages such as soft drinks and more plain water from the tap, we also reduce our intake of sugar and processed beverages and stay healthier.

## **Partners in Say YES to Waste Less**

11 NEA is launching the “Say YES to Waste Less” campaign today, to encourage all of us to say yes to reusables, and increase their use in our daily lives. I am very heartened by the strong support from the People, Private and Public, or 3P, sectors for this nation-wide campaign.

12 Over the next three months, 59 partners covering over 1,600 premises such as retailers, supermarkets, food and beverage establishments, hotels, Community Development Councils, grassroots organisations, schools and non-governmental organisations will be encouraging the community to reduce the use of disposables.

13 Their initiatives include displaying campaign visuals at cashier points, prompting customers to bring reusable bags or opt out of receiving disposable cutlery with online orders, and removing bottled water from meeting rooms. Schools and youth groups will also be carrying out activities to nudge the community towards lifestyle changes that reduce the use of disposables. IKEA, for example, is working to inspire and enable people to reduce disposables. IKEA Tampines will be putting up a huge banner calling on Singaporeans to “choose to reuse” and the store is now promoting products like reusable food containers, water bottles and reusable bags. This weekend, there are even colouring activities and storytelling sessions to raise awareness for the “Say Yes to Waste Less” campaign among children.

## **Conclusion**

14 Let me conclude. Our collective efforts to conserve our resources today will pave the way towards a sustainable environment for future generations. So let’s make the right choice. Choose reusables and Say YES to Waste Less.

Thank you.

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[1] <http://www.sec.org.sg>

Mr Jack Ng,  
CEO of Sky Greens Pte Ltd

Dr Ahmad Magad,  
Secretary-General of Singapore Manufacturing Federation

Ladies and Gentlemen

1 Good afternoon. Today, we witness the certification of Sky Greens under the Singapore Standards for Organic Primary Produce, or SS 632. This is the world's first organic standard for produce grown in urban and peri-urban environments, and Sky Greens is the very first local vertical farm to be certified. Let us congratulate Sky Greens.

2 I am confident this milestone for Singapore's agri-tech industry will be followed by many more, as our farms continue to transform themselves to tap on the latest market opportunities.

### **Changing agri-food landscape**

3 The agri-food landscape is changing rapidly. As global population continues to grow, global food demand will also rise. At the same time, vital resources such as water and energy, needed for the production of food, will be increasingly scarce. Climate change will exacerbate the situation. Amidst this, new food production methods and techniques will emerge to meet these new challenges.

4 Earlier this year, I announced that we will increase our local food production as one of our key strategies to bolster Singapore's food security. We target to produce 30 per cent of our nutritional needs locally by 2030, also called our 30-by-30 vision. This is more than a three-fold increase from our current levels of production.

5 To achieve our 30-by-30 vision, we will need to leverage on science and technology to grow more with less. We will have to develop our own approach, to grow more nutritious food with limited water, energy and land, and within a highly urbanised and densely built-up living environment. If we succeed, we will be able to share our experience with other countries and export our solutions. In the process, we will also grow our enterprises and create good jobs for our people.

### **Growing potential in the organic food market**

6 One area with significant growth potential for our farms is the increasing demand for organic food. The global organic food and beverage market is expected to grow to US\$320 billion by 2025, with the fastest growth anticipated in the Asia Pacific. In Singapore, growing consumer awareness and the wider availability of organic products in the market have contributed to the increasing demand for organic food.

7 Our local farms are already leveraging on technology and best practices to grow quality organic produce. Sky Greens is a first mover. Sky Greens is the first vertical farm in Singapore, and grows vegetables in nutrient-rich organic compost, using sustainable organic agriculture processes which can be effectively traced from farm to fork. I understand that other hi-tech farms in Singapore, such as Panasonic's indoor farm, have expressed interest in being certified under SS 632.

8 High food standards and stringent regulations help to build trust in Singapore's food products and services. This in turn enables our farms to gain market share locally and access new markets overseas. Currently, we have a certification scheme to recognise local vegetable farms that adopt the code of "Good Agricultural Practice" as a food safety assurance system. Going forward, SFA is looking to develop a set of "Clean-Green Standards" for urban vegetable farms that adhere to high standards, but are not strictly organic. This will recognise farms that produce safe, good quality, and nutritious vegetables in a clean, resource-efficient environment with no pesticide use. The Standards will be developed together with the industry, academia and consumers.

### **Leveraging circular economy approaches**

9 Another area where we can set high standards is to adopt a circular economy approach in food production. Some of our farms are already turning waste into resource.

10 N&N Agriculture is a good example of a farm which has adopted a circular approach. The farm converts poultry waste to biogas using an anaerobic digester. The biogas is then used to generate electricity used by the farm. The solid by- product of anaerobic digestion is also used as compost for growing vegetables. As a result, the farm generates no waste that needs to be incinerated or landfilled.

11 At the national level, our agencies recently formed a National Mirror Committee on Circular Economy under the Singapore Standards Council, to participate in one of the technical committees formed by the International Organisation for Standardisation (ISO). The government will work with industry players to develop standards relating to the circular economy. By working together to adopt the circular economy approach in the agri-food industry, we can identify synergies between our food, water, energy and waste sectors, and co-create innovative solutions to enhance local food production and be more resource efficient.

### **Supporting local produce**

12 Consumers play an important role in helping our local agri-food industry to grow. When we buy more local produce, the demand enhances the commercial viability of our local farms, and leads to economies of scale. This allows local farms to invest more in technology and develop further. From an environmental perspective, local produce reduces our carbon footprint as they travel a shorter distance to reach consumers. The products are also fresher and safer as they are easily traceable. Local produce can be easily identified by their “homegrown” labels or quality assurance logos.

### **Conclusion**

13 To conclude, there is immense potential to transform our agri-food industry and develop our local enterprises. By tapping on the growing potential of the organic food market and adopting a circular economy approach to produce food safely and sustainably, our local farms can tap on new business opportunities, export agri-tech solutions overseas, and support our 30 by 30 vision.

14 Congratulations to everyone involved in realising this milestone certification for Sky Greens.

Thank you.

His Excellency Jun Yamazaki, Japanese Ambassador to Singapore

Mr Yacob Hussain, President, SSEAYP International Singapore

Ladies and gentlemen,

1 Good morning. It is my pleasure to join you today.

2 “Capturing Water Conservation Through the Lens” is a meaningful contest and exhibition that promotes awareness of water scarcity and conservation through the art of photography. It also commemorates the coronation of Emperor Naruhito as the 126th Emperor of Japan. I would like to congratulate Japan on the beginning of the Reiwa era.

3 Water security has been and continues to be an existential issue for Singapore. Despite receiving abundant rainfall annually, there is not enough land to collect and store all the rain. Through the determination and dedication of generations of water engineers, we have built a robust and sustainable water supply through our four national taps – water from local catchment, imported water, NEWater and desalinated water. By collecting and treating every drop of used water, we managed to close the water loop which allows us to reuse this precious resource again and again. We are now looking to adopt this circular economy approach for other areas as well, such as the waste sector.

4 However, Singapore remains one of the most water-stressed countries in the world. The challenges to our water supply are compounded by the effects of climate change. At the same time, our water demand is expected to double by 2060 with increasing demand and economic growth. Investing in infrastructure to increase our water supply is only one-half of the formula to meet this increase. Managing our water usage is equally important to safeguard water security. PUB, Singapore’s National Water Agency, has initiated a wide range of water conservation programmes to encourage prudent water usage. These include the Mandatory Water Efficiency Labelling Scheme, and the installation of 300,000 smart water meters by 2023.

5 There are encouraging trends in our management of water demand. Singapore’s per capita household water consumption was reduced from 165 litres per day in 2003 to 141 litres in 2018. Our target is to lower household water consumption to 130 litres of water per person per day by 2030. This requires everyone to take ownership in conserving water through our daily habits, and community efforts in building greater awareness.

6 Today’s event is part of a series of events held under PUB’s water conservation campaign launched earlier this year. It is a good example of collaboration between PUB and partners to encourage the public to treasure and conserve water.

7 I would like to thank SSEAYP International Singapore for organising this event. I also congratulate the photo winners for inspiring us with your works, capturing the beauty of our waterways and promoting water conservation in unique and innovative ways. I look forward to viewing the exhibition and meeting you later. Thank you.

Good morning! Thank you for joining us today to find out more about an important topic — that is, Recycling Right.

### **Year Towards Zero Waste**

2 Why is this important? Some of you would be aware that the Ministry of the Environment and Water Resources (MEWR) has made 2019 Singapore's Year Towards Zero Waste. We did this to focus everyone's attention on the fact that we are wasting a lot of precious resources each year.

3 The amount of waste disposed of in Singapore has jumped seven-fold over the past 40 years. Although we incinerate our waste to conserve space, Semakau Landfill, our only landfill, will be filled up by 2035 if we continue to waste resources at the current rate. Incineration also takes energy and generates carbon emissions, which in turn contributes to climate change. To tackle this, we need everyone to make it a habit to practise the 3Rs of Reduce, Reuse and Recycle Right.

4 Last week, I launched the National Environment Agency's "Say YES to Waste Less" campaign to encourage Singaporeans to say yes to reusables, and reduce the use of disposables. Today, we will focus on the #RecycleRight [*pronounced as: Re-cycle Right*] movement.

### **Why Recycle Right**

5 According to a survey my ministry conducted earlier this year, about 60 per cent of Singaporean households are recycling regularly. This is very encouraging and I commend those of you who are doing your part for the environment.

6 However, it is worrying that about 70 per cent of those surveyed thought that soiled paper food packaging is recyclable. It is not! When food and liquids get into the blue recycling bin, they contaminate other recyclables in the blue bin, which then have to be trashed rather than recycled. Today, the contamination rate of blue recycling bins is high, at 40 per cent. We can do better than this and we must, if we aim to reduce our waste.

7 Recycling right enables us to turn our trash into treasure, and reuse it for as long as possible. This is what we call a circular economy approach. One company that has demonstrated the value of recycling is Miniwiz. The company has been innovative in turning waste materials into beautiful products. I am very happy that they have brought one of their innovations – their mini Trashpresso [*pronounced as: Trash-press-so*] – here this weekend. This is the first time the mini Trashpresso is on public display in Singapore. This portable recycling plant is able to convert plastic waste into useful end products through a three-step process of size reduction, purification and reshaping. For instance, when plastic shreds derived from used bottle caps are placed into the Trashpresso, they are transformed into beautiful coasters. This gives the plastic used for the bottle caps a second lease of life. I hope looking at the Trashpresso and the beautiful coasters it produces, will give you a real sense of the value of recycling, and inspire you to recycle more and recycle right.

### **Three Simple Facts to Remember**

8 Recycling right does not take a lot of time and effort. In fact, our survey found that Singaporeans who recycle regularly say they do it because it is convenient, and they do not want to be wasteful. There are just three simple things to remember.

9 **First, read the labels on the blue recycling bins** to find out what recyclables you can put in. You might think that toys, clothes and shoes can be placed in the blue bin. Actually, these should be donated if they are in good condition. Otherwise, they should be thrown away.

10 **Second, make sure your recyclables are clean and dry, and free of food and liquids.** This means that if you want to recycle a milk container, you should give it a quick rinse before depositing it into the recycling bin. Any packaging with food or liquids will contaminate the other recyclables. This will waste the efforts of other Singaporeans who are doing their part for the environment.

11 **Third, you do not need to sort the materials that you put into the blue bins.** We practise a co-mingled recycling system in Singapore. The recyclables will be sorted centrally at our Material Recovery Facilities, or MRFs, after they are collected from the blue bins. This makes it more convenient for everyone since you do not need to sort the different types of recyclables and store them separately at home. All the recyclables can be placed together and deposited into the blue bin at any time. A co-mingled recycling system is also more efficient for our Public Waste Collectors who are responsible for collecting the recyclables from blue bins. They do not need to send separate trucks to collect the various recyclables, thus saving manpower and time.

## **Conclusion**

12 Let me conclude. I hope that you will enjoy the exhibition and the activities brought to you by my ministry and National Geographic this weekend. National Geographic 2017 Nature Photographer of the Year Jayaprakash Bojan [*pronounced as: Ja-ya-pra-kash Boh-jan*] has shot a photo story which brings you behind the scenes of how recycling takes place in Singapore. Do visit the photo exhibition later to find out more.

13 Through this event, we hope you will learn more about the recycling process in Singapore and pick up a few tips on how to #RecycleRight, to share with your friends and family.

14 If we can all do our part to #RecycleRight, I am confident that we can make significant progress towards a zero waste nation. Let's work together to build a sustainable Singapore, for our future generations.

Thank you.

Chairperson

Excellencies

Distinguished delegates

### Our climate future

1 According to the recent IPCC Special Report[1], global warming could reach 1.5°C above pre-industrial levels by 2030, which will have negative impact on all countries. As a low-lying island city state, Singapore is no stranger to the adverse effects of climate change. We already experience longer dry periods alternating with more intense storms. By 2100, Singapore could experience mean sea level rise of up to around 1 metre; an increase in daily mean temperatures of 1.4 - 4.6°C; and more extreme and intense weather events.

### Singapore's efforts to enhance resilience

2 To prepare Singapore, we are taking decisive action to enhance our resilience to climate change. We have developed a Resilience Framework to identify key climate change risks and formulate robust long-term adaptation plans. We have also taken steps to protect our coastal areas with hard structures, and invested in technologies such as NEWater (or reclaimed water) and desalination to strengthen the resilience of our water supply. Looking ahead, we will construct the new Terminal 5 of Changi Airport at 5.5 metres above the mean sea level, as a safeguard against sea level rise. We have also invested \$1.2 billion in drainage improvement works since 2012, and will spend another \$500 million in the next two to three years to ensure that we can cope with more intense and frequent extreme rainfall. As climate change poses existential challenges for Singapore, we will have to invest in building up our capabilities and resources to address it, so that Singapore remains a vibrant and liveable city even in the face of climate change.

3 We are also strengthening local capabilities in climate science and modelling to enhance our understanding of our risks. In 2013, Singapore established the Centre for Climate Research Singapore (or CCRS) under the Meteorological Service Singapore to develop research expertise in the weather and climate of Singapore and the Southeast Asia region. Today, CCRS is the key node for climate and weather research in Singapore, and produces Singapore's long-term national projections on climate change.

4 We are also contributing where we can to enhance resilience in the region. Singapore is supporting the establishment of the Southeast Asia Disaster Risk Insurance Facility (SEADRIF) to provide climate and disaster risk financing

and insurance solutions, and strengthen the financial resilience of participating ASEAN Member States. The SEADRIF, which is also supported by Japan and the World Bank, will be domiciled in Singapore, with an initial focus of providing a flood risk pool for Laos, Myanmar, and potentially Cambodia. We are pleased to note that this initiative and our partnership with Japan was included in the G20 Action Agenda on Adaptation and Resilient Infrastructure as part of the G20's efforts to enhance the adaptation and resilience efforts of other countries. We commend the Japanese G20 Presidency for the Action Agenda. G20's continued support and leadership in this area will be critical to address the adaptation and infrastructural needs of countries in the face of climate change.

#### Other measures to address climate change

5 It is equally important for the international community to fulfill its commitment under the Paris Agreement to limit global warming to 2°C so that we are required to adapt less. On Singapore's part, we are undertaking bold climate change mitigation measures. For instance, Singapore is the first country in Southeast Asia to implement a carbon tax<sup>[2]</sup>. This complements our suite of mitigation measures to incentivise emission reductions, which includes the Green Mark Scheme that sets benchmarks for environmental sustainability in buildings, and the Vehicle Emissions Scheme, which encourages the take up of cleaner and more efficient vehicles.

#### Conclusion

6 Singapore has laid out an extensive plan to mitigate and adapt to climate change. As a responsible global citizen, we stand ready to join regional and international efforts in addressing climate change.

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[1] Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5°C

[2] The carbon tax will start with a tax rate of US\$3.8 (S\$5) per tonne of CO<sub>2</sub>-equivalent of greenhouse gas emissions in the transition period from 2019 and 2023.

Mr Ong Chao Choon, Deputy Chairman and Advisory Leader,  
PricewaterhouseCoopers (PwC) Singapore

Mr Tony Gourlay, Chief Executive Officer, Global Initiatives

Ambassadors

Distinguished guests

1 Good evening. It is a pleasure to be here at the fifth Sustainable Business Awards, to recognise the achievements of businesses which believe in the importance of sustainability.

### **Urgency for Environmental Action**

2 According to the recent landmark report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, as many as one million species on Earth are now threatened with extinction, while 75 per cent of the land environment and 66 per cent of the marine environment have been significantly altered by our actions. Other recent reports indicate that atmospheric CO2 levels have hit a historic high.

3 In Singapore, we are already feeling the effects of climate change, from flash floods to more erratic weather patterns. It is almost 1 degree Celsius hotter today in Singapore than in the 1950s. By year 2100, maximum daily temperatures could reach as high as 37 degrees Celsius, if carbon emissions continue to rise at the same rate. The abnormal temperatures in Hokkaido and Arctic area are a warning of the extent of changes that are underway.

4 The need for urgent environmental action is therefore clear. That is why we designated 2018 as the Year of Climate Action — to galvanise climate action among Singaporeans. We continue to strengthen our scientific capabilities along with adaptation and mitigation measures. We have designated 2019 as Singapore's Year Towards Zero Waste, in order to raise awareness of the unsustainable rate of waste generation here, and to encourage a paradigm shift towards a circular economy approach.

5 Environmental action requires commitment from the whole of society. As Deputy Prime Minister Mr Heng Swee Keat highlighted at the recent dialogue on "Building Our Future Singapore Together", climate change is a serious challenge. We need everyone, including businesses and communities, to come on board and partner Government to address this existential threat, and reap the economic opportunities which await us. We also need to collaborate with international partners, as we chart our way towards a Sustainable Singapore.

## **Role of Businesses in Sustainable Growth**

6 It is therefore always encouraging to meet businesses which are playing their part in this journey. Given the transnational nature of businesses, you have the potential and responsibility to make a positive and significant impact on our environment. In fact, we have always believed that environmental sustainability is complementary to business growth. Let me share three ways in which you can pursue sustainable growth.

7 First, adopt a circular economy approach to resource management. Instead of the linear model of “take-make-throw”, businesses can seek out processes and technology that allow you to recycle and channel your waste and used resources back into the supply chain. This will not only enhance resource efficiency, but also lower costs in the longer term.

8 Second, strive for improvements in energy efficiency and lower carbon emissions. Increasing energy efficiency saves on energy costs, while incorporating renewable energy sources such as solar energy will also reduce your carbon footprint. Making a clear commitment to sustainable practices will also help you to attract increasingly discerning customers who want to support businesses that care about their impact on the environment.

9 Third, forge partnerships with other businesses that adopt a sustainable approach. This will help with knowledge sharing, promote best practices and even strengthen branding. The pooling of resources and complementary expertise could also yield new innovations that improve operations and processes.

## **Sustainable Business Awards 2019**

10 This year, more than 80 companies have participated in the Sustainable Business Awards. The winners today have shown how responsible business practices can be aligned to both business and environmental goals. Allow me to highlight four examples:

- i. In February 2018, Unilever Asia became the first consumer goods company to publicly disclose the suppliers and mills they source palm oil from. They are also currently mapping out their palm oil supply chain to improve on its traceability. Their efforts towards transparency and accountability are commendable.
- ii. Interface has set a goal to achieve net zero emissions and be powered by 100 per cent renewable energy by 2020. From 1996 to 2018, they reduced their greenhouse gas emissions intensity from manufacturing sites by 96 per cent. Interface has also made their products carbon neutral across their life cycle.

- iii. Rolls-Royce has developed new processes which allow up to 95 per cent of a used aero engine to be reused or recycled. This circular economy approach has resulted in cost savings from not using virgin materials, and benefits the environment at the same time.
- iv. CDL has formulated policies and set specific targets on energy usage and carbon emissions within their operations. Besides continuing to retrofit their properties, they also work with their tenants improve on energy efficiency.

11 These four companies showcase the many possibilities in pursuing sustainability. I am also heartened to see that today's winners come from diverse industries, ranging from manufacturers to property developers and social enterprises. This shows that every business *can* play their part in sustainability.

## **Conclusion**

12 Let me conclude by thanking Global Initiatives and PwC for organising this event. It puts a well-deserved spotlight on companies that have made commendable efforts in going green. They have been exemplary role models, and I hope they inspire other enterprises to embark on their own journeys. We need more businesses, both big and small, to join us in addressing climate change. Our collective efforts will help us make strides towards a Zero Waste Nation, and a Sustainable Singapore.

Thank you.

Ms. Naina Batra, Chairperson and CEO, AVPN  
Distinguished Guests  
Ladies and Gentlemen

1. A very good morning to everyone.

2. Let me congratulate the AVPN on the seventh edition of this conference, which brings together funders, impact investors and beneficiary organisations from around the world to address pressing social and environmental challenges. AVPN occupies an important and unique position in the social investment ecosystem, by promoting learning and collaboration among its stakeholders, and unlocking and directing much-needed resources to worthy projects.

### **Long-term Challenge of Climate Change**

3. Climate change is one of the most far-reaching and long-term global challenges, and poses existential threats for Singapore. This was the impetus for designating 2018 as Singapore's Year of Climate Action. Tackling climate change is for the long haul, and today's conference is an important reminder that we must continue to press on with this urgent task.

4. There are signs of accelerating climate change impacts. Singapore is heating up twice as fast as the rest of the world - at 0.25 degrees Celsius every decade. What is even more worrying is the trend of warming. Singapore's top 10 warmest years have all occurred in the past 25 years. The Global Climate Risk Index highlights Asia's vulnerability. In recent years, India has been experiencing severe heat waves. The most recent one, affecting primarily northern and central India, saw temperatures reaching over 48 degrees Celsius. Last year, super-typhoon Mangkut left a trail of destruction in the Philippines, Hong Kong and Southern China.

5. Climate change aggravates challenges such as public health, livelihoods, and food supply. A projected one metre rise in sea level by the end of the century could wipe out 40 per cent of the Mekong Delta. This could displace millions of people and severely disrupt rice production in Vietnam. Businesses are also realising and counting the cost of climate risks. A report by the CDP showed that the world's biggest companies are expecting climate change to cost them 1 trillion US dollars within the next five years.

6. We must address this global challenge with ambition and urgency. In Singapore, we are taking steps under our Climate Action Plan, such as investing in solar energy, developing more sustainable buildings, and expanding our public transport network so that eight in 10 households will be within walking distance to a train station. To complement these efforts, we have also implemented a carbon tax this year, to send an important economy-wide price signal on the need to reduce carbon emissions and invest in green technologies. The tax revenues will be earmarked for worthwhile projects that improve energy and carbon efficiency.

7. However, the government cannot tackle climate change alone. Everyone, including civil society organisations, businesses and individuals, must take urgent climate action. In line with this year's conference theme of "Breaking Boundaries", let me touch on how we can continue to break down barriers to enable greater climate action and impact in the social investment sector.

### **Unlocking Capital for Effective Investments in Climate Action**

8. First, we must expand the notion of capital and green financing. As a thriving global financial hub, Singapore is well poised to direct capital flows towards sustainable activities, and as importantly, away from those that harm our environment.

9. We are seeing good progress in the financial sector. For example, our local banks have implemented policies aligned with the Guidelines on Responsible Financing issued by the Association of Banks in Singapore, to evaluate their borrowers' environmental, social and governance risks, and help borrowers improve their sustainability profiles. In April 2019, our local banks announced their decisions to cease financing of new coal-fired power plants. To support the growth of sustainable financing in the capital markets, the Monetary Association of Singapore (MAS) introduced the Sustainable Bond Grant Scheme to subsidise the cost of external reviews related to issuing green, social and sustainability bonds that are aligned with internationally accepted standards. To date, over 4.5 billion US dollars of green bonds have been issued in Singapore. MAS has also signed a Memorandum of Understanding with the International Finance Corporation, a member of the World Bank Group, that aims to strengthen financial institutions' knowledge of green bonds and support a stronger pipeline of green bonds in Asia.

10. Beyond the financial sector, there is a growing pool of impact investors who want to “do well” and “do good”. Currently, less than 2 per cent of all philanthropic dollars are being spent towards climate action globally. We want to unlock this pool of capital and work with a broader range of impact investors, including Foundations, Trusts and family offices, to grow the philanthropic dollars supporting climate action.

11. Besides financial capital, human and intellectual capital also play important roles in catalysing climate action. Such capital investments could be in the form of strategic support, physical infrastructure, or professional services such as financial advisory services. Hence, impact investors must be able to identify and deploy the suitable type of capital in a targeted manner. To this end, I am happy to learn that AVPN has a dedicated Knowledge Centre to build up such capabilities for its members. Through the Knowledge Centre, members can benefit from training on key investment practices such as impact assessment and stakeholder engagement, as well as the sharing of best practices amongst members.

### **Growing and Scaling Up Climate Solutions**

12. Second, we must engage and equip organisations with the resources and capabilities they need to grow and scale up their climate solutions. Innovative and effective solutions are more likely to attract capital, and be able to achieve the scale needed to deal with the challenges of climate change. Many can even grow into viable and successful enterprises that will increasingly shape our future economy.

13. Allow me to share some examples of innovative sustainability projects in Singapore. These projects have received recognition and support through AVPN's Deal Share Platform, which showcases and facilitates social investment in programmes and projects seeking capital support.

(i) Positive Energy Ltd., a start-up based in Singapore, is using blockchain technology to simplify the renewable energy financing process. The solution accelerates the deployment of renewable energy assets globally by matching interested investors to project developers on their digital platform.

(ii) Another start-up, UglyGood, adopts a circular economy model to transform fruit waste into useful products, such as animal feed and natural bio-based cleaning agents. UglyGood has diverted over forty thousand kilograms of fruit waste away from Singapore's landfill. Moving forward, they are looking to transform organic by-products into other higher value products such as essential oils and high value enzymes.

14. It is heartening to see enterprises innovating good climate solutions. We can do more to support such enterprises. One important aspect is through capability-building. I am pleased to note that AVPN is partnering Credit Suisse to run a pilot programme to strengthen social enterprise development. Through interactions with investors, online business clinics and other advisory services, social enterprises can gain insights on how they can boost the attractiveness and readiness of their solution for investment. Whether you are start-ups, businesses or social enterprises, we want to work together and catalyse innovative solutions to help us in our fight against climate change.

### **Connecting and Enabling Stakeholders to Deliver The “Last Mile”**

15. Finally, we need to close the “last mile” and connect capital with climate solutions. I am heartened to witness the launch of the Climate Action Platform today. As a dedicated, Asia-wide Platform, it will profile a broader scope of climate solutions and mobilise more capital. By bringing together a wide range of stakeholders, including investors and beneficiary organisations, the Platform will also build up stakeholders' capabilities and understanding of climate issues and foster cross-sectoral collaboration.

16. Collective action is essential in the fight against climate change. We need to break down the silos between the public, private and people sectors, and engage and collaborate with one another. This is where AVPN, and social investing, plays an important role. Through an extensive network of strong partnerships, we can ensure that resources are deployed to the most impactful solutions. Let us act now, and act together.

17. Thank you, and I wish you all a good conference.

Mr Rajan Menon, Founder, RHTLaw Taylor Wessing

Mr Tan Chong Huat, Chairman of the Foundation

Distinguished Guests

1 Good evening. It is my pleasure to join you this evening for your inaugural GAIL Sustainability Day Gala Awards.

2 Last year, I attended the RHT ASEAN Summit. I had the pleasure of witnessing the commissioning of the RHT Rajan Menon Foundation's sustainability initiative, GAIL, which stands for Greening ASEAN: Initiatives & Leadership. I am happy to see that the Foundation has built on that by organising the Gala Awards this year. Your sustained focus on environmental issues is commendable. I am heartened by the strong support you have shown, which helps us move towards becoming a Zero Waste Nation.

### **Leadership in sustainability**

3 Tonight, we recognise organisations which have shown leadership in driving sustainability initiatives. Grand Hyatt Singapore is one example. The hotel has been implementing sustainability initiatives since 2010. Their initiatives have included advancements in energy-saving measures, food waste management, sustainable sourcing of ingredients and the removal of plastics from some aspects of its business.

4 Travel brands have also come together to adopt a sustainable approach in their businesses. This year, several travel brands under The Travel Corporation have removed single-use plastics from their coach tours. Their employees also play their part by volunteering for events such as community beach clean-ups. In addition, they have pledged to plant a tree for every client who chooses not to receive printed documents.

5 These are small but important steps which can collectively make an impact on our environment.

### **Year Towards Zero Waste**

6 Sustainability is a concern in the Asia Pacific region because it has experienced significant economic growth in recent decades. In fact, a report from the International Monetary Fund has stated that the region accounted for more than 60 per cent of the world's economic growth in 2018. It is imperative that we ensure economic growth does not come at the expense of our environment.

Unsustainable development would increase carbon emissions, further deplete our resources and produce more waste.

7 Since our early years, Singapore has always pursued economic development in tandem with environment sustainability and social inclusion. Sustainability is a continuous journey. We have to constantly adapt and address the challenges that arise along the way.

8 An increasing challenge for many countries, including Singapore, is the amount of waste we are generating. In 2018, we generated close to 8 million tonnes of waste. This increase in waste is shortening the lifespan of Semakau Landfill, which is expected to reach full capacity by 2035. To raise awareness of waste issues and the need to Reduce, Reuse and Recycle, we have designated 2019 as our Year Towards Zero Waste. We need everyone – businesses as well as individuals – to take collective action on conserving our resources and reducing waste.

### **A Circular Economy approach to resource management**

9 One way for businesses to do so is to adopt a circular economy approach to resource management. This would entail engaging in sustainable production and consumption, recycling and reusing resources for as long as possible, and shifting away from the traditional 'take-make-throw' model. A good example of a circular approach is our water situation. In Singapore, we have managed to close the water loop, and constantly reuse our waste water, and convert it into NEWater. This is what we are hoping to do for waste – to close the waste loop by reusing and recycling the materials.

10 While circularity is not an entirely new concept, more can be done to ensure it becomes the norm. I understand that best practices in circularity for businesses in Asia were highlighted at the Sustainability Forum held earlier today. I hope that the insights were useful, and inspired many of you to rethink your business models.

11 A circular economy approach offers more than just environmental benefits. It brings about business opportunities as well as job creation and cost savings. For example, new industries can be developed if we scale up our upcycling efforts and the extraction of resources from waste. UglyGood, a local social enterprise, recycles food waste into products like cleaning solutions. They are even looking to extract high value enzymes from organic byproducts. I hope that more organisations can see the value of circular economy practices and incorporate them into their key operations.

### **Importance of collective action**

12 Beyond adopting a circular economy approach, businesses can also play an important part in helping to raise public awareness of environmental issues. Every interaction with your customer is an opportunity to talk about how you are reducing your impact on the environment, and through that, help elevate public understanding.

13 In this Year Towards Zero Waste, I hope you can help us drive more people to reduce, reuse and recycle by sharing what you are doing as a business, particularly in food waste, e-waste and packaging waste. Your collective action will help move us closer to becoming a Zero Waste Nation.

## **Conclusion**

14 Let me conclude. I congratulate tonight's winners for their achievements in sustainable practices and thank them for their dedication to the environment. They have shown that doing well in business and doing good for the environment are complementary goals. I look forward to more of such success stories, as we continue to work on building a Sustainable Singapore together.

15 Thank you, and I wish you an enjoyable evening ahead.

UN Secretary-General António Guterres,

Minister Thani Al Zeyoudi,

UNFCCC Executive Secretary Patricia Espinosa

Distinguished Guests,

Ladies and Gentlemen.

Good morning.

1. I would like to thank the UN Secretary-General and the Government of the UAE for organising this summit meeting.
2. I would like to thank in particular the UN Secretary-General for his leadership and for convening the Climate Action Summit which will be held in New York on 23 September 2019.
3. The Climate Action Summit is appropriately framed as an *action* summit. It is meant to galvanise ambitious *actions* from all stakeholders to ensure that we are on track to meet the Paris goals.
4. We are a small and highly urbanised city state, which limits our access to alternative clean energy options.
5. But we will not let our constraints be an excuse for inaction.
6. Singapore will play its part to support the global effort to address climate change and scale up our climate actions.
7. We participate as a member of the coalition on Infrastructure, Cities and Local Action, and are actively working with Kenya and Turkey as well as other coalition partners, to put forward a concrete and ambitious set of plans and actions on how we can transform our cities and infrastructure to make them more carbon efficient in support of the Paris goals.
8. We are also looking at how we can support the initiatives put forward by the other 8 coalitions.
9. We are committed to making a positive contribution in this process and will support the UN Secretary-General in his efforts to make the Climate Action Summit a success.
10. But beyond this, Singapore is committed to taking strong national actions to address climate change.
11. We have put forward an ambitious 2030 climate pledge under the Paris Agreement. We are currently in the process of formulating our 2050 strategy with a view to have it

ready for submission next year. We also intend to review and update our 2030 climate pledge as part of this exercise.

12. The UN Secretary-General has outlined three key “asks” of all countries, notably to (i) stop subsidising fossil fuels, (ii) put a price on carbon, and (iii) phase out the use of coal by 2020.

13. I am pleased to say that Singapore is already responding to this call.

14. First, we do not subsidise fossil fuels and even apply taxes, such as fuel levies, on some of them. Singapore’s approach has always been to price our resources to reflect the cost of externalities so that consumers and businesses take into account the real cost of using these resources and avoid excessive consumption or waste. Energy, including renewables, is subject to market pricing to encourage efficient usage.

15. Second, Singapore is the first country in Southeast Asia to introduce a carbon tax. From the start of this year, we have introduced a carbon tax to put a direct price on greenhouse gas emissions. The carbon tax will send a right price signal to our industry and forms an integral part of our suite of mitigation measures to incentivise emissions reduction across all sectors, and transition to a low-carbon economy. To support this transition, we will use the carbon tax revenue to provide grants and incentives to help businesses reduce their emissions and become more carbon efficient. Although we are starting with a modest carbon tax, this is an economy-wide tax with no exemptions. This rate will be reviewed in 2023, with the intention to double or triple the tax by 2030.

16. Third, since 2005, Singapore has taken steps to use a cleaner fuel mix for our electricity generation, switching from fuel oil to natural gas. Currently, natural gas constitutes about 95% of our fuel mix for electricity generation. Many banks in Singapore have also declared that they will cease the financing of new coal-fired plants beyond their existing commitments, and step up financing for renewables instead. While there are limits to the deployment of alternative or renewable energy resources in Singapore given our small size, we will continue to invest actively in research on clean energy technologies and explore other options, including importing clean hydrogen. However, we recognise that countries have different constraints and different pathways to energy transition.

17. To conclude, Singapore is committed to supporting the UN Secretary-General’s efforts to galvanise ambitious climate actions across the globe. Even though we contribute no more than 0.11 percent of global emissions, we are committed to playing our part and taking strong national actions as part of our contribution to the global efforts to address climate change.

18. I thank you for this opportunity to contribute to the process, and I look forward to having a productive exchange with my esteemed colleagues today.

Ms Soh Bee Lian, Head of Sustainability, IKEA Southeast Asia,

Ladies and Gentlemen,

1 A very good afternoon to all of you. It is my pleasure to be here for IKEA's sixth run of the Young Designer Award.

### **Year Towards Zero Waste**

2 I am glad that IKEA has chosen "Zero Waste Challenge" for this year's theme. It is in support of us designating 2019 as Singapore's Year Towards Zero Waste. Why did we designate this year as the Year Towards Zero Waste? If you have done your research, you would have understood the context and the background. We did this because we are concerned about how much waste we are generating as a country. Over the last 40 years, the amount of waste disposed in Singapore has jumped seven-fold. We generated almost 8 million tonnes of waste, enough to fill 15,000 Olympic-sized swimming pools. Singapore is one of the few countries in the world who incinerate our waste. This is because of our land constraints as incineration reduces our total waste volume by 90 per cent. Unlike other countries, we landfill the incineration bottom ash, as direct landfilling has its own set of issues. But Semakau Landfill, our only landfill, will run out of space by 2035 if we continue to dispose of waste at the current rate. Therefore, we need to take urgent action now to reduce, reuse and recycle our resources. We want to turn waste into resource, trash into treasure.

3 One way to do this is to design products to be more durable, and easily recyclable when they reach their end-of-life. This is important because we have finite resources on our planet. It is why we want to shift towards a circular economy approach, instead of the traditional 'take-make-waste' linear model, where resources are kept in use for as long as possible. I always use the way we close our water loop as a very good illustration. In Singapore, our waste water, or sewage water, is recycled into NEWater, so every drop of water can be used many times. This is what we want to do for our waste — to close our waste loop, by turning trash into treasure, and turning waste into resource.

4 Apart from turning our trash into treasure, we can also produce and consume sustainably. Recently, I attended a #RecycleRight community event jointly organised by the Ministry of the Environment and Water Resources with National Geographic. One of the highlights of the event was a mini Trashpresso from Miniwiz, which converts clean plastic waste into beautiful products such as coasters, cups, plates, and even building materials, which they have used in construction. This is one way in which we can extend the lifespan of materials, and give them a second lease of life. Adopting this circular economy approach will save costs for businesses in the long run, and create new, exciting jobs and economic opportunities for Singaporeans.

### **What Government is doing: Introducing Greater Accountability for Waste**

5 To pave the way for Singapore to become a Zero Waste Nation, my Ministry will be introducing a mandatory reporting framework for packaging waste, including plastics, from 2020. I know many people are seized with the issue of plastics. Originally, the mandatory reporting framework was supposed to be out in 2021, but we have moved it forward by a year. Businesses such as brand owners, importers and large retailers, including supermarkets, will need to start collecting data on the types and amounts of packaging that they place on the market, and submit plans for reduction. In addition, we will implement the Extended Producer Responsibility (EPR) approach for e-waste by 2021, and for packaging waste by 2025. We have made this public, and informed businesses, stakeholders and retailers to start preparing for this. Under the EPR framework, producers will be responsible for the proper recycling and disposal of their products at the end-of-life. We hope these moves will spur businesses to develop products that can last longer, and also design them such that they can be more easily recycled.

### **What you can do: Inspire through Design**

6 As young designers, you have the potential to nudge consumer behaviour through your designs, which help minimise our impact on the environment. I am heartened to note that there was a record-breaking 122 entries from local tertiary institutions for this year's Young Designer Awards. This shows that waste is an issue which our youth are interested in.

7 Many of you have created innovative solutions in answer to IKEA's call to inspire or encourage the public to reduce waste at home and as a community. Let me name a few. The first is the augmented reduce, reuse and recycle (ARRR) mobile app from a team of Singapore Polytechnic students. The app ingeniously utilises augmented reality to enable users to experience how furniture or cardboard packaging can be transformed into a variety of new and useful products.

8 The second solution I want to mention is Nanyang Polytechnic student Muhammad Afiq's colour-coded clip system, which reminds users to consume leftover food that is often left forgotten at the back of refrigerators. I must confess that I am also guilty of this. This system will help to reduce instances of food going bad and help reduce food waste.

9 The third is Ngee Ann Polytechnic's "ECORoad", which cleverly harvests heat from roads and converts it into electrical energy. This is an interesting take on the waste-to-energy paradigm.

10 The range of ideas generated from this competition shows the immense contributions that our young designers like yourselves can potentially bring to our fight against waste and of course, climate change. Your ideas and submissions – and I include those who may not be one of the finalists today – show your passion for design and heart for our environment.

### **Conclusion**

11 Let me conclude. I would like to thank IKEA for providing young designers with this annual platform for them to flex their creative muscles, and empowering them to express their passion for the environment. IKEA has been a steadfast partner to the MEWR Family. Recently, IKEA partnered NEA for the 'Say Yes to Waste Less' campaign to reduce the use of disposables in Singapore. IKEA has also pledged to remove all single-use plastics from its home furnishing range by end 2019. IKEA is also preparing to replace disposables in their restaurants and bistros with products made from 100 per cent renewable resources. I hope IKEA's efforts will inspire other retailers to do the same.

12 To all the designers here, and designers-to-be, I urge you to continue to be bold, to stay the course, and become agents of change. You can make a difference. I think everyone can make a difference. You are all winners and custodians of Singapore's journey towards a sustainable future. In fact, as young people, you are also custodians of the environment that we have. So let me wish you all the best.

13 Thank you.

Mr Seah Kian Peng, CEO of NTUC Fairprice

Ms Pek Hai Lin, Manager of Zero Waste SG,

Partners,

Ladies and Gentlemen,

1 Good morning. I am happy to be here today to launch Zero Waste SG's Bring Your Own Bag, or BYOB, campaign. This campaign is launched in partnership with the National Environment Agency and major supermarket retailers such as FairPrice, Cold Storage, Sheng Siong and Prime Supermarket.

### **BYO Movement**

2 BYOB is part of Zero Waste SG's ongoing Bring Your Own, or BYO, movement which was launched in 2017. This nationwide initiative promotes the use of reusable bags, bottles and containers, with the aim of reducing the use of plastic disposables. Within the first four months of its launch in 2017, their efforts have helped to avoid the use of over two million pieces of plastic disposables. That is a tremendous effort. The number of retail outlets and businesses that joined the movement to promote the use of reusables have increased significantly from 430 in 2017, to 796 today.

### **Packaging Waste in Singapore**

3 It is commendable, but more needs to be done. In 2018, disposables, including plastic bags, made up about 164,500 tonnes of domestic waste. This is about 10 per cent of our total domestic waste.

4 Although plastic disposables are incinerated in Singapore – thereby averting problems like marine litter or landfill pollution – the process of doing so will add to our carbon footprint. The resources that go into producing and transporting disposables also contribute to carbon emissions.

5 A recent survey by the Singapore Environment Council found that 820 million plastic bags are taken from supermarkets each year. This works out to two to four plastic bags per shopper per visit. While plastic bags are useful for the bagging of our waste, many of us probably take more than what we need.

6 In March this year, my Ministry held a public consultation for the upcoming Zero Waste Masterplan and asked respondents how we could reduce packaging waste. Close to 90% of the respondents supported encouraging people to BYO. This is something that we ought to do.

## **BYOB Campaign**

7 With the launch of this new BYOB movement, supermarkets FairPrice, Cold Storage, Sheng Siong and Prime Supermarket will be making a renewed and joint effort to educate and encourage the customers to bring their own reusable bags and reduce the use of disposables. To raise awareness of the campaign, they will be organizing 48 roadshows at eight supermarket outlets, across the four brands, over the next four months. All the cashiers in the participating outlets will be asking customers if they need a plastic bag, and will thank them if they refuse a plastic bag or BYOB. They will also wear badges to remind customers to BYOB. Reusable bag donation bins will also be placed in outlets for the public to donate their reusable bags. I am proud to say that within my constituency early this year, we have worked with Prime Supermarket and Sheng Siong to place the reusable bag donation bins at their outlets. I have seen my residents donating and also picking up the reusable bags from these bins. Efforts like these are useful for people who may have forgotten to BYOB.

8 BYOB supports NEA's 'Say YES to Waste Less' campaign which involves a total of 59 partners covering over 1,600 premises such as retailers, supermarkets, food and beverage establishments, hotels, Community Development Councils, grassroots organisations, schools and non-government organisations. These partners will also be encouraging the community to use reusables and reduce the use of disposables.

## **Conclusion**

9 Changing consumer behaviour is not an easy task, but it is something we must collectively do to reduce our reliance on plastic bags nationwide. If we can do this collectively, we can make a difference.

10 Let me conclude by sharing with you four simple actions you can take to support the campaign, which I hope that you can also share with others:

- i. Bring reusable bags every time you go shopping
- ii. Take single-use plastic bags when you need to and refuse when you do not need them
- iii. Reuse plastic bags to bag your trash
- iv. Praise a brand that has reduced their plastic bag usage, and tag them on social media.

11 Thank you for joining us, and I wish you a good day ahead.

Her Excellency Kara Owen, British High Commissioner

Ladies and Gentlemen

1. Good afternoon and thank you for joining us at the Partners for the Environment (PFE) Forum.

### **The End of 'Life as Usual'**

2. In 2007, Mr Lee Kuan Yew wrote in a FORBES column that, "the ultimate threat to human survival is global warming and climate change. [...] If sea levels rise to inundate many millions of people, there will be no 'life as usual'." In fact, at every occasion when I had the opportunity to sit in on calls between Mr Lee and world leaders, it was clear that he was fully convinced about the threat of climate change, and even more concerned about its potential impact than that of terrorism.

3. For me, it is not just the constant stream of reports about countries experiencing extreme weather. It is indeed alarming that France recorded its highest-ever temperature of 45.9 degrees Celsius during a record-breaking European heatwave and postponed national exams. Germany imposed speed limits on highways because they feared that road surfaces could buckle and rip apart. Historic droughts led to a 20% fall in grain production and forced Australia to import wheat. Floods and mudslides caused by torrential rain led to forced evacuations in Kyushu, Japan, a few weeks ago.

4. Closer to home, a prolonged dry period brought water levels at Linggiu Reservoir to the historic low of 20% in 2016. This was barely two years after Singapore's last dry spell in 2014! During dry years in 2013 and 2015, the region also suffered choking haze from burning peatlands, which closed airports and schools, and brought daily life to a halt.

5. For me, and I hope for you too, the more alarming fact is these events are very much interlinked. The extreme weather events we are experiencing are not one-off incidents, but symptoms of a much greater problem. In May, scientists at Hawaii's Mauna Loa Observatory reported that atmospheric carbon dioxide concentrations were the highest they had ever been in human history. These levels are likely to continue rising.

6. And as these carbon dioxide levels rise, climate change will intensify. We can already see some effects. When I was growing up in the sixties, the hottest month in Singapore was about 27 degrees Celsius on average. That is now the average temperature of the coolest months in this decade, and our hottest days exceed 34 degrees. Apart from changes to our temperatures, scientists project that climate change will have wide-ranging impacts on our water cycle, sea levels, and air quality. What climate science is piecing together, foretells the calamity that will befall the world if we all do too little too late.

7. Time is running out. Last year, the Intergovernmental Panel on Climate Change (IPCC) issued one of the starkest warnings from the scientific community: an increase of 1.5 degrees Celsius in average global temperatures could occur as early as 2030. The warning is loud and unmistakable: we must act now, or we may well face the ultimate threat to human survival that Mr Lee wrote about – the end of 'life as usual'.

## **Tackling Climate Change is a Pressing Priority**

8. There are two questions I am often asked:

- i. Given that Singapore only contributes 0.11% of global greenhouse gas (GHG) emissions, can we make a difference?
- ii. Given alarming projections on climate change and sea level rise, can we do anything to protect ourselves?

9. Over the years, we have put in great efforts to protect our environment and improve our resilience against environmental threats, to help us prepare for as many of the eventualities that can arise from climate change as we can.

10. Our water policy is a prime example. We have developed our Four National Taps over the decades, which reinforce our resilience against any sudden shocks to our water supply. Even our intensive tree-planting programme, which was started in the 1960s, has strengthened our resilience. While the motivations for tree planting in our early days might have been different, we have benefited from the moderating impact that our greenery has on rising ambient temperatures.

11. We can thank our pioneer leaders for putting us in a better position, but the urgency of environmental challenges cannot be overstated. My answer to the two questions is that we must remain clear-eyed about Singapore's vulnerability as a small, low-lying island with no natural resources and no hinterland to retreat to if sea levels rise. For me and my fellow colleagues, tackling climate change is a pressing priority, and an existential challenge. At stake is nothing less than the physical preservation of our island nation and its inhabitants.

### **Our Actions Must be Based on Robust Science**

12. We must meet this challenge with actions based on robust science. This is why we have started research and made early investments in climate science. In 2013, we established the Centre for Climate Research Singapore (CCRS) under the Meteorological Service Singapore (MSS). CCRS has since grown to be one of our region's most advanced tropical climate research centres.

13. Climate science, where it is developed specifically for the tropics, is a new and complex area of research. There is a limited amount of expertise and experts in this area. Much more work needs to be done. I am glad we are taking the initiative to lead.

14. In Singapore, preliminary findings have allowed us to make specific policy formulations. Based on today's science, climate scientists in Singapore have projected that our mean sea levels could rise by up to around one metre by 2100. If ice sheets melt more rapidly and, worse, if ice shelves in Antarctica were to collapse, sea levels could reach one metre even earlier, or go even higher. To many climate scientists, this is one of the most worrying 'black swan' scenarios for low-lying countries such as Singapore.

15. Furthermore, sea level rise from climate change is just one component of overall sea levels. CCRS has considered what might happen if we see high mean sea levels, high tide, and high surge all at the same time – even though this would be a rare scenario. Sea levels could reach almost four metres above current mean sea levels, and overwhelm our low-lying coastal areas.

16. And if we push our imaginations further, in the extremely rare occurrence that a tropical storm happens at sea – sending us surge waters that we can't keep out – and a heavy rainstorm happens inland – bringing down rainwater we can't drain away – both at the same time, we could have the ingredients of a 'perfect storm'. While this is an extremely rare scenario based on today's science, it could possibly not be inconceivable in the future.

17. Climate science has given policy makers guidance on the need to protect critical infrastructure against rising sea levels and extreme events. This is why we are already building new projects such as the Tuas Port Terminal and Changi Airport Terminal 5 at higher platform levels.

18. Climate science developed by CCRS, because it is tailored for the tropics, is an impactful contribution that Singapore can make to global understanding of climate change. We will share what we know and hope it can also help our neighbours plan for their adaptation to climate change.

19. We will further contribute to the development of climate science in three ways. First, we will strengthen our understanding of sea levels around Singapore to help us develop more robust sea level rise projections in the future. I am pleased to announce that **CCRS will be launching a \$10 million National Sea Level Research Programme** over the next five years. CCRS will be issuing the request for proposals soon.

20. Second, **MEWR will set up a new Programme Office in CCRS to lead and drive efforts to formulate our national climate science research masterplan as well as to build up our local capabilities.** The Programme Office will work closely with scientists and researchers in our Research Institutes and Universities to harness their expertise for cutting-edge climate science research. The research will focus on key areas with significant impact on Singapore, including: sea level rise; the impact of climate change on our water resources; and the impact of warming trends on human health and the energy sector. More details will be announced today.

21. We will also find opportunities to partner and collaborate with the best scientific minds around the world. I am pleased to announce that **we will be hosting a Scoping Meeting of the Intergovernmental Panel on Climate Change (IPCC) in Singapore in October 2019, together with a meeting of the IPCC Bureau, one of the highest decision-making bodies in the IPCC.** This is the first time that Singapore will be hosting IPCC meetings. It signals our strong support for and commitment to climate science and climate action.

### **Taking Early Actions and Leading the Way in Mitigation**

22. Apart from climate science, Singapore has also taken early actions to contribute to efforts to mitigate our GHG emissions. Indeed, we have led the way in many of our policies and measures, and in showing that even a small, highly-urbanised city-state with limited alternative energy options can contribute meaningfully to the global fight against climate change. We will share what we have learnt. Our experience can be a model for others to draw from in their paths to find sustainable growth.

23. One bold measure that we have taken is in putting a price on carbon. We are doing this to incentivise industries to reduce their GHG emissions. Economists call this pricing an externality properly. Industries have been emitting GHGs for the longest time and often excessively, because they do not always adopt the lowest GHG emitting technology and often only look for cost effectiveness. Singapore is the first country in Southeast Asia to

implement a carbon tax, making no exemptions to any industry – probably the first in the world to do so. While the price is arguably low today, industries have already been given notice that this will double if not triple by 2030. They are being given time to adjust and we hope the tax signal will incentivise them to adopt low GHG emitting technologies to avoid an even higher future carbon tax.

24. Second, we have led the way in the production of energy. PUB and EDB are supporting innovative floating solar PV projects at Tengeh Reservoir and offshore off Woodlands respectively. These projects will be one of the world's largest floating inland and offshore solar PV systems when completed. We are on track to achieve our target of 350 MWp of solar adoption by 2020. We aim to raise this to 1 GWp beyond 2020 and will continue to push for more.

25. Third, we are striving to harness resource synergies and reduce the carbon footprint in our public infrastructure. We are building a used water and waste treatment plant called Tuas Nexus by 2025, which can integrate water reclamation and waste-to-energy incineration in a single facility, and reduce the amount of energy required in the used water treatment process. This can help us cut down carbon emissions by more than 200,000 tonnes a year – the equivalent of taking more than 42,500 cars off the road. We are also striving for zero energy buildings across Singapore. BCA's building standards, such as the Zero Energy (ZE) and Super Low Energy (SLE) standards, challenge buildings to produce all the energy they consume, or even surplus energy, and push the boundaries for energy efficiency and energy savings.

26. Singapore is also a leader in our transport policies. We have set the target to put in place a comprehensive public transport system by 2040 that allows for a 45-minute commute to the city during peak hours, which will be the envy of many cities. COE and ERP will not only provide for congestion-free roads, but make Singapore the only city state that is able to enforce zero growth of car ownership. I hope that we will have more innovative car sharing services and technology that is so pervasive, convenient, and cost-effective that they will make car ownership a thing of the past.

### **Need to be Bold, Innovative, and Decisive in Climate Adaptation**

27. We have in parallel been building up our climate resilience. Since 2011, we have spent around \$1.8 billion on drainage improvement works to boost our flood resilience. This includes the Stamford Diversion Canal and Stamford Detention Tank completed last year, which significantly enhance the flood protection of the Orchard Road areas. We will do more. **In the next two years, we will spend another \$400 million to upgrade and maintain our drains.**

28. We have invested in R&D in NEWater and desalination to strengthen our water security for drought resilience. To strengthen our food resilience, we aim to diversify our food imports, produce 30% of Singapore's nutritional needs locally by 2030, and grow overseas – because food supply diversity alone does not translate to food security for Singapore, with widespread extreme weather events and water crises in food producing countries. Climate change also poses threats to our biodiversity and health. We have been restoring our mangrove forests in Pulau Tekong and have also invested in new technologies such as *Wolbachia* to help suppress the mosquito population.

29. I spoke earlier of infrastructure readiness and building new projects such as the Tuas Port Terminal and Changi Airport Terminal 5 at higher platform levels. But this is not enough.

Because one third of Singapore is less than 5 metres above mean sea level, we need to take this further. We are studying how to protect the rest of Singapore, and in particular the low-lying areas around our coast, in a comprehensive and holistic manner.

30. Given that climate science is evolving rapidly, we need to start preparing and investing now to ensure that we are prepared if indeed sea levels rise faster or are higher than currently projected. A major focus of infrastructure works and spending for the foreseeable future will be determined by climate change adaptation and mitigation. We cannot afford to wait and do nothing, until we are certain of the effects of climate change.

31. For many of these measures, we will need to start implementing them now and continue over the next 30, 50 years or 100 years. These investments are hefty and for the long term. The Netherlands currently commits around one billion Euros a year to address flood protection and water supply challenges. Recent reports have suggested that the US may need to spend more than 400 billion US dollars between now and 2040 to defend its coastlines against rising sea levels.

32. For Singapore, we need to plan, invest and implement for the long haul. We will need to assess the financial implications carefully, looking at the cost-effectiveness and benefits, and then apply them appropriately across Singapore. Singapore has always prided ourselves on our foresight and long-term planning. By planning early, we can phase in the necessary measures in a timely manner whilst spreading out the costs over many years.

### **The Sum of Our Actions**

33. The Government has initiated the momentum for action. But we cannot do this alone. As Deputy Prime Minister Heng Swee Keat said last month, we believe in expanding our democracy of deeds, where Singaporeans contribute not just their ideas, but also their efforts to build our future.

34. The work of protecting our environment and improving our resilience is an area where we need this more than ever. We need to partner businesses, individuals and organisations to come up with creative and effective solutions. We need everyone to play their part and as one nation, **overcome the existential challenge that climate change poses, which can threaten our way of life.** If we put our heads, hearts and minds together, we will come out of this for the better and will leave behind a more resilient and prosperous Singapore for our children, grandchildren and many generations to come.

35. There are many ways that we can work in partnership together. Let me share some examples.

36. First, in our daily lives, we can all choose to **make climate-friendly choices.** One practical opportunity is when we purchase appliances for our homes. Currently, about 97% of domestic refrigerator models available in Singapore are climate-friendly and use refrigerants that are of a lower Global Warming Potential (GWP). While there are similar climate-friendly air conditioner options available, the take-up has been low. We all can make a difference by making the right choices.

37. Second, **every effort counts.** Though climate change cannot be solved by any single person, do not discount the cumulative impact of small actions. Every one of us must bear individual responsibility and take action. Let me illustrate. If all households in Singapore were to swap one fluorescent lightbulb for an LED bulb, we could potentially achieve 5.8 million

kilowatt hour in energy savings in a year, enough to power 1,000 4-room housing units! So it is the sum of all our actions that counts. That goes also for reducing single-use plastics, using our clothes as long as we can, and repairing our electronics.

38. Over the years, the MEWR family has worked closely with partners to build collective action for sustainable development. Moving forward, we want to unlock even more perspectives, listen to diverse views, and bring together different segments of society to co-create solutions.

39. In particular, we want to harness the passion and energy of youths. A recent report by DBS suggested that millennials are almost twice as likely to invest in companies that target specific social or environmental outcomes. For example, shares of Beyond Meat, a company that produces plant-based meat substitutes, soared more than 570 per cent since the firm's initial public offering last month.

40. I am heartened that our youths are particularly passionate about wanting to make a positive change for the environment. In fact, our millennials are the most environmentally conscious group, setting trends in reducing single-use plastics and electronic waste. Their drive has caused many businesses to come on board and change their practices.

41. We have been engaging youth leaders on environmental policies, and we will do more. In the next few months, we will use different platforms, such as YOUTHx, to engage youths to unlock their potential to think out of the box, and design interesting programmes (such as dialogues, learning journeys, or camps) that are 'by youth for youth', to build a more environmentally conscious society.

42. Moving beyond, we will step-up our efforts to partner businesses, non-governmental organisations (NGOs) and Singaporeans to work together to co-create solutions. **By September, MEWR will convene a Citizens' Workgroup to get 50 Singaporeans to work with us to come up with solutions to improve the way we recycle, and inspire more people to recycle at home.** The Citizens' Workgroup will include Singaporeans with diverse backgrounds, and be given access to policy-relevant information like household recycling surveys as well as resource persons who can share their expertise and help with the piloting and implementation of solutions.

43. As climate change ultimately requires a global solution, we will also continue to work actively to galvanise regional and global climate action. We are 7,000km away from the Arctic, but Singapore has been an observer in the Arctic Council since 2013, because we are interested in how climate change impacts on the Arctic can affect the rest of the world. Closer to home, following up on our successful convening of the inaugural Special ASEAN Ministerial Meeting on Climate Action last July, Singapore will host the second ASEAN Climate Change Partnership Conference this year to maintain the momentum of regional climate action. We will continue to work with all Parties in the implementation of the Paris Agreement.

## **Conclusion**

44. Let me return to science. In 1953, a storm surge in the North Sea overwhelmed dykes in the Netherlands and claimed 1,800 lives – the country's greatest natural disaster in the 20<sup>th</sup> century. This was a most unfortunate incident, particularly because scientific studies done in 1928 and 1934 had repeatedly warned that existing dykes were inadequate.

45. We must learn from the experience of the Dutch and act now. Climate science tells us it is not a matter of 'if' the sea level will rise but a matter of 'when' and 'how much'. We must be prepared to make the necessary investments to protect Singapore against sea level rise and, for critical infrastructure, against the 'perfect storm'.

46. At our independence, the Pioneer Generation turned Singapore into a metropolitan city out of mudflats. Climate change sets us a monumental, inter-generational task – how to ensure that our Little Red Dot does not disappear below the waves. All of us in this room – the government, the industry, and the public – must make the right choices and play our part. Only then can Singapore remain a shining jewel in the tropical sea.

47. Thank you.

Her Excellency Kara Owen, British High Commissioner to Singapore

Partners for the Environment

1. Good morning. I am heartened to see both new and familiar faces today. The expansion of our Partners for the Environment, or PFE family is encouraging. For returning partners, thank you for your continued support for Singapore's journey towards sustainable development. To our new partners, I warmly welcome you to our family and look forward to your fresh perspectives.

2. This is the third PFE Forum organised by the Ministry of the Environment and Water Resources. By bringing together our partners from the People, Public and Private, or what we call 3P, sectors, the Forum has facilitated the sharing of useful insights and collaborations among partners.

3. Last year, we focused on accelerating action on climate action. This year, in line with our Year Towards Zero Waste, we will centre much of our discussions on what we need to do together to achieve Singapore's vision of becoming a Zero Waste Nation. But climate change remains very much on our agenda, and Minister will share his thoughts on this in his keynote address this afternoon.

### **Pivotal Role of Businesses**

4. Climate change and environmental protection are complex and multi-faceted problems that cannot be addressed by the government alone. As we jointly tackle these existential challenges, we need industries and the community to join hands and spearhead green practices and initiatives.

5. In particular, the corporate sector plays a pivotal role in promoting sustainable consumption and production in a resource- and carbon-constrained world. With your networks, reach and influence, you can lead the way in adopting circular economy practices. I am glad we have the opportunity to recognise the outstanding efforts of some companies at the Singapore Packaging Agreement, or SPA, Awards today.

6. One of them is Resorts World Sentosa (RWS), which has stopped providing plastic bottled water and soft drinks in all of its attractions, dining establishments and hotels. Instead, its hotel guests now have refillable carafes in each room and water stations on every floor of the hotels.

7. Another notable example is the hotel chain Six Senses Singapore. Six Senses carries out on-site composting of some of the food waste generated from its kitchens. The rest of the food waste is sent to urban farms for composting, along with coffee ground.

8. RWS and Six Senses Singapore are amongst the 19 winners of this year's Singapore Packaging Agreement Awards. I would like to extend my congratulations to the winners and my sincere thanks for their significant contributions in reducing packaging waste. I

would also like to commend the 239 signatories of the SPA, for their collective efforts in reducing 54,000 tonnes of packaging waste and saving \$130 million in packaging material costs from 2007 to date. The 239 signatories we have today also marks a significant increase from the 32 organisations we had at the launch of SPA in 2007.

9. Building on the foundation of the SPA, the **National Environment Agency, or NEA, will be introducing a new programme to develop industry capability in managing packaging waste sustainably.** The programme will help lay the groundwork, and complement the implementation of the mandatory packaging reporting in 2020, and the Extended Producer Responsibility framework for packaging waste management by 2025. The three key thrusts of this programme are to build up industry capability to reduce, recover and recycle packaging waste; introduce supply chain initiatives that foster sustainable use of resources; and to raise industry and consumer awareness on the 3Rs of packaging waste management. More details of this programme will be announced at a later date.

### **Co-Creating Solutions with the Community**

10. Our citizens also play an important role in our journey towards a Zero Waste Nation. By practising the 3Rs – reduce, reuse and recycle – in our daily lives, and encouraging our family and friends to do the same, we can each generate a multiplier effect in the larger community.

11. Over the past year, my Ministry and the NEA have engaged the public widely on the inaugural Zero Waste Masterplan which will be launched later this year. We are grateful for the many useful ideas and suggestions which have helped us to formulate an actionable and sustainable Masterplan.

12. We want to go beyond discussion, and work with Singaporeans to co-create effective and meaningful solutions. **We will convene a Citizens' Workgroup of 50 Singaporeans from diverse backgrounds to work with us on solutions to improve the way we recycle at home. The Citizens' Workgroup will be given access to policy-relevant information like household recycling surveys, as well as resource persons who can share their expertise and help with piloting and exploring solutions. Starting today, members of public can indicate their interest to participate in the Citizens' Workgroup at [towardszerowaste.sg](https://towardszerowaste.sg).**

13. To our partners, I hope you will work with us to support this Workgroup as resource persons. Your insights, experiences, professional knowledge and resources will be invaluable, both in the discussion stage, as well as when we move into piloting and implementation. I invite you to let us know if you are interested in being a resource person, and partnering us to co-deliver the recommendations put forward by the Workgroup, which should be published before the end of the year.

### **Conclusion**

14. Let me conclude. At the start of the year, we launched two sets of videos to urge Singaporeans to Save Semakau and Recycle Right. Following positive responses to the videos, which garnered more than a million views each, we will be launching a second series of videos next month. I now leave you with a preview of the videos, and may it inspire all of us to do more and go further in our journey towards a Zero Waste Nation.

15. Thank you, and I wish you a day of fruitful discussions.

Distinguished Guests,

Ladies and Gentlemen,

## **Introduction**

1 Good evening. It is my pleasure to join you at this year's EcoFriend Awards Ceremony.

2 Since 2007, the EcoFriend Awards have recognised individuals who have made significant contributions towards our environment. This year, the National Environment Agency received 343 nominations for the awards, of which over half are new nominees. I am encouraged to see more environmental champions coming to the fore.

## **Challenges facing our Environment**

3 The need for environmental stewardship has never been more critical. Today our global environment faces unprecedented challenges. Growing populations and urbanisation have led to increasing amounts of waste and over consumption of resources. Climate change is threatening food, water supplies and our very existence. While sustainability has always been a cornerstone of Singapore's development, we must step up our efforts to protect our environment.

4 The government is doing its part to prepare for a resource and carbon constrained future, and counter the challenges posed by climate change. But the government alone cannot drive sustainability. We need all stakeholders – businesses, individuals and civil society groups – to lead by example, and rally the community to care for our environment and treasure our precious resources. That is why we are working with our close partners this week to sustain the momentum from our 2018 Year of Climate Action with a Climate Action Week. Let us step up our efforts to inspire and lead Singaporeans to incorporate climate action in their daily lives.

## **Attributes of EcoFriends**

5 Today, we pay tribute to 10 individuals who have demonstrated outstanding environmental stewardship and distinguished themselves with qualities deserving of the EcoFriend Award, or what I call the three 'C's.

6 First, EcoFriends are committed in their beliefs and actions. Ms Farah Sanwari is a designer and social innovator at social enterprise Sustainable Living Lab. She co-founded the Repair Kopitiam programme in 2014 to combat the buy-and-throw-away culture in Singapore. Farah and her team of experienced repair coaches started out by conducting monthly coach training to train new repair coaches. They also organised public repair events to guide Jurong residents in fixing their broken electric appliances such as fans and kettles. Through her consistent efforts, the initiative has steadily gained popularity amongst residents. To date, Sustainable Living Lab has conducted more than 130 workshops, and has extended its efforts to Ang Mo Kio and Tampines.

7 Second, EcoFriends help build capacity in others to contribute to the environment.

Since 2012, Ms Amy Ho, Director of the Office for Environmental Sustainability at the National University of Singapore, has been guiding student environmental groups in their green endeavours, which include e-waste collection drives and roadshows to promote zero waste.

8 Amy and her team also run regular environmental capacity-building platforms. One example is the Aviva Digital Garage Operation Lifehack 2.0, which raises students' interest in social entrepreneurship and global issues. I met some of Amy's students at the 24th Conference of the Parties (COP24) to the United Nations Framework on Climate Change (UNFCCC) in Katowice last year, and was heartened by their passion for environmental causes.

9 The third 'C' is that of collaboration. Ms Pek Hai Lin works with local non-governmental organisation (NGO) Zero Waste SG. The NGO introduced the Bring Your Own, or BYO, movement in 2017 to encourage people to bring their own reusable bags, bottles or containers. My Ministry is also currently collaborating with Zero Waste SG on a food waste recycling pilot in Tampines Greenlace. I will leave Hai Lin to share more about her work later this evening.

## **Co-Creating Solutions with Singaporeans**

10 With these qualities, our Ecofriends have demonstrated how individuals can make a positive difference to the environment. Today, I would like to introduce another 'C' which will be an important enabler in the next phase of Singapore's sustainable development journey.

11 Beyond hearing the views of the public, the government wants to partner you to co-create solutions for sustainable development, and write the next chapter of our Singapore Story together. At the Partners' for the Environment forum yesterday, I had shared how we will set up a Citizens' Workgroup to co-create solutions with citizens from diverse backgrounds to encourage Singaporeans to recycle more and recycle right.

12 We also want to tap on the perspectives of youth on issues such as climate change and resource conservation. Since March this year, my Ministry has been engaging a group of youth leaders on our environmental policies and programmes. Through their lens, we hope to better understand youth perspectives on sustainability, and empower them to lead more ground-up initiatives, to build a more environmentally conscious and gracious Singapore.

13 Taking climate action is not just the responsibility of youths, however. Everyone must take climate action. That is why we launched Singapore's first Climate Action Week, to continue to raise awareness on the need to take collective action on climate change. Earlier this week, the National Climate Change Secretariat launched a public consultation on Developing Singapore's Long-Term Low Emissions Strategy. You can play a part by giving your views on actions that different stakeholders can take to enable Singapore's long-term low emissions development. I encourage you to give your views at [bit.ly/nccsconsult](http://bit.ly/nccsconsult).

## **Conclusion**

14 Let me conclude. We are facing existential challenges on the environmental front, and we must heed the warning signs now. Every one of us – regardless of age, gender and profession – can be an EcoFriend. If we come together and take collective action, we can build a more sustainable environment for our future generations.

15 I hope you will have a fruitful and enjoyable evening. Do take the time to visit the booths of our partners, share your experiences and explore opportunities for collaboration.

16 Thank you.

Ms Esther An, Chief Sustainability Officer, City Developments Limited,  
Ladies and Gentlemen,

1 Good evening. It is my pleasure to join you at the CDL Youth4Climate Fest for the second year running.

2 If you feel that the weather has been warmer in recent years, you are not alone. The impacts of climate change are already upon us. Countries around the world are reeling from the effects of extreme weather phenomena. In fact, recent news had mentioned that many cities in the United States are expecting a heatwave. Temperatures could reach 38 degrees Celsius. Singapore is not spared – we are experiencing more frequent occurrences of heatwaves and dry spells. As a low-lying island city-state, we could also experience mean sea level rise of up to 1m by 2100.

### **BUILDING MOMENTUM ON CLIMATE ACTION**

3 While the government has a holistic climate action plan, we need all hands on deck to effect changes. This was why Singapore designated 2018 as the Year of Climate Action — to galvanise everybody to fight climate change together.

4 The response was encouraging. We received more than 340,000 climate action pledges from individuals and organisations. Our partners from the people, public and private sectors organised more than 800 climate action events last year – that's equivalent to 2 events a day!

5 We must continue to build on the momentum. The Ministry of the Environment and Water Resources, or MEWR, has initiated a Climate Action Week this year to continue the national conversation on climate change. I am heartened that CDL has supported our Climate Action Week by holding the Youth4Climate Fest 2019 this weekend.

### **YOUTHS PLAY AN IMPORTANT ROLE**

6 Climate action is important as it concerns our future. Earlier this week, I spoke about MEWR convening a Citizens' Workgroup to work on solutions for improving household recycling. We have received a very positive response, with many people expressing their interest to contribute. You can register your interest too at [towardszerowaste.sg](http://towardszerowaste.sg).

7 The National Climate Change Secretariat has also launched, on the REACH website, a public consultation on Developing Singapore's Long-Term

Low Emissions Strategy. This process will allow us to hear your views on actions that different stakeholders such as households, individuals and businesses can take to enable Singapore to move towards a low-carbon future.

8 Interested youths such as yourselves should take part in such consultations. It is imperative that you contribute your views because our actions now will have a tremendous impact on your lives in future and those of your children.

9 As leaders of tomorrow, you have an important role to play in raising awareness about the effects of climate change, and rallying Singaporeans to reduce our carbon footprint. In the words of Swedish teenager activist Greta Thunberg, you are never too small to make a difference. We should never underestimate the impact of our collective actions. Did you know that if every household in Singapore were to swap one fluorescent lightbulb for an LED bulb, the energy savings could power 1,000 four-room housing units for a year?

## **YOUTH4CLIMATE FEST**

10 Let me conclude. Today's Youth4Climate Fest is organised jointly with NEA, NParks, ActiveSG and other partners. It provides a platform for youths like yourselves to creatively express your passion for the environment through the performance arts.

11 Our partners have set up several booths to raise awareness on environmental issues. Do check out NEA's Say YES to Waste Less booth to find out how you can start your journey towards zero waste, and speak to the CDL E-Generation Challenge 2019 winners about their experiences from their recent Arctic Expedition. This year, the festival has also expanded to include a climate action workshop conducted by youths, and a movie screening.

12 I hope this event will encourage our youths and everyone present to care for, and protect our environment, and formulate solutions for Singapore to address climate change.

13 Thank you, and have a wonderful evening ahead.

Mr Yuji Hiruma, Director and Senior General Manager of Digital Workplace Marketing Division, Ricoh Asia Pacific

Mr Yeo Li Pheow, Principal and Chief Executive Officer, Republic Polytechnic

Ladies and Gentlemen

1 Good morning. It is my pleasure to join you here today. Let me begin by congratulating Ricoh on another successful Eco Action Day campaign. I am heartened to hear that many citizens and businesses have pledged to take action for a more sustainable Singapore.

## **URGENT NEED FOR CLIMATE ACTION**

2 One of the biggest threats facing the world today is climate change. Many countries are experiencing extreme climate-related disasters such as floods and droughts. Singapore is not immune to the effects of climate change. We have noticed increasingly erratic weather patterns, such as heavier and intense rainfall leading to flash floods. Simulations conducted by scientists at the Centre for Climate Research Singapore have also indicated that we could experience days with temperatures as high as 40 degrees Celsius by 2045, in a worst case scenario.

3 Let me highlight 3 “Cs” that are necessary for us to win the battle against climate change – Communication, Commitment and Consistency.

- First, we need to communicate and raise awareness on the need for urgent climate action. This is why we designated 2018 as Singapore’s Year of Climate Action.
- Second, we need the commitment of organisations and individuals to take action. Every effort counts. While one person or organisation cannot solve the problem, the sum of all our actions will make a difference.
- Third, we need the action taken to be consistent. This is because sustainable development is a lifelong journey, and cannot be addressed by a one-time effort.

4 We need to build on the momentum generated by our Year of Climate Action. That is why we have organised Climate Action Week this year, with the support of our partners from the People, Private and Public (3P) sectors. We need to continue to address the threat of climate change, more urgently than ever.

## **ROLE OF BUSINESSES**

5 We have designated 2019 as Singapore's Year Towards Zero Waste. We want to raise public awareness of the increasing amount of waste that we are generating, and how adopting circular economy strategies can help us to overcome our resource constraints and support climate action. I am glad that this year's Eco Action Day Roundtable focused on sustainable waste and resource management via a circular economy approach. I believe Mr Tan Meng Dui, Chief Executive Officer of the National Environment Agency, had a lively discussion with 3P partners on the topic. I understand that one of the key points raised was the important role played by manufacturers in achieving sustainable development.

6 Indeed, businesses have the potential to make a positive and significant impact on our environment by ensuring sustainable production and consumption within the supply chain. To encourage more to move in this direction, my Ministry will be putting in place an Extended Producer Responsibility Framework for e-waste by 2021. This framework aims to spur recycling of e-waste, while ensuring that products are designed with sustainability and recycling in mind. And by 2025, we aim to introduce a similar EPR framework for packaging waste. These initiatives will support our goal to adopt circular economy strategies, turn what we normally perceive as trash into treasure, and reuse and recycle our limited resources for as long as possible.

## **RICOH LEADS BY EXAMPLE**

7 An added incentive for sustainability is how 'doing good' can lead to 'doing well'. Ricoh is an exemplary example of how environmental sustainability can be aligned to business goals. Their Asia Pacific office in Singapore is completely powered by renewable energy, and they have also made plans to switch a portion of their vehicles to electric and hybrid models by 2025. These initiatives will not only result in a lower carbon footprint, they should lead to savings on energy costs as well – a win-win situation for business and the environment.

8 The company also designs their products with a circular economy approach in mind. Product waste and used materials are rechannelled into the supply chain, to enhance resource efficiency and lower costs in the long term.

9 In addition, as Mr Yuji Hiruma mentioned, Ricoh will be launching a community seed distribution initiative today. This initiative to encourage the public to plant and harvest their own fruits and vegetables is a wonderful way to

support Singapore's "30-by-30" vision — which is our vision to produce 30 per cent of our nutritional needs locally by 2030.

10 Beyond these initiatives, Ricoh has consistently communicated the importance of sustainable development to their wide network of partners. The annual Eco Action Day campaign is a platform to remind all of us, be it individuals or businesses, that we have a significant role to play in the battle against climate change.

11 Ricoh has demonstrated that there are many benefits and possibilities in pursuing sustainability through business. I hope their efforts will inspire others to also embark on their own journey of sustainable development.

## **CONCLUSION**

12 Let me conclude. There is an old African proverb that says, "If you want to go quickly, go alone. If you want to go far, go together." I urge everyone, whether you are a big or small entity, to come together and do your part for the environment. Through our collective efforts, we can create a sustainable Singapore for future generations.

Thank you.

Ladies and Gentlemen

Good afternoon, I am happy to join you at today's Sustainability Showcase. To our foreign visitors, a very warm welcome to Singapore.

### **Sustainable development a necessity**

2 Sustainability has been a cornerstone of Singapore's economic development. Since the early years of our independence, we have sought to balance economic growth with environmental protection and social inclusion. To us, sustainable development is a necessity. This unwavering principle has been instrumental in transforming Singapore from a mudflat to a metropolitan and enabled us to provide our people with a clean, green and highly liveable urban environment.

### **The threat of climate change**

3 We must press on with this journey of sustainable development, for the sake of our future generations. This is especially so in the face of climate change, the biggest environmental challenge of our generation. The late Mr Lee Kuan Yew has always believed that if countries do not come together to battle climate change, then civilisation as we know it, will be wiped out. We already know the story that science tells, atmospheric levels of carbon dioxide have reached historic highs, resulting in the warmest weather that mankind has experienced.

4 Climate-related disasters such as floods, droughts, wildfires have threatened food and water supplies, and pose serious threats to people all around the world. If we take this problem seriously and all come together to do our part for the environment, we can reverse the trend of temperature rise. However, when sea levels rise and seas expand, they take time to recover. Therefore, even if the world works together, we must make sure to build our resiliences to prepare for this.

### **Building up the three 'Resiliences'**

5 In Singapore, we are building up what we call the 'Three Resiliences', to ensure that our future generations continue to enjoy a home that is vibrant and liveable.

6 First, we are building up our climate resilience. We are taking steps to protect our people from impacts such as sea-level rise and extreme weather conditions. New projects such as Changi Airport Terminal 5 are being built on higher land platform levels. We are also investing in climate science research, and I recently announced that we are putting \$10 million into a National Sea Level Research Programme. The research will strengthen our understanding of sea levels around Singapore, and enable us to develop more robust sea level rise projections. The

research will also contribute towards global understanding of climate change, both in the tropics and non-tropics, and help our neighbours plan for their adaptation to climate change.

7 Second, we are also building up our resource resilience. Climate change will put pressure on essential resources such as energy, food and water, and we must plan ahead to effectively address these challenges. The best way to think about resource resilience is how Singapore dealt with our water problem. We have transformed it from an existential challenge to one where every drop of water is recycled endlessly, in a closed loop system. We hope to emulate this with our waste loop. This is one reason why we designated 2019 as Singapore's Year Towards Zero Waste. We are committed to move towards more sustainable consumption and production, and shift towards a circular economy approach to reuse our resources for as long as possible.

8 This brings me to the third resilience we are building up, which is economic resilience. We need to ensure that our businesses are able to adapt and develop the capabilities to thrive in a resource and carbon constrained world. Let me cite my favourite example. The shares of Beyond Meat, a company that produces plant-based meat substitutes, soared more than 570 per cent since the firm's initial public offering last month. This tells us that people are likely to invest in companies that support social or environmental outcomes. Impossible meats, also here today, is another example. Earlier this year in St Louis Missouri, Burger King partnered with them to roll out the Impossible Whopper. These plant-based meat substitutes have been gaining popularity as more attention is focused on the environmental trade-offs in industrial ranching. Also as a bonus, it is completely cholesterol free!

9 In order to build up our 'Three Resiliences' effectively, we will need the support and participation of all stakeholders.

### **Role of youths in driving sustainability**

10 As youth leaders, you have the potential to make a positive impact on the environment by becoming an agent for climate action. Platforms such as today's event serve as an excellent launchpad for you to conceptualise and showcase your sustainable innovations. I hope you take the time to share your experiences, learn from each other, and challenge yourselves to make a difference.

11 I have been told that participants from last year's showcase have built six solutions for implementation across Southeast Asia. Each is aimed at addressing an environment-related problem faced by local communities. One such solution is GateWaste, a mobile application to help households in Jakarta recycle their plastic waste through third-party collectors. Not only does the app allow for a more efficient and sustainable recycling system, it also improves the livelihood of these third-party waste collectors.

12 In Singapore, we have youth who are equally passionate about driving the sustainability agenda among their peers and the community. An example is the Sustainable Living Lab, which helps community members repair their broken appliances, such as fans and kettles. This combats the buy-and-throw-away culture and reduces waste going to our only landfill — Semakau landfill. As a bonus, residents get to save money!

## **Conclusion**

13 Let me conclude. Youths such as yourselves can play a very important role in shaping your own future. I encourage you to channel your energy and influence towards advocating for climate action. Find partners and leverage on each other's strengths. Let us work together to achieve a more sustainable future for all.

14 Thank you, and I wish you all a fruitful event ahead.

Distinguished Guests

Scholarship Recipients

Parents

Good morning, and welcome to MEWR. I am glad to see many parents here. Your nurture, support and guidance have groomed our young scholars to where they are today and you have reason to be very proud.

2 Since 2008, 171 National Environment and Water, or NEW, scholarships have been awarded to outstanding young talent who are keen to pursue a career in the environment and water sectors. This year, we are presenting 17 scholarships. This includes five inaugural awards by the Singapore Food Agency, which was formed in April. Congratulations to our newest scholarship recipients. I look forward to your contributions to the next chapter of our Singapore story.

### **Preparing Singapore for the future**

3 These are important times for our environment, at home and globally. Climate change is bringing new threats and putting pressure on resources like water, food and energy. To ensure that Singapore continues to thrive in a resource and carbon constrained world, we need to plan ahead and make long term investments in science and technology.

4 In MEWR, we are building up three areas of resilience to ensure that Singaporeans will continue to enjoy a home that is vibrant and liveable. The first is climate resilience. This means protecting ourselves from impacts such as sea-level rise and extreme weather, through investments in infrastructure as well as research in climate science.

5 Second, we are building resource resilience. Think about our water, which remains an existential challenge for us. Over time, we have significantly enhanced our water resilience by developing four national taps, and recycling every drop of water endlessly, in a closed loop system. We want to do the same for other resources.

6 The National Environment Agency (NEA) is working hard to turn incineration bottom ash into construction material, or what we call "NEWSand". NEA has developed provisional environmental standards and field trials will start next year. We are also adopting a systems-level approach to harness synergies across different resource loops. For example, we are co-locating a new water reclamation plant with an integrated waste management facility. Called Tuas Nexus, it will co-digest food waste with used water sludge to triple biogas yield. The biogas produced will generate more than enough energy to power the Tuas Nexus. We estimate that this will reduce carbon emissions by more than 200,000 tonnes a year – equivalent to taking 42,500 cars off the road.

7 The third resilience we are building is economic resilience. We need to ensure businesses are developing new capabilities to continue to thrive. For every challenge we face, there is also an opportunity waiting to be seized. Take food for instance. Today, we produce less than 10 per cent of our food. We have set for ourselves an ambitious target to produce 30 per cent of our nutritional needs by 2030. We will transform our agri-food industry to adopt innovative solutions. In the process, we can develop our local enterprises and provide good jobs for Singaporeans. One of my favourite overseas examples of opportunities in this sector is Beyond Meat, a US company that produces plant-based meat substitutes. Its shares soared more than 570 per cent after its initial public offering. This tells us that people are interested in investing companies that support environmental outcomes.

### **How a MEWR Family Officer can contribute**

8 To drive these areas of work, we require men and women with talent. More importantly, we need people with a passion for sustainable development, and a commitment to care for and protect the environment. As a member of the MEWR Family, you must continue to push the boundaries, stay open to new ideas, and remain steadfast in ensuring Singapore's sustainability.

9 Let me give you a few examples of how MEWR officers have contributed. Charles Lim from PUB went on an overseas attachment to the UK to study the thermal hydrolysis process. This technology has been installed at the Jurong Water Reclamation plant, allowing PUB to improve energy yield and reduce the space needed for sludge treatment. He is currently involved in the development of Tuas Nexus.

10 Another officer is Samuel Chong. At the Waste and Resource Management Department in NEA, he worked closely with government agencies to coordinate a Whole-of-Government effort to maximise resource recovery for critical infrastructure. He has joined MEWR's Environmental Policy Division, and will continue to contribute to Singapore's zero waste initiatives.

11 One of the first recipients from the Singapore Food Agency (SFA) is Lau Kai Kiat. He has been awarded a scholarship to study Food Technology at the Wageningen University & Research in the Netherlands. Kai Kiat supports the circular economy approach for the food sector. He believes that data science and artificial intelligence can improve processes to ensure food security, and reduce and manage waste.

### **Conclusion**

12 I warmly congratulate all our 17 NEW scholars and your parents. I hope that this award will mark the beginning of a fulfilling and purposeful career for you in the MEWR Family. Make use of every opportunity to learn and contribute. Let's work together to build a sustainable Singapore for our future generations.

13 Thank you.

Ms Kwee Wei-Lin, President, Singapore Hotel Association,

Distinguished guests,

Ladies and gentlemen,

Award recipients,

1. Good afternoon. Thank you for inviting me to join you today to recognise hotels for their efforts in environmental sustainability.

2. During the inaugural edition of this event in 2009, I presented the award to 15 hotels. I am heartened to see that more hotels have stepped up their efforts in this area, and today, we have 27 hotels receiving awards — nearly double the number in 2009. I also note that from this year, all nominated hotels will be required to have the Green Mark certification, which is the minimum environmental sustainability standard for all new and retrofitted buildings in Singapore.

### **Gearing towards a Circular Economy**

3. Sustainable development is not simply a choice for Singapore. It is a necessity. Since our independence, we have sought to balance our economic development with environmental protection and social inclusion. And we must continue on this journey, for the sake of our future generations. This is especially so in the face of climate change. As Prime Minister Lee said at the National Day Rally, climate change is one of the gravest challenges facing humankind. It will bring many risks and consequences, such as new diseases, more frequent pandemics, food shortages, and rising sea levels. And it will change life as we know it.

4. PM has called for Singaporeans to understand, mitigate and adapt to climate change. In fact, my Ministry designated 2018 as our Year of Climate Action, to raise public awareness and understanding of the need for collective action to reduce our carbon footprint. We have received a resounding response from all of you. Our partners from the people, public and private sectors organised more than 800 climate action events in 2018 — equivalent to two events a day. More than 341,000 individuals, educational institutions and organisations have pledged to take climate action.

5. As PM puts it, Singapore may not be able to stop climate change by ourselves, but we can contribute to solutions, and we must do our fair share. Through this, we hope to be able to encourage other countries to also do their part, and work together with others towards a global solution to climate change. To sustain the momentum for collective environmental action, we designated this year as our Year Towards Zero Waste. We want to raise awareness of the need to move towards more sustainable consumption and production, and promote the adoption of circular economy strategies to overcome our resource constraints and turn trash into treasure.

6. Building a circular economy will not just benefit the environment. Efforts to reduce, reuse and recycle can lower operating costs for businesses. Consumers are also increasingly demanding green products and services. A report by digital travel platform Booking.com in April this year indicated that 55 per cent of global travellers are opting to make sustainable travel choices. This is an added incentive for hotels to go green, in order to attract the growing number of environmentally-conscious travellers.

### **Hotels that lead by example**

7. Let me share some examples of exemplary practices by our winners. To reduce food waste, Mandarin Oriental has installed a food digester, and conducts regular reviews of mini-bar items in hotel rooms to remove those with low demand. The hotel also provides reusable glass bottles in meeting rooms instead of plastic bottled water. Through these and other 3R measures, Mandarin Oriental successfully achieved a waste diversion rate of 13.7 per cent last year.

8. Under Novotel Singapore Clarke Quay Hotel's "Say No to Food Waste" campaign, staff learnt how to repurpose leftovers and reduce food waste in their line of work and at home. The hotel also uses excess ingredients in its staff canteen and buffet lunches served at the Square Restaurant.

9. From 2024, large commercial and industrial food waste generators such as hotels and malls will be required to segregate their food waste for treatment. From 2021, developers of new developments which are expected to be large food waste generators will be required to allocate and set aside space for on-site food waste treatment in their design plans and to implement on-site food waste treatment from 2024. These measures will be implemented through the Resource Sustainability Bill later this year.

10. Besides minimising waste, it is important that businesses improve efforts to use water wisely. Our non-domestic water demand is projected to increase from 55 per cent of our current water supply today, to 70 per cent of our future water demand by 2060.

11. Since 2015, large water users with consumption of at least 60,000m<sup>3</sup> per year have been required to install private water meters to track and monitor water usage. They are also required to submit a Water Efficiency Management Plan, or WEMP, to PUB annually. This year, 61 hotels have submitted their WEMPs to PUB. Based on the data collected, PUB has developed water efficiency benchmarks for hotels. PUB has also consulted with the industry to publish a 'Best Practice Guide in Water Efficiency for Buildings' in March last year.

12. I would like to commend Hotel Michael under Resorts World Sentosa, or RWS, for its efforts in improving water efficiency. Thanks to its Centralised District Cooling System, RWS has been achieving total freshwater consumption reduction targets year on year since 2015. Between 2015 and 2018, RWS achieved 850,000m<sup>3</sup> of cumulative water savings.

13. Beyond water conservation, Hotel Michael is also doing its part to conserve energy through energy-efficient initiatives like the use of LED lighting and motion sensors across its premises. In 2018, RWS attained a combined energy savings of more than three million kilo-watt hours (kWh), which can power more than 5,500 four-room HDB flats for a month.

## **Conclusion**

14. Let me conclude. My heartiest congratulations to all the winners of this year's Singapore Green Hotel award. I hope your efforts and achievements will inspire other organisations to follow in your footsteps.

15. The hotel industry plays an important role in our climate mitigation efforts, and in helping Singapore to become a zero waste nation. Let me thank the Singapore Hotel Association and the supporting public agencies – BCA, NEA, PUB and STB – for promoting a sustainable hotel industry through this biennial event. We value the strong partnership and efforts of all our stakeholders. Indeed, every action counts, and we will continue to work closely with all of you to ensure a Sustainable Singapore for the future.

16. So once again, congratulations and thank you.

Ms Isabella Loh,

Chairman of the Singapore Environment Council

Distinguished Guests,

Ladies and Gentlemen

Good morning. It is my pleasure to join you today to recognise the efforts of organisations which have demonstrated commitment to environmental sustainability.

2 Let me begin by commending the Singapore Environment Council, or SEC, for embarking on a joint study with Deloitte Singapore, to provide recommendations to reduce food loss and food waste in Singapore. This is certainly a meaningful effort in Singapore as we mark this year to be the Year Towards Zero Waste.

### **Climate change challenges**

3 Today, I would like to talk about climate change and the need to reduce our waste. At the National Day Rally, Prime Minister Lee chose climate change as a topic to share with Singaporeans on how it is not just the gravest challenge to mankind, but also a challenge that Singapore takes very seriously. Indeed, he calls it an 'existential issue'.

4 As PM said, although we will not be able to stop climate change by ourselves as it is impossible to do so, we can contribute to solutions, and we must do our fair share. Let me name three ways in which we can contribute towards the reduction of greenhouse gas emissions.

5 The first is by exploring clean energy options. This is harder than you may think, especially for Singapore. We are small, with high urban density and low wind speeds. We may feel the breeze as we walk around, but that is not enough to move the windmills that will give us wind energy. We also lack geothermal resources although we are very close to the ring of fire. All these limit our access to alternative energy options. Our neighbours have better and more options to choose from. There are other options like nuclear, hydro-electric, wind and geothermal power. Among these options, solar energy is the most promising renewable energy option, but our limited land makes it challenging to deploy solar power on a large scale. But that did not stop us from deploying them in any case. The floating solar photovoltaic, or PV, system at Woodlands which is set to complete by 2019 will be the largest offshore floating PV in the region. As for the PV project at Tengeh Reservoir, it will be one of the largest single floating solar PV systems in the world when completed by 2021.

6 A second way in which we are doing our part is by improving energy efficiency. Singapore is the first country in Southeast Asia to introduce an economy-wide carbon tax with no exemptions. Many countries in the world may have high carbon tax but they also have foot notes to indicate who are exempted, and many important industries which should be taxed could be exempted too. Putting a price on carbon will encourage companies to switch to more energy efficient technologies and more sustainable processes. Companies who want to come to Singapore will notice that we are implementing the carbon tax. Although we are now charging at \$5 per tonne for those producing more than 25,000 tonnes of emissions, we will be doubling or tripling the charge by 2030. Companies do take note when they make their decisions to come to Singapore. Over the next five years, we will be collecting a revenue of nearly \$1 billion. We will not use it to build hospitals or schools, but to use this revenue to provide grants and incentives to businesses to transform their energy use, so that their carbon emissions will be reduced in the process. The government will help businesses to achieve energy efficiencies through our grants and incentives, which we will be collecting through our carbon tax.

7 A third way in which we are reducing our emissions is through greening our transport system. By 2040, we aim to have nine in 10 of all peak period journeys made on "walk, cycle and ride" transport modes, where "ride" refers to public and shared transport. By 2040, we aim to have 100 per cent cleaner energy public bus fleets and taxis (e.g. electric or hybrid).

8 By taking these and other actions, we hope to show that even a small, highly-urbanised city-state like Singapore with limited alternative energy options can contribute meaningfully to the global fight against climate change.

### **Reducing waste**

9 The above measures are what we call climate mitigation, which is what we do to reduce emissions. We will continue to do our best in this area, but we must also be prepared for the worst. Beyond sea level rise, climate change will put a strain on essential resources like water, food and energy. We must take action now to prepare ourselves for resource scarcity in future.

10 Singapore designated 2019 as the Year Towards Zero Waste because we want to rally Singaporeans to treasure our resources, and make the 3Rs of Reduce, Reuse and Recycle our social norm. Today, we tend to take, make, use and throw without a second thought to our impact on the environment. This will become increasingly unsustainable. We must all adopt a circular economy mindset, and seek to close our resource loops.

11 One of the best examples of how we have adopted circular economy strategies is in our water story. By endlessly recycling the water we use into NEWater, and putting it back into the system, we have closed the water loop, so no water is wasted. NEWater and desalination are two sources of water that will help us tide over dry spells and strengthen our water security in the face of climate change. These two national taps did not come easy, and required a lot of hard work and heavy investments. Going forward, we will pursue the circular economy in the waste and material sector with the same determination.

12 Later this week, we will launch our inaugural Zero Waste Masterplan. Food waste will be one of the areas we will put special focus on, as it is one of the biggest waste streams in Singapore. When we waste food, we not only lose food that could have fed others. We also waste the resources used to grow, harvest, transport and package food. Earlier this year, the National Environment Agency called on consumers to adopt three simple habits to reduce food waste. They are: 1) Order only what you can finish; 2) Ask for less rice/noodles if you can't finish them; and 3) Say 'No' to side dishes you won't eat.

13 Even as we discuss what Government and businesses can do to reduce waste, we must recognise the need for all sectors of society to contribute to our journey towards zero waste and environmental sustainability. Each of us can make an impact if we act collectively to adjust our lifestyles and become environmental stewards.

### **Singapore Environmental Achievement Awards**

14 Today, I am happy to present the Singapore Environmental Achievement Awards to 11 organisations from diverse sectors which have demonstrated outstanding environmental stewardship.

15 One of them is DBS Bank, which has been driving energy efficiency through the optimisation of its data centres' electricity consumption. Instead of focusing on having bigger and more powerful computers, they thought about how they could serve their customers best using the least energy produced through their systems. Congratulations to DBS!

16 Another positive example is Asia Pacific Breweries, which is one of the first in Asia to install a Water Reuse Treatment Plant to conserve water and reuse it for cooling, cleaning and landscaping. The company also encourages its suppliers to adopt green practices. I hope that these efforts will inspire other organisations to strive towards environmental sustainability.

### **Conclusion**

17 Let me conclude. There are many challenges ahead for Singapore, given our significant constraints. We must all work together to play our part to mitigate climate change, even as we find solutions to adapt to a new normal. By planning ahead and investing well, I am confident that Singapore will remain a vibrant and liveable city for our future generations.

18 Congratulations again to all the winners of the Singapore Environmental Achievement Awards. I wish everyone a fruitful afternoon. Thank you.

Your Excellency Ms Margriet Vonno

Ambassador of the Netherlands to Singapore and Brunei

Ms Nicola Willey

Acting Deputy High Commissioner, British High Commission to Singapore

Ladies and gentlemen

1. Good morning. I am proud to mark the opening of Choa Chu Kang Waterworks, after the completion of its upgrading works.
2. Built in 1975, Choa Chu Kang Waterworks is one of the oldest water plants in Singapore. It has the capacity to treat 80 million gallons of raw water per day from Kranji, Pandan and Tengeh reservoirs, and is an important part of our supply network to safeguard water resilience.

### **Importance of continued investment in new water technologies**

3. With climate change, the quality of our local catchment water may deteriorate. For instance, rising temperatures could result in warmer waters while intense rainfall may lead to an excessive amount of nutrient runoff being washed into our waterways and reservoirs. These conditions are likely to fuel algae growth in the reservoirs, which will need to be removed as part of the water treatment process. In anticipation of such challenges, PUB has to continuously invest in new water treatment technologies and upgrade our water treatment plants, as we have done in Choa Chu Kang.
4. Choa Chu Kang Waterworks has undergone two phases of upgrading — the first was completed in 2008, to employ polymeric membranes in addition to the traditional water treatment method of using sand filters. Today, we mark the completion of the second phase of upgrading works, which lasted three years, and cost S\$162 million. Choa Chu Kang Waterworks now utilises the latest ceramic membrane technology and has the world's largest ceramic membrane system in a single plant that treats up to 40 million gallons of raw water per day.
5. This ceramic membrane technology is more energy efficient, occupies less space, and has a longer lifespan of about 20 years, which is four times more than polymeric membranes. The use of ceramic membrane also results in lower water loss of about 1 per cent, compared to 5 per cent for polymeric membranes. Adopting this technology not only ensures that we continue to have a reliable supply of clean and safe drinking water, it also helps PUB improve their energy and water efficiency in water production.
6. Prior to the deployment of ceramic membranes, PUB had conducted extensive trials to evaluate the reliability and suitability of ceramic membranes for large-scale water treatment operations. In 2011, PUB collaborated with Dutch

Company PWN Technologies to build a S\$5 million ceramic membrane demonstration plant here at Choa Chu Kang Waterworks. This was supported by a grant administered by the Environment and Water Industry Programme Office under my Ministry, which promotes early adoption and commercialisation of new environmental and water technologies. Following positive results from the demonstration plant, PUB decided to deploy ceramic membrane technology at full-scale, becoming one of few pioneer water treatment plants around the world to adopt this leading-edge technology.

7. Besides the ceramic membranes, the upgrade also includes the implementation of ozone and biological activated carbon filtration, or ozone-BAC filtration. Ozone, one of the strongest disinfectants available in drinking water treatment, kills germs in the water, while activated carbon removes other natural organic impurities. The installation of the ceramic membranes together with the ozone-BAC system means that Choa Chu Kang Waterworks possesses one of the most advanced water treatment processes in the world.

8. Such plant upgrades are part of PUB's efforts to continually enhance its water treatment capabilities to ensure that Singapore has an efficient, adequate and sustainable supply of water. Our rigorous water treatment processes and quality monitoring programme from source to tap allow all Singaporeans to drink tap water safely without the need for boiling or extra filtration – a privilege not enjoyed by the vast majority of the world's population.

### **Improving the quality of jobs**

9. Adopting new technology also improves the quality of jobs for our workers, as they upgrade their skill sets and technical competencies. Let me give one example.

10. 54-year-old Mr Mohamed Salfarimi is currently an operations engineer who has been working at Choa Chu Kang Waterworks for over 20 years. Salfarimi joined PUB in 1986 as an assistant technician. His work then involved general plant operations, such as conducting laboratory tests, operating the pumping systems and monitoring the water treatment processes.

11. As Choa Chu Kang Waterworks underwent upgrading from sand filtration in the early days to polymeric membranes and now ceramic membranes, Salfarimi took the initiative to pick up new skills and adapt to these new technologies. With training opportunities provided by PUB, Salfarimi learned to operate more sophisticated systems and processes.

12. Salfarimi is now a plant operations engineer who supervises the shift teams. He also helps to implement projects to improve work processes, and was heavily involved in the plant commissioning works for the upgraded water treatment processes. He is a good example of how PUB works with its staff to upskill and

retrain them, to take on improved job functions as new technologies transform the workplace.

### **Sharing water knowledge and expertise through strategic partnerships**

13. Many of the water challenges faced by Singapore are not unique to us. Water utilities around the world will have to invest heavily in resources and manpower to keep abreast of the threats to water quality, safety and supply. It is important that utilities share their experience and expertise, in order to optimise their investments and resources. I am pleased to announce that PUB will be forming a utilities alliance with Dutch water utility, PWN and British utility company South West Water. With the signing of the MOU today, the three utilities will share knowledge and best practices in water treatment. This reflects our strong commitment to innovate and develop new water solutions.

### **Conclusion**

14. Let me conclude. Water is an existential issue for Singapore, and our quest to provide a safe, sustainable and resilient water supply is a never-ending journey. The challenge of meeting the water needs of our population and economy will likely be increasingly complex in the future. PUB is committed to investing in R&D and new technologies to address growing urban challenges, so that our people can continue to enjoy clean and safe drinking water at the turn of our taps. Climate change has made water an issue every country will have to grapple with in the near future. I am glad that Singapore has been on a quest to address our water issues for the longest time, and am confident that we will continue to address our water supply needs.

15. My congratulations to PUB on the completion of this upgrading project at Choa Chu Kang Waterworks. Let us show our appreciation to the dedicated project team for bringing this to fruition.

16. Thank you.

Distinguished guests

Ladies and Gentlemen

1. This is a significant milestone in Singapore's sustainable development journey and our Year Towards Zero Waste. I am happy that so many have joined us to launch Singapore's inaugural Zero Waste Masterplan. We have more than 200 representatives from various sectors – industries, civil society, government agencies, academic and research institutes and members of the public with us today for the launch. Your presence is testament to the wide-ranging contributions that have made this Masterplan possible.

### **Zero Waste Efforts Key to Fighting Climate Change**

2. At this year's National Day Rally, PM Lee underscored the critical need for Singapore to address the existential threats of climate change. Singapore is vulnerable to sea level rise and extreme weather. Climate change also has far reaching impact on our water and food supply, and spread of diseases like dengue.

3. We can already see the effects of climate change. All of Singapore's top ten warmest years have occurred in the past 25 years; eight of them were recorded in this century. This July was the driest July on record and also the second hottest month since records began.

4. PM Lee highlighted three things we need to do: understand the science of climate change, mitigate climate change, and adapt to climate change. Reducing waste, and adopting circular economy approaches, will directly support our climate mitigation efforts.

5. We deplete scarce resources when we produce, consume, and throw away. From mining raw materials; to manufacturing and transporting goods; and down to incinerating and landfilling waste. Take for example, a mobile phone. To produce its components like casing and battery, aluminium and lithium have to be mined overseas. The phone is then assembled, enclosed in packaging and transported to us. A study estimated that 3.4 kg of metal ore and 100 litres of water are required to produce just one iPhone. The associated activities – be it mining, manufacturing or shipping – also emits greenhouse gases. These gases trap heat in the atmosphere and contributes to climate change. Therefore, we need to take urgent action, and this Masterplan charts a strategic path for us towards a Zero Waste Nation.

### **Building Resilience through a Circular Economy**

6. Climate change will change the world our businesses operate in. Governments around the world have adopted emissions reduction targets, and businesses will start to feel these carbon constraints. Businesses will also have to adjust to resource constraints, such as energy, clean water, and raw materials. To continue thriving in a carbon- and resource-constrained world, we have to build up our Three Resiliences. First, climate resilience:

we must address the existential threats of climate change, especially rising sea levels, and cope with rising temperature and extreme rainfall patterns. Second, resource resilience: we must overcome global resource constraints and ensure a safe and secure supply of critical resources like food and water. Third, economic resilience: we will support our companies to thrive in a future economy that is carbon-light and seize new opportunities in the green economy.

7. We need to transition to a sustainable future economy that is good for both businesses and the environment. We can no longer afford to operate “business-as-usual”. The inaugural Zero Waste Masterplan is our holistic strategy for Singapore to make a significant paradigm shift, and adopt a circular economy approach towards a Zero Waste Nation. Each chapter in the Masterplan represents a key pillar of the strategy. These include legislation and regulation, infrastructure, industry development, research and development, and outreach and engagement. We have set ourselves an ambitious target – to reduce the amount of waste that we send to our landfill by 30% by 2030. Everyone has a part to play to meet this target – industry, government, and households. I am confident that we will achieve this goal if we accomplish all that has been set out in the Masterplan. This will in turn allow us to extend the lifespan of Semakau Landfill beyond 2035. In fact, this year marks the 20th anniversary of Semakau Landfill. Let’s do our part to #SaveSemakau so that we can celebrate many more anniversaries to come!

### **Government is Taking the Lead**

8. The Government is taking the lead to catalyse a shift to the circular economy. We have introduced a landmark Bill in Parliament — the Resource Sustainability Bill. We have decided to enact a new Act, rather than amend existing ones, to demonstrate and emphasize the new paradigm to view waste as a resource. The Bill marks a distinct shift in our approach towards resource management by extending the regulatory framework upstream. This regulatory framework sends an economic signal to producers to take into account their impact on the environment. It will finance the aggregation and recovery of useful materials such as metals from e-waste. It also aims to encourage producers to reduce the use of packaging. The regulatory framework will target our 3 priority waste streams of electrical and electronic waste, or e-waste, packaging waste including plastics, and food waste. We will share more details on the regulations in the presentations to follow.

### **Opportunities for Companies & Good Jobs for Singaporeans**

9. Adopting a circular economy approach to work towards a zero waste nation means that the “economy”, as always, is intertwined with the environment. We believe that the circular economy will bring economic opportunities which Singaporean companies and workers can tap on. This is why we have partnered WMRAS to organise the launch event today.

10. For example, preliminary studies have estimated that we can reap a net benefit of \$40 million by recovering and reusing materials from e-waste. This includes creating new

jobs, and tapping on overseas opportunities to export our local solutions. In fact, TES Singapore, a local e-waste recycler, is currently building a new facility to treat lithium-ion batteries from Hybrid and Electric Vehicles. The treatment process employs chemical extraction techniques to recover lithium and other valuable materials. This will help grow the green economy and create new jobs for engineers and skilled technicians.

11. There are similar opportunities with plastics. Many of you here will be familiar with China's ban on plastic recyclables, and how this has shifted the trade patterns of plastics. Many countries are also closing their borders to plastic recyclables. We believe that closing the plastics loop domestically, to extract treasure from trash, is an area where both economic and environmental opportunities lie. NEA recently conducted a study on how we can develop the local plastics recycling industry, and is planning a deeper dive into various recycling solutions and their feasibility for adoption in Singapore. For example, mechanical recycling to turn waste plastics into plastic pellets for manufacturing new products, or chemical recycling to turn plastic waste into chemical feedstock or fuel. We will conduct an industry consultation session after the launch event to share more information and seek the industry's views.

12. All these changes will not just generate profits for companies, but also create good jobs with better working conditions in the Environmental Services industry. The Pneumatic Waste Conveyance System, or PWCS, is an example. The PWCS uses air pressure to move waste through a network of pipes into a central collection station. As compared to labour-intensive collection of waste from individual refuse chutes. This has transformed the way waste is collected, and created new high value-added jobs such as skilled technicians and project engineers.

13. 24 year-old Mr Koh Kheng Huat is a promising young man who has pursued a career in this industry. He currently works at PV Vacuum Engineering, a PWCS services company, as a project coordinator. To upskill himself, he has enrolled in a SkillsFuture Work-Study Programme for a Diploma in Applied Science by Republic Polytechnic. The specialisation in Environmental Services and Management will enhance his capability to take on more complex projects.

14. Another example is Ms Jade Loh, who works at Plaspulp Union, a local SME which develops recycling solutions for waste materials. Her company utilises advanced technology and automation to process plastic waste for use in new products. An important solution indeed as the world declares war on plastic waste. I am glad that both Kheng Huat and Jade are able to join us today, and I wish them all the best in their career.

15. As the environmental services sector continues its transformation efforts, more good jobs will be created. By 2025, we expect about 30,000 people from the industry to benefit from higher-value jobs through skills upgrading and technology adoption. I encourage our industry partners to proactively seek opportunities through programmes such as NEA's Regulatory Sandbox for Environmental Services or the \$30 million Productivity Solutions Grant.

## **Science and Technology at the Fore of Zero Waste**

16. We are also leveraging science and technology to develop new and more efficient ways to recover resources from waste. A few months ago, we announced our plans for NEWSand: a strategic endeavour to turn incineration bottom ash into construction material, instead of landfilling it. Progress on NEWSand is going well. NEA has developed provisional environmental standards for the use of NEWSand, and field trials are on track to begin next year.

17. Beyond closing individual resource loops, we will also adopt a systems-level approach to promote industrial symbiosis. This refers to mutually beneficial collaboration, where what is deemed as waste by one could be used as raw material for another. The Tuas Nexus is a good illustration of industrial symbiosis. The co-location of NEA's Integrated Waste Management Facility and PUB's Tuas Water Reclamation Plant will allow output from one facility to be used as feedstock to another. The Tuas Nexus will co-digest food waste with used water sludge to triple biogas yield, which in turn will generate energy to power the Tuas Nexus.

18. We are also exploring closing resource loops at the district level. Government agencies across various domains are working together to optimise resource flows within the upcoming Jurong Lake District and Punggol Digital District. One possibility is to convert food waste into useful products like compost for landscaping – all within the district. We are also exploring further synergies in our existing districts. For example, JTC commissioned a Jurong Island Circular Economy Study to map out resource flows and identify further synergies within the petrochemical cluster.

19. To achieve a Zero Waste Nation, we must nurture a vibrant R&D ecosystem. We need innovative enterprises to test-bed promising technologies and scale them up to commercial viability. To do so, we have dedicated significant resources in R&D. Our \$45 million Closing the Waste Loop R&D initiative is propelling research to extract valuable components from packaging waste; spearheading solutions to turn incineration bottom ash into construction materials; and synthesising novel methods to recycle e-waste. We are also pushing the boundaries of waste-to-energy technologies with the \$25 million WTE R&D programme. We will continue to invest in and harness technology to close the resource loop for waste; like what we have done for water. This will augment Singapore's position as a leader and centre of excellence in circular economy solutions. In other words, we will make a splash, with our trash!

## **Building our Future Singapore Environment Together**

20. Our Zero Waste vision requires everyone to play a part. We need individuals, businesses and organisations to partner us to co-create and co-deliver effective solutions. Earlier this year, I hosted a roundtable dialogue for NGOs and youth groups such as Zero Waste SG and Sustainable Living Lab. I was glad to see their passion as they shared their views on how we can do better on our zero waste efforts.

21. We also engaged many other stakeholders in preparation for the Masterplan. As part of our engagements, we consulted more than 250 companies to craft our regulations. We also sought the views of more than 5,000 households on recycling and held 7 focus group discussions to gather the views of Singaporeans. More than 1,300 people participated in our public consultation. In partnership with the National Youth Council, we spoke with youth leaders to understand their perspectives on environmental sustainability. We have been actively engaging schools and the youth as well to support them in organising ground-up initiatives. In total, we have engaged more than 6,000 stakeholders in preparation for the Masterplan.

22. In this Year Towards Zero Waste, MEWR and NEA have embarked on the #RecycleRight campaign. We are co-creating measures with Singaporeans to reduce the contamination of recyclables in our blue bins. Today, I am pleased to unveil the new design of our recycling bin labels, which is a first product of our co-creation efforts.

23. The new design clearly indicates examples of what can be recycled within each category of material, and what cannot be recycled. This is to encourage people to place the right recyclables into the blue bins. There will also be a prominent banner stating “No Food. No Liquids.” – to remind users to keep recyclables clean and free from food and liquid waste. These labels will be progressively rolled out over the next few months in your housing estates. I hope the new design will help everyone to Recycle Right. And now, with the banner “No Foods, No Liquids”, there is no excuse not to Recycle Right!

24. Our engagement with Singaporeans is an ongoing journey. A Citizens’ Workgroup will start next month to focus on other ways to improve household recycling and reduce contamination of our blue recycling bins. We will continue to support ground-up initiatives with the \$2 million Towards Zero Waste Grant to partner individuals and organisations in your zero waste efforts.

25. I would like to take the opportunity to express my appreciation to all who shared your ideas and perspectives. We have today a Masterplan which encapsulates the aspirations of Singaporeans to treasure our precious resources and to do our part to protect Singapore and our planet.

## **Conclusion**

26. It has been said that: We did not inherit the earth from our ancestors; we merely borrowed it from our children. Our pioneer generation worked hard to leave us with the clean and liveable Singapore that we enjoy today. It is now our turn to take action together to ensure that our children and grandchildren will inherit the shining jewel that is Singapore.

27. Today’s launch is an important step and I invite you to continue this journey with us.

28. Thank you.

Prof Yeoh Lean Weng,

President of The Institution of Engineers, Singapore

Distinguished guests,

Ladies and gentlemen,

1. It is heartening to see so many of you gathered today to discuss possible solutions to the key environmental challenges of our lifetimes. I understand that we have a diverse group, including engineers, business leaders, policy-makers and other professionals. Underpinning all of this, are the immense possibilities to create new job and business opportunities, and most importantly, to protect our environment and better our lives.

### **Challenges Arising from Urbanisation and Climate Change**

2. The theme of this year's summit – "Engineering future cities – harnessing and managing technologies to improve quality of life" – is timely. According to the United Nations, another 2.5 billion people are expected to live in urban areas by 2050. This translates to 68 per cent of the world population, compared to 55 per cent today.

3. While urbanisation has improved the living standards of billions of people worldwide, it has also strained the global environment. Many cities face issues such as increased pollution, high waste generation and the urban heat island effect. The increase in temperature is exacerbated by climate change. According to the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C, global warming could reach 1.5°C above pre-industrial levels as early as 2030. There is an urgent need for global action to reduce emissions, in order to prevent the worst – and potentially catastrophic – effects of climate change.

4. As a low-lying and densely populated city-state, Singapore is vulnerable to many of the challenges faced by cities. Most notably, the effects of climate change, such as rising sea levels, could pose an existential threat. At the National Day Rally, Prime Minister Lee spoke about the need to understand, mitigate and adapt to climate change. He underscored the long-term planning that we have undertaken, and the significant investments that we will be making on this front. As PM said, there are good engineering solutions available to

address our challenges. We will need to examine all the options carefully. I invite engineers such as yourselves to continue to look at improving and developing new solutions to help us address climate change. At the same time, we will also need the strong partnership of all stakeholders, including businesses and the community, to effect the magnitude of change that is necessary to fight climate change.

5. Singapore is also facing challenges in waste management. The amount of waste we dispose of has increased seven-fold over the last 40 years. Last year, we generated 7.7 million tonnes of waste. At this rate, our only landfill – Semakau Landfill – will run out of space by 2035.

6. This is why we have designated 2019 as our Year Towards Zero Waste. We want to make Reduce, Reuse and Recycle a way of life in Singapore, and adopt a circular economy approach to waste and resource management. We will be releasing our inaugural Zero Waste Masterplan tomorrow, and it will detail the key policies and strategies that the Government will be implementing in the next few years to achieve this, supported by industry transformation and research and development.

### **Harnessing Technology and Innovation to Meet Environmental Challenges**

7. As cities face increasingly complex environmental challenges, it is imperative that we harness technology and innovation to meet them. Creative engineering solutions can help us achieve three things: 1) bring about operational efficiencies; 2) reduce the use of energy, water and other resources; and 3) transform the way we produce, consume, work and play. There is potential to develop optimised and integrated solutions that will generate new industries, jobs, and business opportunities.

8. The winners of the IES Prestigious Engineering Achievement Awards 2019 have shown us some of these possibilities. Let me name a few.

a. The Housing & Development Board (or HDB) has developed an innovative Floating Solar System for use in reservoirs and coastal areas. With our small size, urban density, low wind speeds, relatively flat land and lack of geothermal resources, we have limited access to alternative clean energy options. Solar energy is our most promising renewable energy option, but our limited land makes it challenging to deploy solar power on a large scale. HDB's Floating Solar System enables us to explore new modes of deployment, and intensify the harnessing of solar power. This will in turn help us to reduce our carbon emissions. The system is currently being deployed at Tengeh Reservoir and off the coast of Woodlands, and will be among the world's largest floating solar systems when completed.

b. HDB's other wins this year include the successful implementation of a pneumatic waste conveyance system to enhance the living environment of residents in Yuhua, as well as the development of an urban microclimate modelling tool in conjunction with A\*STAR. The modelling tool is the first of its kind, and brings together multiple urban physics models. It studies the inter-dependencies between urban environmental factors, as well as their combined effects on new urban plans and development. This allows urban planners, architects and engineers to visualise environmental impacts and make informed decisions with greater certainty to mitigate the impacts upfront, through design strategies or implementation of technologies.

c. Another example is the next-generation hybrid air-conditioners developed by Ecoline Solar Pte Ltd. These significantly reduce energy consumption of compressors while harvesting solar heat. This has enabled buildings, such as hostels at the Nanyang Technological University, to achieve the BCA Platinum Green Mark Award. Thousands of these air-conditioners have been installed locally and overseas.

9. As one of the most water-stressed countries in the world, Singapore has invested great efforts in closing the water loop so that no water goes to waste. I am glad to see water treatment solutions featured among this year's winners. The engineers from Black & Veatch and AECOM have jointly designed a demonstration plant for the Tuas Water Reclamation plant to produce high-grade reclaimed water from used water as part of Phase 2 of the Deep Tunnel Sewerage System. And the engineering team from the National University of Singapore (NUS) has developed a way to treat industrial wastewater via electrochemical processes. This is a novel way of efficiently generating electricity, by harnessing the energy from the rising and falling of tides. As the mechanism is able to harness energy without any input energy, it is both a clean and very low-cost way of producing electricity.

10. I would like to extend my warmest congratulations to the winners of the awards, and commend you for your ingenuity and contribution to the field of engineering and sustainable development. Your work is instrumental in building a future-ready, vibrant and resilient Singapore.

## **Conclusion**

11. Let me conclude. The decisions that we make today, will determine the future of our cities. Even as we remain cognisant of the scale and complexity of the environmental challenges we face, let us remain steadfast in effecting changes for the better. With good planning and the right investments, we can transform our challenges into opportunities. All of us have a pivotal role to play in building a greener and more sustainable home for our current and future generations. Together, we can shape cities of the future.

12. I wish you all a pleasant evening. Thank you.

Ms Tabitha Wong, Principal, Teck Whye Primary School,

Distinguished guests and partners,  
Students, Staff, Parents of the Teck Whye family

1. Good morning everyone. I am happy to see so many members of the Teck Whye family gathered here today to celebrate Teck Whye Primary School's 60th Anniversary. This is truly homecoming for me, because not only did I spend the first six years of my education in this school, I used to live in this area too.

2. Teck Whye Primary School has come a long way since it was established in 1959. Back then it was known as Jalan Teck Whye Primary School. Over the years, many members of the alumni have distinguished themselves in many areas, and contributed to our society. Today, we celebrate Teck Whye Primary's Diamond Jubilee with pride, as we reflect on many achievements and success stories.

3. I remember when I was a student, we were housed in a much smaller campus, just down the road from here. We had wooden desks and chairs. There were no fans. And we had assembly not in the hall but out there in the field. Today, as you can see, the school is very well-equipped and comfortable.

### **Nurturing stewards of the environment**

4. Looking at the facilities you now have in this sprawling school premise, I can see the vast changes that Teck Whye Primary School has undergone to improve the learning environment you provide your students. I am happy to note that Teck Whye Primary School has been conducting many good programmes to develop your students holistically. I am especially pleased to learn that you have nurturing young Teck Whyeans to be stewards of our environment, and that the school has sustained a close partnership with the National Environment Agency (NEA) for many years now. Let me share three examples of your efforts.

5. First, the school has been part of the Green Schools @ South West. This is a programme organised by NEA and South West Community Development Council since 2010. In fact, you have been awarded the Gold Award every year and you have won the Sustained Achievement Award twice – in 2013 and 2016 – for your consistent strong effort in environmental stewardship.

6. Second, under the South West Dengue Mosquito programme, your students have helped to conduct house visits in the nearby blocks to engage the residents on dengue prevention.

7. Third, the school also supports the annual Day of Service @ South West, by conducting a litter-picking exercise in your neighbourhood as well as organising a cleaner's appreciation event for the school cleaners. 8. These are just three examples of your commendable efforts. There are many more. I hope you will continue to work with

NEA, and build on the good programmes you have put in place over the years. These efforts help to nurture in your students not just care for the environment, but also care for your neighbours and for your community.

### **Doing our part for the environment**

9. At the recent National Day Rally, the Prime Minister spoke about the global threat of climate change, and how it will bring about many grave consequences for Singapore. We must take action now. All of us.

10. In order to fight climate change, we must first understand the issue, and how it will impact Singapore. We can already see some effects. The temperature in Singapore has been increasing over the years. When I grew up in Teck Whye, the hottest month was about 27 degrees Celsius on average. Today, 27 degrees is the average temperature. We will see even higher temperatures in future. But what we are really worried about is sea level rise — up to one metre by the end of this century. That's why Singapore is taking all these steps to make sure that we protect our coast. We will also take the opportunity to renew and revive our coastal areas.

11. All of us must do our part to support and promote sustainability and think about what we do every day to reduce carbon emissions. We may not be able to stop climate change by ourselves, but it is important that we all do our part. Because collectively, all of us here in Singapore, and all around the world, together, we can make a difference.

12. One of the things my Ministry did this year was to designate 2019 as the Year Towards Zero Waste. Yesterday, we just launched our Zero Waste Masterplan. The plan spells out how we intend to reduce waste, and this is part of how we fight climate change too.

13. Let me use the example of food waste. This is one of the biggest waste streams in Singapore. When we waste food, we not only lose food that could have fed another person. We also waste the resources used to grow, harvest, transport and package food. When we reduce waste, we reduce our impact on our environment. When we reduce our impact on the environment, we also help fight climate change.

14. I am glad to know that Primary 4 students at Teck Whye are given the opportunity to grow your own crops using hydroponics techniques. This should also teach you to treasure food more. Each of us can help reduce food waste by doing three simple things: 1) Order only what you can finish; 2) Ask for less rice or noodles if you can't finish them; and 3) Say 'No' to side dishes that you won't eat. After all, we only have one Earth. Let us all do our best to care for this earth and protect our environment.

### **Conclusion**

15. Ladies and gentlemen, while some things like infrastructure or systems have been renewed over the years, I am glad that the spirit of nurturing Teck Whye students has

remained at the core of what the school stands for. I would not be standing here if Jalan Teck Whye Primary did not nurture me for the first six years of my schooling life.

16. So let me thank all the principals, teachers and staff, past and present, for your dedication and unwavering efforts to bring out the best in your students. Some of you have served for well over 20 years. We honour you for the dedication you have given to the nation through the school.

17. To the students here today, may the school motto 'Aspire and Achieve' always guide you well in life, just as it has other seniors before you.

18. Congratulations again on your 60th anniversary.

19. Thank you.

Dr. Ho Nyok Yong, President of the Singapore Green Building Council

Distinguished Guests

Ladies and gentlemen

1 Good evening. It is my pleasure to join you today to celebrate the Singapore Green Building Council's 10<sup>th</sup> anniversary.

2 Let me first commend SGBC and its members for your contributions over the past decade. Your efforts in creating and maintaining a sustainable built environment have played a key role in Singapore's journey towards sustainable development.

### **Taking Action Against Climate Change**

3 Since our independence, we have sought to balance the pursuit of economic development with environmental protection and social inclusion. With climate change, it has become even more critical that we continue on this path of sustainable development. Now, more than ever, we can no longer live and operate in a 'business as usual' mode. We need to take action now, to ensure that our future generations can continue to thrive.

4 Even though Singapore contributes only 0.11% of global emissions, we continue to play our part to realise ambitious climate actions. We have put in place a comprehensive suite of measures to reduce carbon emissions across all sectors. These include exploring innovative ways to harness solar energy and implementing a carbon tax to enhance energy and carbon efficiency. We will use the nearly \$1 billion revenue we expect to collect from the carbon tax to provide grants and incentives to help businesses reduce their emissions and become more energy and carbon efficient. We are also greening our transport system. By 2040, we aim to have 100 per cent of our public bus fleets and taxis convert to cleaner energy vehicles (e.g. electric or hybrid), and have nine in 10 of all peak period journeys made on "walk, cycle and ride" transport modes, where "ride" refers to public and shared transport.

5 We are also building up three types of resilience in Singapore. First, we are building up our climate resilience by taking steps to protect ourselves from the effects of climate change. Since 2011, we have raised minimum reclamation levels for newly reclaimed lands to at least four metres above the mean sea level. We have raised the minimum platform levels for new developments and are building critical future developments such as the Changi Airport Terminal 5 and Tuas Terminal mega port at higher platform levels. We are also making plans for coastal defences to better protect our coastal areas as a whole, such as

sea walls or pumping stations. These are major investments that we intend to make, to safeguard our future as the effects of sea level rise are felt in the coming decades. We are also investing in climate science research to strengthen our understanding of climate change and sea levels around Singapore.

6 Second, we are building up our resource resilience. Climate change will put increasing pressures on essential resources such as energy, food and water. We must not take these resources for granted. Our inaugural Zero Waste Masterplan, which we launched last week, maps out our key strategies to manage three key waste streams – e-waste, food waste and packaging waste including plastics. The Resource Sustainability Bill introduced this week will give legislative effect to our regulatory measures to target the waste streams. We need to move towards more sustainable consumption and production, and adopt a circular economy approach to reuse our resources for as long as possible. We have done this successfully for water, and will pursue the same for other critical resources.

7 Last but not least, we are building up our economic resilience. As we transit towards a resource- and carbon-constrained future, businesses must transform themselves to adopt circular economy strategies and be more energy- and resource-efficient. This brings me to the role all of you in the built environment industry play.

### **Role of the Built Environment Industry**

8 The Government has initiated the momentum for action. But we cannot fight climate change alone. We will require collective efforts from all sectors of society to make a positive difference to the environment. I am therefore heartened to hear Dr Ho mention that SGBC is actively engaging both the industry as well as the general public.

9 The built environment industry is in a good position to make an impact and lead by example. As Singapore is a dense urban centre and regional business hub, our buildings contribute 17 per cent of our carbon emissions and use more than half of the electricity we generate. They also contribute to the urban heat island effect, which is caused by many factors, ranging from types of materials used on roads, roofs and buildings, to the height and geometry of the buildings. Ironically, the use of air conditioning worsens the effect.

10 Therefore, it is important that the industry implements green building design, sustainable practices and energy-efficient solutions. The professionals here today play a big role in protecting Singapore against rising temperatures. Through maximising the permeability of the urban areas, increasing the use of natural ventilation rather than air-conditioning, and using retro-reflective

materials, we can mitigate urban warming as well as reduce carbon emissions. Research plays an important role in enhancing our fight against climate change. Researchers in the Cooling Singapore project have been looking into the urban heat island effect, and have also formed a task force to address this issue. Some of you here may even be in this task force. I am also happy to hear the recent announcement that the industry has received extra support in the form of a \$20 million top-up to enhance the Green Building Innovation Cluster. I hope that you can tap on this to look into new energy efficient solutions for buildings.

11 Green certification schemes, like the Singapore Green Building Products (SGBP) certification scheme, are invaluable in guiding buying decisions, and enables the industry to choose building and furnishing products which are more environmentally-friendly. The SGBP scheme also allows buyers to choose products that are low in chemical emissions, which lead to healthier indoor environments.

12 Increasingly, many of our buildings and associated infrastructure are being designed, constructed, operated and maintained in efficient and sustainable ways. The Singapore Green Building Council, with its public-private partnership engagement model, has played an instrumental role in nudging the industry in this direction.

### **Leaders in Sustainability**

13 Today we pay tribute to the 21 winners of the SGBC-BCA Sustainability Leadership Awards 2019. These Awards recognise outstanding contributions in green building and sustainability development at the individual, organisational and project levels.

14 I am happy to note that the majority of the winners are local firms and home-grown companies. This is testament to the high standard and quality of local green building capabilities and competencies. Many of our winners in the Individual and Organisational categories were involved in creating the distinctive buildings which dot the Singapore cityscape today. Others have developed products and solutions that elevate the sustainability of our buildings.

15 This year's winning building projects also include a number of iconic and familiar buildings. Let me highlight two examples. The ParkRoyal on Pickering stands out with their hotel-in-a-garden concept. It has won several international awards such as the World's Leading Green City Hotel and Asia's Leading Green Hotel. They are a good example of how a building design can be both sustainable and aesthetically pleasing at the same time. Wisma Geylang Serai is another unique example. They have managed to integrate a strong cultural identity with green design, through the use of sustainable materials and products.

## **Conclusion**

16 Let me conclude. Climate change is not a problem that will happen in the future, but a clear and present danger that we have to tackle now. The built environment industry plays an important role in Singapore's climate action efforts. It is encouraging to see the industry responding in such a positive way. Let's continue to work together to protect the environment, so that we can ensure a liveable and sustainable Singapore for our future generations.

17 Congratulations to SGBC on your 10<sup>th</sup> anniversary, and all our winners of the Sustainability Leadership Awards. I wish everyone an enjoyable evening ahead.

18 Thank you.

Distinguished guests,

Ladies and gentlemen,

Good morning. I am pleased to join you at the Leaders in Science Forum.

2 The theme of this year's forum, "Innovating for a Sustainable Future", is timely and important.

3 As a small city-state with no natural resources, Singapore has pursued sustainable development from the beginning. We have always sought to balance economic development with environmental protection and social inclusion. But today, we are at an inflexion point. Sustainability can no longer be viewed merely as a means for nations to provide a green and liveable environment. On the contrary, sustainability has taken on an existential significance. Climate change, the over-consumption of resources, pollution of the air, land and water; these are all pushing our planet to a breaking point, and threatening our very existence.

4 These challenges compel us to stay on the path of sustainable development. As the forum's theme reminds us, we have to press on towards a 'sustainable future', because there is no future otherwise.

5 We must however change the way we pursue sustainable development. Our challenges are many – protecting against sea level rise; overcoming water, food and other resource shortages; building liveable communities amidst harsher climates and environments. These are all immense challenges that we cannot overcome by depending on conventional approaches. We have to rethink our assumptions, break the mould and find new pathways towards a sustainable future.

### **ACCELERATING TOWARDS A CIRCULAR ECONOMY**

6 One major shift Singapore is pursuing in sustainable development is our move towards the circular economy. Instead of the linear "take-make-use-throw" model of consumption, we now have to find ways to reuse resources for as long as possible. By closing resource loops and turning "trash into treasure", we can secure critical supplies of water, food and other materials. This reduces our vulnerability to global supply shocks and future-proofs our economy, ensuring that Singapore continues to thrive in a carbon and resource-constrained world.

7 To this end, my ministry launched the Zero Waste Masterplan last month, which holistically presents our strategies to meet our vision of a Zero Waste nation. Just last week, the Resource Sustainability Bill was passed in Parliament, putting in place a

systems-level framework to enable nationwide resource re-use and recycling focused on our 3 key waste streams; food waste, electrical and electronic waste, and packaging waste including plastics. This Bill marks a distinct shift in our approach to resource management, bringing our regulatory framework upstream by sending an economic signal to producers to account for their impact on the environment. The regulatory framework encourages innovation and redesign of products such that they require less material and are more easily recycled, and will also fund recovery and aggregation of resources from waste.

8 An example of a “trash-to-treasure” strategy we are exploring is urban mining. A few months ago, we announced our plans for NEWSand: a strategic endeavour to turn incineration bottom ash into construction material, instead of landfilling it. Together with other measures in the Zero Waste Masterplan, turning ash into NEWSand will help to extend the useful lifespan of our only landfill Semakau beyond 2035.

9 Adopting a circular economy approach can also create new business models. Recycling, creating value and manufacturing useful products out of waste will present new economic opportunities, industries and jobs for Singaporeans. Preliminary studies estimate we can reap a net benefit of \$40million by recovering and reusing materials from electrical and electronic waste. It could also help our economy remain competitive, as improving material efficiency helps reduce business costs and increase productivity.

10 For example, A\*STAR’s SIMTech conducts a Lean Manufacturing course under the Singapore Workforce Skills Qualifications system, to encourage companies to adopt resource-efficient practices. The programme teaches engineers and managers how to optimise workflows in manufacturing to eliminate waste and gain productivity breakthroughs. Techcom Technology, a local provider of engineering solutions, successfully identified process improvement targets through this course, and was able to achieve time savings of over 60 per cent, while more than halving the rate of cosmetic defects in their production process.

## **SCIENCE AND TECHNOLOGY A KEY ENABLER OF SUSTAINABILITY**

11 Secondly, we are putting science and technology at the centre of our sustainability strategy. Our policies must be evidence-based, and guided by insights from all knowledge domains, from the physical, biological and engineering sciences, to human psychology and behavioural sciences. Science can shed light on the most appropriate pathways towards a sustainable future, while technology can help us get there more efficiently.

12 MEWR has been investing heavily in the science and engineering capabilities of our agencies – NEA, PUB and SFA. We will harness science and technology across a wide-range of applications; from developing new technologies like Wolbachia to help suppress the mosquito population, using autonomous drones and sensors to monitor

water quality in reservoirs and detect illegal discharges into waterways, to embracing high-tech farming with robotics and data analytics to maximise and optimise agricultural crop yields.

13 Our policies and plans for coping with climate change must especially be based on robust science. In 2013, we established the Centre for Climate Research Singapore, or CCRS, to further our knowledge in climate science, specifically tailored to the tropics. Climate science has already guided us towards specific policy formulations to protect against the adverse impacts of climate change, such as rising sea levels and extreme weather events. That is why we have built new critical infrastructure like Tuas Port Terminal and the upcoming Changi Airport Terminal 5 on higher platform levels.

14 To further strengthen local climate science capabilities, MEWR will set up a new Climate Science Research Programme Office under CCRS next year. This office will take the lead in formulating and implementing a National Climate Science Research Masterplan, working closely with research institutes and universities on cutting-edge, interdisciplinary climate research.

15 Scientific research also plays a critical role in pursuing a circular economy and closing resource loops. NEA introduced the Closing the Waste Loop R&D initiative in 2017. One of its objectives is to develop technologies to extract resources from our 3 key waste streams. These include techniques to extract valuable components from plastic packaging waste, and novel methods of recycling precious metals from used lithium ion batteries found in laptops and mobile phones.

16 For example, NTU researchers are working to develop an ultrafast enzymatic process to convert food waste into high-grade organic fertilisers in 8 hours. Not only is this much faster than conventional methods, which take up to 24 hours, but the enzymes used are cultivated from the food waste itself – indeed, nothing goes to waste! NTU intends to design and build a compact modular pilot plant using this process that can treat 100kg of food waste per cycle, making it easy and flexible to deploy.

## **COLLABORATING AND CO-INNOVATING TO GROW AND SCALE SUSTAINABILITY SOLUTIONS**

17 Third, the complexity of the challenges we face demands a multi-sectoral and multi-disciplinary approach to innovation. This requires collaboration across sectors – governments, academia and companies, as well as across academic disciplines.

18 Each sector plays a different yet important role. Academia provides the deep scientific knowledge and know-how to turn concepts into workable prototypes. Companies help test-bed prototypes, give a market perspective to help translate technologies into commercially viable products, and also provide financial backing. The government further catalyses the development and translation of R&D by providing the

infrastructure, funding, platforms for collaboration, and a conducive regulatory framework.

19 Our water story is a good example of such collaboration. Water has always been an existential issue for Singapore. Over the last few decades, the Government has heavily invested in infrastructure to recycle every last drop of water, while right pricing water according to its long term scarcity. PUB also worked closely with researchers and companies to develop technologies, giving us NEWater and desalination as part of our 4 national taps. As a result, we not only closed the water loop, but also groomed a thriving water sector in our economy, creating close to 15,000 jobs in Singapore across 200 companies and 25 R&D centres in the past 10 years.

20 A key role government plays is balancing innovation with public interest and safety. Policy makers must have constant dialogue with researchers and innovators, and continually review policies and regulations to ensure relevance in the face of disruptive technologies.

21 This is relevant, for example, in the field of food safety innovation. Under the Singapore Food Story R&D Programme, SFA, A\*STAR, and NTU will set up a new platform called the Future REady Food Safety Hub, or FRESH in short, to foster deep collaboration between the food industry, researchers and regulators. Not only would it allow “first-in-market” food products to be safely launched in Singapore, it could also enhance our local food regulatory capabilities, and help promote Singapore-developed food standards internationally.

22 Other than collaborating, we must also readily explore multi-disciplinary solutions. We can come up with better solutions by combining ideas and approaches from different disciplines. For example, PUB will roll out 300,000 digital smart water meters across the island by 2023. Smart meters enable daily reading and tracking of water consumption by PUB, allowing quicker detection of leaks in the water supply network. Smart meters also allow customers to easily access their daily water usage, which could empower and “nudge” them to change their usage behaviour. By harnessing both smart digital technology and behavioural science, smart water meters can help increase both operational efficiency and water savings.

## **SCIENTIFIC TALENT ESSENTIAL TO POWERING SINGAPORE’S SUSTAINABILITY EFFORTS**

23 Of course, the foundation of innovative, game-changing science lies in having good scientific talent. We need scientists and researchers who not only have deep scientific expertise, but can also educate and communicate science to the general public, and stoke a passion for sustainability in others, especially in our youth. If our youth can appreciate the importance of science, technology and sustainability, they will be prepared to face tomorrow’s environmental challenges, and safeguard Singapore’s future.

24 I am pleased to know that there are scientists and researchers giving their time and expertise to such efforts. Let me name a few.

25 Dr Poh Hee Joo, a senior scientist at A\*STAR's Institute of High Performance Computing, actively shares knowledge on environmentally-friendly building design with the construction industry, as an adjunct lecturer under the BCA Green Mark professional course. He also helps BCA assess ventilation projects, and applies computational fluid dynamics to achieve greener building designs.

26 More recently, Dr Poh led a team of researchers and collaborators from HDB to develop a modelling tool to simulate the interaction of environmental conditions with the urban landscape. This tool could help planners and architects design and site new flats to maximise thermal comfort, and create a more conducive living environment. This innovation received an MND Merit Award at the recent Urban Sustainability R&D Congress.

27 Another outstanding researcher is Dr Goh Chee Keong, a senior manager who spearheads R&D efforts at Republic Polytechnic's Environmental Technology Centre. Over the past 10 years, Dr Goh has worked with NEA to find ways to treat incineration ash for utilisation in construction and automobiles, by eliminating the risk of toxic heavy metals in the ash leaching into the environment.

28 Dr Goh and his team have created novel chemicals which prevent toxic heavy metals exposed to water, sunlight and air from polluting the surroundings. They are conducting further studies to ensure these chemicals could be adopted by industry. Dr Goh is also passionate about educating and inspiring the youth to apply science towards sustainability, through his concurrent role as a lecturer in Environmental Science at Republic Polytechnic.

29 I look forward to meeting the researchers and innovators here today who are doing meaningful scientific work.

## **CONCLUSION**

30 Let me conclude. As we move ahead on our journey of sustainable development, we must shift our mindset to embrace a circular economy approach, put science firmly as the foundation of everything we do, and collaborate across sectors and disciplines.

31 As we pursue science and technology for the betterment of Singapore and the world, I invite the research community and companies to partner with the Government to safeguard our environment for our children and grandchildren.

Thank you.



Distinguished guests,  
Ladies and gentlemen,

I am pleased to join everyone today to mark the completion of upgrading works for the Bukit Timah First Diversion Canal. It is the culmination of seven years of hard work by PUB, and part of their continuous effort to upgrade and maintain the drainage system, in order to strengthen Singapore's flood resilience.

2 \$300 million was invested to expand this diversion canal, making it one of the most expensive and complex drainage improvement projects that PUB has undertaken to date. However, it is an important and necessary investment. As the Prime Minister said in his National Day Rally speech last month, climate change will bring forth more extreme weather in the future. You have probably already noticed some of the impacts of climate change such as more intense rainfall and prolonged dry spells. By 2100, we could experience mean sea level rise of up to 1 metre, an increase in daily mean temperatures as high as 4.6°C, and more extreme and intense weather events, which may lead to more frequent floods. The upgraded diversion canal will help us to better prepare for this. The diversion canal is now able to convey 30 per cent more rainwater, a significant increase from before.

## **ENHANCING FLOOD PROTECTION**

3 The Upper Bukit Timah catchment has a history of flooding that dates back to the 1930s, due to rapid urbanisation in the area. To address this, the diversion canal was built in 1972 to ease the burden on the Bukit Timah Canal, which runs parallel to Bukit Timah Road. It diverts water to Sungei Ulu Pandan, which leads to Pandan Reservoir in the west of Singapore.

4 With more recent extreme rainfall patterns, there was a pressing need to enhance flood protection in the upper Bukit Timah catchment, which includes landmarks such as Ngee Ann Polytechnic, Beauty World Plaza and Bukit Timah Shopping Centre.

5 Some of us may remember a "freak" rainstorm on 19 November 2009. The rain was so intense that almost 110mm of rain – nearly half the average monthly rainfall for November – fell over the area, causing the upstream portion of the Bukit Timah First Diversion Canal to overflow. Floodwaters reached knee-level, which partially submerged the ground floor of buildings and resulted in major traffic congestion along Bukit Timah Road.

## **DANGERS OF CLIMATE CHANGE**

6 While the unusually intense rainstorm that day does not occur often, it may occur more frequently in future. Such extreme rainfalls cause our waterways to be temporarily overwhelmed by an immense volume of water. With climate

change, the threat of flash floods is very real.

7 A recent Swiss study identified Singapore as one of the major cities that could experience a dramatically different climate by 2050. To address our flood risks, PUB has put in place a comprehensive, island-wide improvement programme to upgrade our drainage system, prioritising drains located in flood-prone areas. From 2014 to the end of 2018, drainage improvement works were completed in 254 locations. Two weeks ago, we unveiled the completion of improvement works at Sungei Pandan Kechil, which will offer better flood protection to the Ayer Rajah Expressway and the West Coast area.

8 Over the years, PUB has made significant progress to reduce the size of flood-prone areas in Singapore. While about 3,200 hectares in Singapore were prone to floods in the 1970s, this has been drastically reduced to about 29 hectares in 2019. Over the next two years, we will invest another \$400 million to upgrade and maintain our drains, in addition to the \$1.8 billion that we have spent since 2011. The significant investments and scale of projects underscore our resolve in tackling the threats posed by climate change.

## **ENGINEERING CHALLENGES**

9 What you see next to you is but a small part of the 3.2 km-long canal that has undergone a remarkable transformation. In 2012, this section of the canal was just 13 metres wide. Today, its width is nearly triple that — at 33 metres.

10 Many feats of engineering ingenuity can be found along the entire stretch of the canal. For instance, part of the diversion canal runs through hilly terrain. To supplement the existing 4.2 metre-diameter twin tunnels of the diversion canal, PUB employed the use of a tunnel boring machine to create two additional 6 metre-diameter tunnels. Not far from here, just underneath Ulu Pandan Road, extensive work was done to construct an additional three-cell box culvert, spanning 24 metre-wide, to expand the canal and improve the conveyance of storm water. Numerous complex diversions were required as traffic on the road is often heavy. PUB spared no effort in minimising the inconvenience to residents staying in the nearby Pine Grove condominium. We even reconstructed an improved overhead pedestrian bridge once the upgrading works were completed.

11 The entire project took seven long years, over three phases, due to several challenges that had to be overcome. These include the hilly terrain, the difficult ground conditions in some areas and the limited space to work with, particularly at the Maple Lane and Holland Green sections, where the canal is located right next to rows of private residential houses. I would like to commend our PUB engineers, some of whom have worked on the project since the very beginning, for their dedication and professionalism. The Bukit Timah First Diversion Canal is truly an engineering marvel in terms of drainage infrastructure, and a significant achievement by PUB.

## **CONCLUSION**

12 Despite PUB's efforts and long-term planning to upgrade our drainage system, it is not possible to completely eliminate the incidences of flash floods. Even with the expanded diversion canal, a particularly heavy deluge could still exceed the canal's drainage capacity. We will continue to upgrade the Bukit Timah Canal to better safeguard the area from flash floods. Works to widen and deepen a section of the canal, from Rifle Range Road to Jalan Kampong Chantek, is due to begin next month.

13 I seek the public's understanding as PUB undertakes drainage improvement projects across the island. Although the weather has been rather dry, the rainy season is expected in a few months. Everyone can play their part in protecting Singapore from flash floods by keeping our waterways clean and litter-free. Thank you.

The Right Honourable Helen Clark,

Mr Eric Reynaud, CEO Asia Pacific, BNP Paribas,

Distinguished Guests,

Ladies and Gentlemen,

## **Introduction**

1. Good morning. It is a pleasure to be here at the fourth edition of the BNP Paribas Sustainable Future Forum. The Forum is a useful platform for leaders in the region to contribute solutions and inspire meaningful action to tackle climate change.

## **Need for urgent climate action**

2. Climate change is the defining issue of our times. To quote the UN Secretary-General, we are in “*a battle for our lives*.” It is a fight nobody chose and nobody can run away from. But it is a fight we must win decisively, with everything we have. Indeed, the potentially devastating effects of climate change respect no geographical boundaries. To guard against these impacts, massive investments from Governments and societies are needed. A recent report by the Global Commission on Adaptation estimates that US\$1.8 trillion is needed in global adaptation spending in the next decade, to avoid the worst effects of climate change, such as pushing over 100 million people below the poverty line by 2030.

3. In the battle against climate change, Singapore’s priority has been to get the science right first and foremost. We set up the Centre for Climate Research Singapore, or CCRS, in 2013. In the last six years, it has grown to be one of the most advanced climate research centres in the region specialising in tropical climate science. From data as far back as 1948, CCRS found that Singapore itself became warmer at twice the average global rate. This can only mean that we are more vulnerable to climate change than global climate models suggest. We will be setting up a new Climate Science Research Programme Office under CCRS to build up critical climate science capabilities across our local research landscape.

4. Science has put up the first red flag that tells us to take this issue seriously. But a robust understanding of climate change must lead to action, not more slogans. As our Prime Minister put it, “*We must make this effort. Otherwise one day, our children and grandchildren will be ashamed of what our generation did not do.*”

5. The recent forest fires in the Amazon are a visceral reminder of the need to protect our environment even as we grow. Likewise, the forest fires in Indonesia and the return of haze to our region highlight the need for stronger resolve and cooperation among ASEAN Member States, to achieve our vision of a haze-free ASEAN by 2020. The forest fires not only result in smoke haze, affecting social and economic wellbeing in the region; they also release carbon dioxide sequestered in the forests, presenting a major setback to the global fight against climate change. The 2015 fires in Indonesia were found to generate nearly 1 gigatonne of carbon dioxide. This is more than half of the 1.5 gigatonnes that was saved from the increased use of renewable energy globally in 2015.

6. As always, we stand ready to help suppress the fires on the ground. Singapore has offered technical firefighting assistance to Indonesia. The ASEAN Specialised Meteorological Centre, which Singapore hosts, shares information on weather and hotspots, to support measures to reduce forest fires.

7. The private sector’s support is also key. Ten companies have been certified under the Singapore Green Labelling Scheme for Pulp and Paper (SGLS+), one of the world’s most stringent environmental standards, which includes a requirement of zero burning on plantations. 17 companies have also pledged to use sustainable palm oil under the Singapore Alliance for Sustainable Palm Oil (SASPO). I hope more companies will come on board the SGLS+ and SASPO.

## **Strengthening climate, resource and economic resilience**

8. Sustainability has always been a cornerstone of Singapore's development, from our beginnings as a newly-industrialising state to the "*City in a Garden*" that we are today. Having had to overcome our lack of natural resources throughout our history, we have found ways to turn constraint into opportunity. (*The Singapore government can easily lay claim to be the original green party*). However, the spectre of climate change has led us to rethink even our sound approach to the environment. We now approach sustainability in terms of three resiliences that are mutually reinforcing – climate, resource and economic resilience.

9. This is exemplified in our water story. We are one of the most water-stressed countries in the world, and climate change poses even greater threats. Our story started with the aim to ensure security and resilience of our water supply. This drove us to explore used water treatment technologies from the 1970s. After two decades of hard work, we created NEWater, Singapore's brand of high-grade reclaimed potable water.

10. We continue to pursue more efficient means of producing water almost at will, whether it is energy used for desalination, or space and time to process drinking water from our reservoirs. While all these will ensure better climate resilience, this new paradigm got us to see the water issue from a different perspective too. We also see the water issue from the angle of resource resilience, by closing the water loop and recycling every possible drop of used water. In doing so, we retain every drop of water within the circular economy of our water sector. We have also leveraged our expertise in water management to become one of the best and busiest hydrohubs in the world. In the process, we created 14,400 good jobs and S\$2.5 billion of economic value-add annually. The water industry has become a major economic ecosystem for Singapore.

11. We are now applying the lessons of our water story to other key resource streams such as energy, food, and materials. We are making a major push towards the circular economy, and shifting from the "*take-make-use-throw*" mind-set to one of "*reduce, reuse, and recycle*." This is a key thrust to position Singapore's economy for a resource and carbon-constrained future. My Ministry recently launched Singapore's inaugural Zero Waste Masterplan and introduced the Resource Sustainability Act to close our resource loops, starting with e-waste, packaging waste, and food waste.

12. Let me now touch on our policy measures to strengthen climate resilience.

13. We are investing significantly in adaptation measures. Since 2011, we have spent around S\$1.8 billion on drainage improvement works to bolster our flood resilience. We will spend another S\$400 million to upgrade our drains over the next two years. To protect against rising sea levels, we have raised minimum land reclamation levels, and require new buildings and developments to be built at least 4 metres above mean sea level. At the national level, we will embark on long-term plans to strengthen our coastal defences. We are studying innovative solutions, such as the use of polders and reclaiming a series of islands offshore. This will be a costly undertaking, perhaps requiring S\$100 billion or more over the next 50 to 100 years. But it is necessary for our island nation's survival.

14. We are also doing our part on climate mitigation. We know that we contribute only 0.11% of global emissions, and may not move the needle in the fight against climate change. But we are as committed as anybody to fulfilling our ambitious climate pledge, with a comprehensive suite of measures to reduce emissions across all sectors.

15. We are the first country in Southeast Asia to introduce a carbon tax this year, with no exemptions. The carbon tax sends an economy-wide price signal to incentivise emissions reductions in the most efficient way. We are prepared to spend more than the estimated S\$1 billion in carbon tax revenues collected in the first five years, to help companies invest in energy- and carbon-efficient technologies.

16. Being an alternative-energy disadvantaged nation means that we have had to think and work harder to decarbonise our energy sector. We took early action to switch to natural gas, the cleanest fossil fuel, for our electricity needs. We are also maximising our solar deployment. To overcome our land constraints, we are investing in innovative solar technologies such as floating solar PV systems on our reservoirs and at sea. These will number among the world's largest when completed.

#### **How businesses can thrive in a resource-constrained and low-carbon future**

17. The battle against climate change is complex and requires multiple solutions; there is no silver bullet. Although effective government policies are key to enabling and accelerating efforts to tackle climate change, the private sector must do its part, as a responsible driver of economic growth. Businesses must move away from business-as-usual, and transform the way we do things today.

18. The first step is to be clear-eyed about the business impacts of climate change. Companies must factor both the risks and the opportunities of climate change into their long-term growth strategies. This means holistically reassessing the entire value chain, from production, to consumption, disposal and recovery.

19. According to the CDP, the world's largest companies face almost US\$1 trillion in climate risks, with a quarter stemming from write-offs of stranded assets. But opportunities also abound to develop new solutions and growth industries which benefit society. The International Finance Corporation estimates that in Asian cities alone, US\$20 trillion is needed in climate-related investments by 2030. For example, clean hydrogen and carbon capture technologies are nascent today, but can potentially disrupt how we use and even reuse energy. Hence, we need to rethink our business models and processes, and early movers will have the advantage.

20. I am glad that businesses are stepping up. Many corporate leaders shared their climate action initiatives in the 2nd September Business Times article, "*Going Green, Saving Gaia*." These include quantifying their organisation's carbon footprint and climate risks, leveraging new technologies such as Internet of Things, and adopting green workplace habits.

21. One concrete action that companies can take is to adopt an internal carbon price. The Task Force on Climate-Related Financial Disclosures says that internal carbon pricing "*can be used as a planning tool to help identify revenue opportunities and risks, as an incentive to drive energy efficiencies to reduce costs, and to guide capital investment decisions.*" According to the CDP, there has been a fourfold increase in the number of companies adopting an internal carbon price in 2014 to over 600 in 2017, with around 140 companies in Asia doing so.

### **The financial sector plays a pivotal role in enabling climate action**

22. As a catalyst and driver of economic trends, the financial sector in particular, is pivotal in ensuring that capital flows are directed to sustainable projects and meet the burgeoning demand for sustainable solutions.

23. First, financial institutions can leverage their vast capital networks to spur climate-friendly investments and lending and as a result, drive future growth. The global green bond market is growing at a fast clip, reaching US\$168 billion in 2018, with US\$48 billion issued in the Asia-Pacific.

24. In Singapore, we are making decisive moves to support the growth of sustainable financing. The Monetary Authority of Singapore introduced the Green Bond Grant Scheme in 2017 to spur the use of capital markets instruments for green financing. To date, over US\$4.5 billion, or S\$6 billion, of green bonds have been issued here. The scheme was expanded this year to include social and sustainability bonds, and renamed as the Sustainable Bond Grant Scheme.

25. To support capacity-building, and accelerate the growth of green bond markets in Asia, MAS signed a Memorandum of Understanding with the International Finance Corporation in 2018. Under the MOU, we have held workshops to enhance the awareness and knowledge of green bonds, benefitting financial institutions, companies and government agencies in the region.

26. From 1980-2016, Southeast Asia suffered US\$150 billion in economic losses from natural disasters, of which only 10-20% was insured. Being keenly aware of the increasing risks posed by climate change, the ASEAN+3, with support from the World Bank, established the Southeast Asia Disaster Risk Insurance Facility, or SEADRIF, in 2018. Singapore is proud to host SEADRIF, the first regional facility to provide climate and disaster risk financing and insurance solutions, and strengthen the financial resilience of participating ASEAN member states.

27. Second, by adopting environmental, social and governance, or ESG, principles in their investment frameworks, financial institutions send a strong signal that stakeholders across the value chain must take

climate change seriously. This month, US fund manager Alliance Bernstein announced a collaboration with Columbia University's Earth Institute to create a first-of-its-kind curriculum for investment professionals, focusing on the financial risks of climate change. This can deepen understanding of climate risks in the wider financial sector.

28. Named by Euromoney as the 2018 "*World's Best Bank for Sustainable Finance*," BNP Paribas has led by example on working with its clients to encourage sustainable business practices. Last year, BNP Paribas issued the first green loan in the Asia-Pacific to a Singapore-based shipping company, paving the way to transform the maritime sector. In April this year, our local banks decided to cease financing new coal plants in the region. This shows that we do not support investments which generate short-term profits, but harm future generations in the long run.

## **Conclusion**

29. To respond to climate change, we must act now and we must act together. Opportunities for green growth are ripe for the taking. We need to muster the collective efforts of the public and private sectors, to move decisively towards a sustainable future. Singapore is committed to doing our part, and we are happy to partner you in ambitious climate action.

30. To conclude, the impacts of climate change respect no geographical boundaries. Scientists at CCRS have projected that sea level rise will continue, even if the whole world succeeded in stopping further global temperature rise in the next decades. We are fortunate that, unlike many island states in the world, Singaporeans need not be despondent about climate change. Indeed, if climate change is a fight, nobody wins a fight by being despondent.

31. We are optimistic because history shows that every government in Singapore is one that does not kick the can down the road. Indeed, each has always enabled successive governments to build on its work. This is why long term plans to enable Singapore to adapt to challenges on the horizon can be delivered. It was so when we were a mudflat and transformed into a metropolis. And it is and will be so as we make Singapore not just liveable, but also sustainable, by strengthening our climate, resource and economic resilience. In Singapore, we are confident it can be done.

32. Thank you.

Mr Wim Roels, Chairman, Singapore Chemical Industry Council,

Ladies and Gentlemen,

1 Good morning. First and foremost, I would like to thank the Singapore Chemical Industry Council (or SCIC) for organising this event, and to all of you for taking time out today to help clean up our coast. I am told that this is SCIC's third coastal clean-up this year. It coincides with the International Coastal Beach Clean-up Day, and is a good reminder that we are part of a meaningful global movement to protect our environment.

### **Marine Pollution**

2 According to the UN Environment's 2016 report on marine plastic debris and microplastics, Singapore is one of the smallest contributors to marine plastic pollution in the world. This is largely because we incinerate our plastic waste safely at our waste-to-energy plants before they are landfilled as ash. Many of our rivers have been dammed up into reservoirs for water supply. For those that continue to flow into the sea, waterway clean-up measures prevent litter, including plastic waste, from reaching the sea. At our anchorages, garbage is collected from ships and disposed of safely. These efforts collectively ensure that waters in and around Singapore meet international water quality standards and are safe sources of water supply and places of recreation.

3 Even so, you can see from your efforts this morning that there is still plastic pollution on our shores. Some of this may not have originated from Singapore. Nevertheless, today is a good opportunity for me to share what the Government has done to encourage the responsible use of plastics.

### **Greater Accountability for Waste**

4 Earlier this month, we passed the Resource Sustainability Bill in Parliament. This landmark legislation will allow us to mandate key responsibilities to enable reuse and recycling. One of the key waste streams addressed by the Bill is packaging waste, including plastics.

5 We generate large amounts of this — almost a third of total domestic waste disposed of in Singapore. We can and should do more to reduce the amount of packaging waste used and disposed. There is opportunity for us to do more to recycle packaging also.

6 To tackle this, as a start, we will require businesses such as brand owners, importers and large retailers, including supermarkets, to collect data on the types and amounts of packaging they place on the market, and submit plans to reduce, reuse and/or recycle packaging waste. This will kick in from next year.

7 This should spur companies to reduce the amount of packaging they use, and the amount of packaging waste they dispose. It will also lay the foundation for an Extended Producer Responsibility framework for managing packaging waste, including plastics. The National Environment Agency (or NEA) is currently studying this framework, and is targeting to have it in place by 2025.

8 We are also keen to work with Singaporeans to co-create solutions to tackle the excessive use of single-use plastics. Tomorrow, we will be convening a Citizens' Workgroup to look at how we can improve households' recycling habits. Next year, we plan to set up another Citizens' Workgroup to look at how we can collectively tackle the issue of excessive consumption of single-use plastics.

### **Importance of collective action**

9 Reducing packaging waste and other types of waste will contribute towards our efforts to tackle climate change and protect our environment. This will be a massive undertaking, and not something Government can do alone. We need everyone to play a part.

10 I am therefore heartened by efforts such as today's initiative. The SCIC represents Singapore's chemical industry and larger chemical companies, such as refineries and petrochemical companies. NEA has been working closely with the SCIC in areas such as pollution control, energy efficiency, and carbon mitigation. The NEA also meets with the SCIC periodically to discuss environmental issues and regulation. This coastal clean-up is an excellent initiative by the industry to take ownership of packaging and plastic waste that they could be contributing to.

11 Today's coastal clean-up is also a meaningful way to educate the public on the need to use and dispose of plastics responsibly. Organisations like the SCIC have the power to pool resources, and leverage their networks to influence the behaviour of the public for the better. I believe that over time, such cumulative efforts will bear fruit.

### **Conclusion**

12 Let me conclude. The key to reducing waste is to avoid the excessive use of single-use disposables, and to proactively reduce, reuse and recycle. It takes only small lifestyle changes such as bringing your own reusable bag to supermarkets, and carrying a reusable water bottle when you are out and about. No effort is too small. I hope each of you will help us pass on this message. Together, we can bring about a sea wave of change.

13 Thank you.

Good morning everyone.

## **Introduction**

1. I would like to thank all of you for spending your Saturday with us, and committing your time to join us for the next three sessions. This is our Ministry's very first Citizens' Workgroup, and we are heartened by your support.

## **Current Household Recycling Landscape**

2. We have chosen to focus on household recycling for this Citizens' Workgroup, because there is much that we can do on this front. Recent surveys conducted by the Ministry of the Environment and Water Resources (or MEWR) and the National Environment Agency (or NEA) indicated that while six in 10 households recycle regularly, many people still lack knowledge in how to recycle correctly. This explains why our blue recycling bins have a high contamination rate. About 40 per cent of the items deposited inside the blue bins do not get recycled because they are either non-recyclable items or are recyclables that have been soiled by food and liquid waste.

3. If we can improve the way we recycle, we can keep our finite resources in use for as long as possible. By turning trash into treasure, we can close our waste loop and move towards a circular economy approach to resource management. This is important for Singapore because Semakau Landfill, our only landfill, will be completely filled by 2035 if we continue our current rate of waste generation. Last year, Singapore generated almost 8 million tonnes of waste, equivalent to the weight of 530,000 double-decker buses! We must change our current habits, and save Semakau Landfill by diverting the waste bound for it.

## **Recent Developments on Government Efforts**

4. Just last month, I launched Singapore's inaugural Zero Waste Masterplan. This was an important step in our transition towards a circular economy, and becoming a Zero Waste Nation. The Masterplan charts the Government's strategies to build a sustainable, resource-efficient and climate-resilient Singapore, and also sets a new waste reduction target for Singapore – to reduce the waste sent to Semakau Landfill by 30 per cent by 2030. If we can achieve this, we will be able to extend the lifespan of Semakau Landfill beyond 2035.

5. Earlier this month, my ministry also passed the Resource Sustainability Bill in Parliament, another significant milestone in our Zero Waste journey. The Bill puts in place legislative powers to tackle electrical and electronic waste, food waste, and packaging waste including plastics. These are the three priority waste streams identified by MEWR and NEA, for they are generated in large quantities but have relatively low recycling rates.

## **Co-Creating Environmental Solutions with 3P Partners**

6. While the Government will continue to drive these Zero Waste efforts, we cannot run this race alone. Over the years, MEWR and the NEA have worked closely with our partners from the 3P (people, private and public) sectors to undertake collective action for the environment. For example, to prepare for the Masterplan, we sought views from diverse stakeholders. We consulted more than 250 companies through industry engagements, conducted door-to-door surveys with more than 5,000 households, received more than 1,300 contributions through our online public consultation, held seven focus group discussions and a dialogue.

7. The NEA also recently launched a new label for our blue recycling bins. The new design provides clearer information on what can and cannot be recycled, and was a product of our extensive partner engagements.

8. MEWR has also partnered the National Youth Council (NYC) to tap on youth perspectives on our environmental policies and initiatives. Our engagement with youth leaders will help us better understand Singaporean youths' views and aspirations, and empower them to build a more environmentally-conscious Singapore for the future.

9. I am also privileged to be the advisor to the Climate Action SG Alliance (CASA), which was formed during the Year of Climate Action in 2018. Comprising 20 members who are leaders in their respective 3P sectors, CASA hopes to raise awareness on climate change and drive collective positive action. Last year, CASA launched a three-part video series which focused on: i) the need to reduce single-use plastics; ii) what can and cannot be recycled; and iii) how recyclables are sorted after collection. In this Year Towards Zero Waste, I am happy to share that two members of CASA, SembCorp and Eco-business, have come together to produce a timely video on the importance of recycling right. You will enjoy a preview of this video after my speech.

### **Taking Co-Creation Efforts Further**

10. Today's Citizens' Workgroup marks a new chapter in our efforts to build strong partnerships with businesses, individuals and organisations, and tap on your unique strengths, experiences and ideas, to co-create and co-deliver pragmatic solutions to make Singapore more sustainable.

11. I am very heartened by the overwhelming response by citizens to join this Workgroup - more than 300 members of the public responded to our call, and 49 members have now come together in this workgroup today. Members of the workgroup represent a diverse group of citizens, who have committed to attend and contribute in all four sessions. I understand that some of you do not recycle actively, and yet you have chosen to join us to co-create solutions to improve household recycling habits. This reflects a growing public commitment to take action to resolve our environmental challenges.

12. This is just the beginning of our efforts to work closer together with Singaporeans. We plan to convene a second Workgroup to look at how we can reduce the excessive consumption of single-use plastics. We will also continue to expand avenues to co-create solutions with Singaporeans to address evolving environmental challenges. By working together, we can go further and do more in our journey towards a Sustainable Singapore.

13. I wish you a fruitful discussion, and look forward to hearing your views.

Thank you.

Distinguished Guests  
Ladies and Gentlemen,

1. It is my pleasure to join you this afternoon at the second 3R Awards & Seminar for Shopping Malls.

#### **Importance of Practising 3Rs for Shopping Malls**

2. Shopping malls have high foot traffic, and people of all ages and background converge for retail activities and consumption of food and beverage. They are located not only along main shopping streets like Orchard Road, but also within regional centres in our heartlands. It is no surprise that in 2018, the wholesale and retail trade industry in Singapore contributed to 17.6% of the nominal GDP<sup>[1]</sup>.

3. However, this also means that large amounts of packaging and food waste are generated in our shopping malls. In 2018, large shopping malls of more than 4,600 square metres of net lettable area collectively disposed of 219,000 tonnes of waste. This is a significant amount, and makes up about 7% of the total waste disposed of in Singapore.

4. The 3R Awards for Shopping Malls was first launched in 2017, to encourage and recognise the 3R efforts of shopping malls and mall retail tenants. With your high footfall and significant retail and F&B activities, you are an important partner in our journey towards Zero Waste.

#### **Supporting Our Year Towards Zero Waste**

5. My Ministry has designated 2019 as the Year Towards Zero Waste because we want to rally Singaporeans to treasure our precious resources and make the 3Rs - reduce, reuse and recycle - our social norm. We also want to encourage businesses to adopt a circular economy approach to waste and resource management. This means engaging in sustainable production and consumption, harvesting treasure from trash, and keeping our resources in use for as long as possible. This approach also supports our national efforts to reduce carbon emissions and mitigate climate change.

6. From a business perspective, there are many benefits to gain in generating new value from waste that would have otherwise been discarded. Besides cost-savings in the long run, the growth of new industries could be catalysed, if we scale up the extraction of resources from waste. This would mean new jobs and economic opportunities for Singaporeans and our companies.

7. As managers of shopping malls and mall retail tenants, you can play a significant role in supporting the circular economy approach, by reducing the waste generated at your premises, and enabling recycling. Since 2014, large shopping malls have been required to submit their waste data and waste reduction plans to the NEA. Under our recently passed Resource Sustainability Act, from 2024, shopping malls and commercial premises that generate a large amount of food waste will also be required to segregate their food waste for treatment. I am pleased to note the promising results from malls' waste reduction and recycling efforts in recent years. From the waste data and reduction plans submitted in 2018, we saw a **10% decrease in the waste generated** at large shopping malls, from 52kg/m<sup>2</sup> in 2014 to 47kg/m<sup>2</sup> in 2018. The **average recycling rate has also steadily increased** from about 7% to close to 11%. These results demonstrate growing awareness and practice of the 3Rs. I would like to thank all of you for contributing to Singapore's vision of becoming a Zero Waste Nation.

8. In recent years, there have also been an increasing number of malls and building owners installing on-site food waste treatment systems. These systems reduce the waste sent for disposal. NEA's 3R fund has supported 24 premises in installing on-site food waste treatment systems that convert food waste into non-potable water, compost or fertiliser. To further encourage the adoption of such technology, I am pleased to share that after consultation with the National Environment Agency (NEA), the Urban Redevelopment Authority (URA) is prepared to consider some gross floor area (GFA) incentives to facilitate the installation of on-site food waste treatment systems. Building owners can approach URA with their specific proposals. So, for those of you who have been contemplating on-site food waste digesters at your premises, I hope that this will encourage you to do so.

#### **Partnering Shopping Malls in Our Zero Waste Efforts**

9. Today, we are pleased to recognise 3 Distinction and 12 Merit winners for their commendable 3R efforts. What is common among the three Distinction Award winners is the setting up of a dedicated green committee to look into the malls' environment-related or sustainability initiatives. This shows that support from the mall management is crucial to the success of their waste minimisation and recycling efforts.

10. Tanglin Mall is a first-time participant and Distinction Award winner. Last year, Tanglin Mall collaborated with its tenants to organise an Eco Lifestyle Bazaar, to engage and raise awareness among shoppers on recycling and reusing. They have also actively adopted 3R practices. For instance, the cloth used for their Chinese New Year decorations were donated to a textile recycling company for re-purposing. Items such as carpets used during promotional events and activities, and hoarding signages for construction works were also reused so that items were not disposed after one-time use.

11. Jem is a second-time recipient of the Distinction Award. Earlier this year, Jem worked with its waste collection partner to organise a recycling-themed event, *Go Green For A Better World To Live In*, to encourage shoppers to recycle. Shoppers received eco-friendly products from Jem's tenants in exchange for every kilogramme of clothes, plastics or paper products that they donated. Jem also organised a visit to a Materials Recovery Facility for its tenants, to build greater awareness of the recycling process. Food waste generated by the tenants are processed at Jem's in-house food waste digester.

12. A second-time winner in the retail tenant category, Kiehl's has embarked on several waste reduction initiatives. Recycling bins are placed in all retail stores to encourage both staff and customers to recycle, and they have organised store events and activities to demonstrate how to reuse Kiehl's empty bottles and jars as decorative items.

13. All these initiatives are excellent examples of the multitude of ways that malls and retailers can practise the 3Rs and encourage consumers to do the same. I would like to extend my congratulations to all the winners, and hope that your efforts will inspire other malls to follow your exemplary practices.

### **Conclusion**

14. Let me conclude. Shopping malls have the potential to make a huge contribution in Singapore's efforts towards sustainable development, and achieve our vision of becoming a Zero Waste Nation. I urge all malls and retail tenants to step up their 3R efforts, and make a positive, impactful difference to the environment.

15. Thank you, and I wish you all a pleasant afternoon.

[1] Singapore Economy infographics published by the Department of Statistics Singapore (<https://www.singstat.gov.sg/modules/infographics/economy>)

Mr John Ng, CEO of YTL PowerSeraya

Mr Veerappan Swaminathan, Founder of Repair Kopitiam

1 Good afternoon to all. I am very happy to be here. I had another event this morning and that is why I have asked the organisers if they could change the timing slightly so that I would be able to attend the official opening of Repair Kopitiam's third community repair meet-up location. Definitely no regrets to see all of you here as well as the wonderful things that you are doing. Thank you Teck Ghee Zone L RC for the wonderful location as well.

### **Building a Repair Culture in the Community**

2 I understand that Sustainable Living Lab has been running the Repair Kopitiam at two other heartland locations – Jurong and Tampines – since 2014. Indeed, it is a wonderful ground-up initiative and it supports our vision of going towards a Zero Waste Nation. I can think of two good reasons why this is a wonderful initiative.

3 Firstly, just simply getting people to come together in a community space is already an achievement, particularly for the men. It is usually hard to get the men to participate in community events, but for this event, it seemed like the men are more interested in hands-on activities like repairing. It is good to also get the young and the old to share knowledge on how to repair damaged items. I was at a Health Promotion Board event earlier this morning. One of my colleagues told me that her plumbing was choked one day. When her mother opened the pipes, the son was surprised that they could even be removed.

4 Very often, we have a throw-away culture. The second thing is really about changing the throw-away culture and mindset to inculcate a behaviour of "repair instead of replace" among residents. Sometimes, we might end up with many of the same items if we just buy new ones, and it ends up being a wastage of resources. Repair Kopitiam has done a lot since 2014 at two locations and it is a really good achievement. They have repair coaches in their monthly workshops, where these passionate repair coaches will teach people how to repair their various items, whether it is toys, clothing or electrical appliances. Since they started in 2014, they have already conducted 130 workshops, trained more than 600 repair coaches and given more than 3,000 items a second lease of life. Let us give them a big round of applause!

### **Unsustainable Rate of Waste Generation**

5 Why is it important to repair, you may ask. We generate so much waste and resources are limited. Last year, Singapore generated almost 8 million tonnes of waste. This is equivalent to the weight of 530,000 double-decker buses! We need to see how we can reduce this. That is why we designated this year to be the Year Towards Zero Waste. We may never be able to achieve zero waste completely, but we must have this vision. The idea of the zero waste vision is to get people to use the resources for as long as possible, just like in Repair Kopitiam where the life of the products are extended. We want to reuse our resources again, just like the circular economy for water where we reuse every drop of water.

6 One of the waste streams that we are particularly concerned about is electrical and electronic waste — what we call e-waste. Although the total amount of e-waste we generate is less than 1 percent of the total waste generated, it contains small amounts of hazardous substances such as mercury and cadmium, which may be harmful to human health and our environment if not handled properly. We can also harvest precious metals from e-waste and turn trash into treasure.

7 When we reduce, reuse and recycle, it helps us to chase the zero waste vision. Let me highlight three reasons why it is important. Firstly, you use less resources and reduce carbon emissions, which contributes towards mitigating climate change. Secondly, it creates new industries, new jobs and economic opportunities for people. Thirdly, if we continue to generate and send so much waste to our landfill, there will not be a Semakau Landfill by 2035. It will be hard to find another place in Singapore. Thus, we want to extend the lifespan of Pulau Semakau.

## **Conclusion**

8 Let me end by saying that everyone can play a part. The government alone cannot achieve our zero waste vision and fight climate change. There are simple things you can do to play your part such as:

- i. Buy only what you need;
- ii. Reduce, reuse and recycle; and
- iii. Repair instead of replace;

9 It is not difficult to help us tackle climate change, conserve resources and protect the environment for ourselves and our future generation. I want to thank Sustainable Living Lab, Repair Kopitiam and PowerSeraaya for working together in order to help us to achieve this vision to build a Sustainable Singapore. Thank you very much and I wish you a wonderful weekend.

Mr Yeo Hiang Meng, President of FMAS  
Ambassador Andrew Toh, Ambassador to UNESCO  
Hawkers  
Ladies and Gentlemen

Introduction

Good afternoon.

1 It's a pleasure to join you at the very first Hawkers' Seminar organised by The Federation of Merchants' Associations, Singapore, or FMAS. I am happy to see so many hawkers here today– thank you for taking the time from running your businesses to be part of this Seminar.

2 The theme for this inaugural seminar is “Hawker Trade: Moving With The Times”. To me, the most meaningful part of this seminar is that it is organised by hawkers for hawkers. Through this seminar, we hope to rally hawkers together to share best practices and learn new ideas, service models and technology that will benefit both new and veteran hawkers. It is also a platform for us to recognise those in the hawker community who have made significant contributions to the trade.

Hawker culture is an integral part of our Singapore identity

3 Our hawker centres and hawker culture are a key part of Singaporean life. Hawker centres are where many of us go to for delicious and affordable hawker food. Talk to any Singaporean on the streets, and they will be able to name you a list of hawker centres they visit regularly for their favourite Chicken Rice, Char Kway Teow, Roti Prata, Nasi Lemak and more. That's the reason why we had Peranakan Sayang earlier to remind us of all the wonderful and delicious hawker food that we crave, especially when we go overseas. Over the years, our hawker centres have become community dining rooms, where people from all walks of life come together to bond over their love of good local food.

4 There would be no hawker centres or hawker culture without our hawkers. It is a tough trade that requires rising early, and long hours behind a hot stove. What has become Singapore's trademark hawker food, is the result of years of refining and perfecting recipes. We thank you for building this defining heritage that all Singaporeans are proud of.

5 To celebrate our hawker culture, and the contributions of our hawkers, we submitted our nomination to inscribe hawker culture onto the UNESCO's Representative List of the Intangible Cultural Heritage of Humanity earlier this year. We are now awaiting the outcome of our nomination, which will be announced at the end of next year. Many hawkers I met told me that they are supportive of the UNESCO nomination. What struck me even more was how many of you shared your hawker stories with pride - such as mastering the perfect plate of fried hokkien mee, or preserving a family recipe that has been passed down many generations.

Supporting our hawkers

6 But many of you have also told me about the challenges that you face, such as the costs of running a stall, manpower constraints, how your customer's tastes have changed over the years, and the increasing competition from food delivery services and centralised kitchens.

7 These are not challenges faced by just hawkers, but the entire F&B industry. While they won't go away overnight, I assure you that the government will work closely with you to manage these challenges.

8 In the past year, we have increased support to help hawkers raise productivity and cope with manpower and cost pressures. At the hawker centre level, we have increased the subsidies under the Productive Hawker Centre Grant from 2 years to 4 years. This grant subsidises up to 70% of the operating costs of productivity measures such as the automated tray return and centralised dishwashing systems in the first two years. The operating cost of the centralised dishwashing system will also be subsidised at 50% and 30% in the third and fourth year respectively. In addition, individual hawkers can benefit from the Hawkers' Productivity Grant, which co-funds the purchase of kitchen automation equipment up to 80%, subject to a cap of \$5,000 over three years from 2017 to 2020. You can tap on the fund to buy equipment such as food processors, automatic cooker, automatic noodle boiler and sugar cane press machine to help reduce food preparation and cooking time, and to overcome some manpower constraints. So far, 673 applications with a total value of about \$1.4 million have been approved.

9 We have also appointed NETS to help roll out a unified e-payment solution for hawker centres, as well as coffee shops and industrial canteens. This solution helps hawkers to complement their cash transactions by providing customers the option to pay from a range of widely-used e-payment schemes. This

is also convenient for the hawkers as they need not have to deal with multiple e-payment schemes. With more customers using e-payment, there is less hassle for hawkers to maintain a daily cash float.

### Sustaining the Hawker Trade

10 Earlier this year, we set up a hawker workgroup to look into ways to sustain our hawker trade. The workgroup comprises hawkers, stall assistants, and hawker culture advocates. They have been meeting regularly over the past few months, discussing how to modernise and upskill the hawker trade, build on our current programmes, and tap on the experience of veteran hawkers to help aspiring hawkers.

11 The workgroup will be submitting their detailed recommendations early next year and one of their key ideas is to develop a new Hawkers' Development Programme. NEA and SkillsFuture Singapore are working together on this programme which will be made available to both existing and aspiring hawkers.

12 Under the Programme, NEA will bring together training providers to offer classes in practical areas. We have selected these areas based on past feedback from hawkers on the support they need. These include cooking skills, menu design, pricing strategy, stall layout and social media marketing. We are also working on making subsidies available, so that these classes are affordable for hawkers. We will be announcing more details towards the end of this year, and we welcome other feedback on courses which you will find useful.

13 The Hawkers' Development Programme will also include apprenticeship and incubation components. We are engaging veteran hawkers to mentor aspiring hawkers through an on-the-job training programme at their stalls. This would allow aspiring hawkers to learn the ropes of the trade from these veteran hawkers. I am glad to share that 10 veteran hawkers have volunteered to be potential mentors when we pilot this programme.

14 The Programme will build on existing efforts to attract and support aspiring hawkers to enter the hawker trade. In 2017, based on the recommendation of the HC 3.0 Committee, NEA and PA jointly introduced the Hawker Fare Series where veteran hawkers share their culinary expertise with aspiring hawkers. Almost 270 participants have attended 26 classes so far. NEA and the Institute of Technical Education also launched a Hawker Business Management course in 2017 to equip aspiring hawkers with the skills and knowledge to run a small hawker business. The response has been good, with almost 290 participants attending 13 classes.

15 NEA also launched the Incubation Stall Programme (ISP) in 2018 to provide eligible aspiring hawkers with support to take up incubation stalls to start their hawker businesses. Under the ISP, NEA provides incubation stall holders a 50% rental rebate for a period of 9 months. To date, we have received over 60 applications and allocated incubation stalls to 20 aspiring hawkers. I am happy to share that two NEA incubation stallholders who are completing the incubation programme, have indicated their interest to convert their incubation stalls into permanent ones. They are Mr Kwan Yee Liang who is selling handmade noodle at Block 163 Bukit Merah Central, and Ms Michelle Yee who is selling Hakka Thunder Tea Rice and Yong Tau Foo at Chinatown Complex. I have tried their dishes and would strongly recommend you to try them too. Do visit and support them.

16 Based on our experience with the Incubation Stall Programme and the feedback we have received. I am pleased to announce that NEA will further enhance the Programme with immediate effect. Currently, new ISP stallholders receive 50% rental rebate for nine months. NEA will now allow the ISP stallholder to operate at the stall for another 6 months with a 25% rental rebate. This means an effective rental rebate of 40% over a 15-month period, and this will help to strengthen our support for the ISP stallholders as they stabilise their businesses and transit to a permanent stall. NEA will also offer ISP stallholders the option to continue their business at the existing stall where they have built up their clientele. Together, these initiatives form a substantial support package to help our aspiring hawkers to enter and succeed in the hawker trade. Everyone has a part to play in preserving and sustaining our hawker culture

17 Singapore's hawker culture belongs to all of us, and it will take our collective efforts to sustain the hawker trade. This includes the young hawkers who have the courage and passion to venture into the trade, the veteran hawkers who have worked hard to hone their skills to cook up our favourite hawker fare, and Singaporeans who patronise our hawkers with their families and friends.

18 It is important that we recognise those in our hawker community who are actively contributing to the hawker trade, and encourage more to step forward. This is why we will present awards of appreciation and

commendation today. This includes the 6 veteran hawkers who have generously contributed their time to share their culinary expertise with participants of the Hawker Fare Series. For example, Mr Neo Cheng Leong has been teaching his chicken rice recipe since May 2017, and has even mentored one of the participants who took up an NEA incubation stall. We also have Madam Hajjah, whose classes on roti prata and curry have been very well-received by many participants. They truly embody the spirit of today's seminar, which is about the camaraderie in the community, and initiatives "by hawkers, for hawkers".

19 To sustain our hawker trade, we need all hands on deck, and even more stakeholders to come onboard. This is why we have been reaching out to various stakeholders to tap on new ideas and leverage their expertise to improve our hawker trade. Our work group on Sustaining Hawker Trade is a good example. Besides the Hawkers' Development Programme, the work group has been discussing about initiatives to better profile the hawker trade, and to share "practical tips" from hawker masters for new entrants. They are also discussing how to help hawkers leverage new trends and technology to grow their business; and to work with educational institutions to incorporate hawker culture as a part of our culinary curriculum.

20 Other stakeholders include the Hawker Associations, whom we will also recognise today for their strong support of various hawker centre initiatives, and operators at the new Socially-conscious Enterprise Hawker Centres who have run various programmes for new hawkers. I am happy to share that after much hard work and support from their mentors, 13 new hawkers at Ci Yuan Hawker Centre and another 2 from the Hawker Centre at Our Tampines Hub, all of whom started as incubation stallholders, have now become permanent hawkers. We are also recognising these young promising hawkers, who have a median age of 35.

#### Conclusion

21 To conclude, I would like to thank FMAS for organising this Hawkers' Seminar. This is a great example of ground-up efforts to promote the hawker culture in Singapore, share ideas on how hawkers can improve their businesses, and to strengthen the community spirit within our hawker community. I wish all of you a fruitful seminar today.

22 I will next say a few words in Mandarin.

大家下午好!

小贩文化是新加坡历史和传统的重要元素，小贩中心也是我们日常生活中不可或缺的一部分。我很高兴参与与小贩首次主办的座谈会，一起探讨如何改善小贩中心的营业和将小贩行业代代相传。

如同其他餐饮业，小贩行业正面临人力短缺、食客喜好的改变、送餐服务的竞争、还有成本方面的挑战。尽管这些挑战很难在短期内解决，政府将与小贩们一起面对这些问题。

例如，我们将之前为期两年的“小贩中心生产力资助计划”延长至四年。这项津贴可补贴提高生产力措施首两年高达百分之70的成本。中央洗碗服务的费用在第三和第四年则可获得百分之50和百分之30的津贴。另外，小贩也可申请“小贩生产力补贴”报销购买厨房自动化器材百分之80的费用。报销总额顶限为五千元，而小贩生产力补贴的有效期为三年。至今，已有673份申请获得批准，为小贩们提供大约一百四十万元的津贴。

在我们保存新加坡独特的小贩文化的同时，也必须帮助小贩行业与时俱进，并吸引更多小贩入行。例如，除了现金付款方式以外，我们也在小贩中心推出电子付款系统。本地114个小贩中心也将全部记录在谷歌地图中。另外，国家环境局将从即日起，进一步优化培育摊位计划。目前培育摊贩享有百分之50的租金回扣，长达9个月。我们将为培育摊贩提供额外的六个月培育期，而在这期间他们将享有百分之25的租金回扣。因为考虑到培

育摊贩已在他们所经营摊位的小贩中心里建立起客户群，所以国家环境局也将允许培育摊贩把他们现有的培育摊位转换为长期性的摊位。

国家环境局和精深技能发展局也将推出新的“小贩培训计划”。其中将包括在资深小贩的摊位当学徒，还有关于烹饪、菜单设计、定价策略、摊位设计和社交媒体营销方面的课程。希望大家踊跃支持这项计划。现有的小贩和有意加入小贩行业者都能参加这项计划。

我在此祝大家今天下午有愉快和充实的交流和讨论。谢谢。

Er Lee Chuan Seng

Chairman, National Environment Agency

Mr Ronnie Tay

Deputy President, Singapore Institute of Technology

Distinguished Guests

1 Good morning. I am happy to join you to recognise the outstanding achievements in energy management by several organisations and individuals. The industry plays an important part in our efforts to fight climate change.

## **TACKLING CLIMATE CHANGE**

2 At this year's National Day Rally, Prime Minister Lee Hsien Loong said that "climate change is one of the gravest challenges facing humankind". During his address to the United Nations General Assembly, PM Lee also highlighted that "Singapore is especially vulnerable to rising sea levels, but will also suffer from its other effects, such as new diseases, more extreme weather events, food shortages, forced migration or even wars."

3 These problems will worsen unless we significantly cut global carbon emissions. This requires individual and collective action, nationally and globally. By international standards, Singapore is a very small emitter, but we are committed to do our full share to fight climate change. Our Paris climate pledge to reduce emissions intensity by 36% in 2030 from 2005 levels, hinges on our ability to transform to a low-carbon and energy-efficient economy.

## **IMPORTANCE OF ENERGY EFFICIENCY**

4 The industry sector is an important pillar of our economy, and accounts for 60% of carbon emissions. It sets the bar on energy efficiency or EE improvements for the rest of our economy. The industry's EE efforts, some of which are being recognised today, will not just lower emissions, but give manufacturing companies a leading edge in the low-carbon economy.

5 We have made good progress to improve industrial EE since 2012, when we introduced the Energy Conservation Act. The EE improvement rate of energy-intensive industrial companies has increased from 0.4% per year in 2014 to 1.4% in 2017. Collectively, these efforts have resulted in \$370 mil of energy savings. We must continue to sustain this rate of improvement in the years ahead.

6 The government is well aware that companies have to balance many competing business costs, energy being one of them. We want to help companies in their low-carbon transition. At the start of this year, the National Environment Agency or NEA enhanced the Energy Efficiency Fund or E2F, to increase the level of support for EE projects from 30% to 50%. We have seen an encouraging response, especially from SMEs – about \$400,000 in co-funding support has been awarded to SMEs to implement EE projects. I encourage more companies to make full use of the E2F to improve your operations and energy performance.

## **ANNOUNCEMENTS**

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### Energy Efficiency Technology Centre

7 As part of our continued efforts to build up the EE eco-system in Singapore, we will need to create a pipeline of capable and well-trained EE engineers.

8 I am pleased to announce that the government will invest \$5 mil to set up an “Energy Efficiency Technology Centre” or EETC. The EETC will be hosted by the Singapore Institute of Technology (SIT) and supported by NEA. The EETC will:

- i. train new students and upskill existing engineers in the area of industrial EE; and
- ii. provide SMEs with greater access to energy services for EE improvements in their facilities.

9 The EETC is a partnership between government, academia and industry, to build up EE capabilities in Singapore. Companies can send their staff to EETC for training or engage energy audit services provided by the Centre. Individuals who enrol in EETC programmes have hands-on opportunities to work on concrete EE projects for companies, which contribute to building up their competencies.

10 Through the EETC programmes, aspiring engineers and energy managers can qualify to become certified Energy Efficiency Opportunity Assessors (EEOA) and Chartered Engineers.

### Energy Management Information System Grant

11 I am also happy to announce that NEA is planning to launch a new grant for Energy Management Information Systems or EMIS, under the Energy Efficiency Fund. The new grant will support industrial companies to enhance and digitalise the way they monitor their energy performance. This helps companies to visualise and track real-time energy consumption, down to the equipment level. It enables fast and accurate detection of energy wastage, and better insight into potential EE opportunities.

12 NEA will release more details of the grant soon.

## **Energy Efficiency National partnership (EENP) Awards 2019**

13 Today, nine companies, an energy manager and two public sector agencies will receive Energy Efficiency National Partnership (EENP) Awards for their commitment and outstanding achievements. Let me highlight two examples.

14 HP Singapore is the first site in HP’s global network to obtain the ISO50001 energy management system certification. It has set an internal target to reduce its carbon emissions by 25% by 2025 from 2015 levels. HP has imbued a culture of resource sustainability within the organisation, and with its supply chain

partners. Recently, 1,200 staff of HP Singapore and its contractors participated in the HP Singapore Annual Environmental Health and Safety Exhibition, and made their pledge to reduce carbon emissions, water usage, and waste production. HP will be receiving the Excellence in Energy Management Award.

15 The Ministry of Home Affairs (MHA)'s Home Team Academy is the first public sector building to achieve Green Mark Platinum (Super Low Energy) certification. The Academy implemented measures to reduce its energy consumption by 30% from 2013 levels. Among its notable measures is the installation of chiller plants that use low Global Warming Potential (GWP) refrigerant. By switching to low GWP refrigerant, the Academy reduced the equivalent of 3 kilo tonnes of carbon emissions.

16 Setting clear sustainability goals and targets, and creating a culture of sustainability within their organisations are common traits among past and present award recipients.

17 My congratulations to HP Singapore, MHA's Home Team Academy, and all EENP Awards recipients. Several award recipients will be sharing their success stories and best practices later.

## **CONCLUSION**

18 I hope you will find the conference programme beneficial. No effort is too small in tackling climate change. Collectively, we can make Singapore a more liveable and sustainable home. This will also contribute to the global fight against climate change.

19 Thank you and I wish you a fruitful day ahead.

1. Good morning everyone. It is my pleasure to be here for the inaugural Young Technopreneurs for a Sustainable 2030 Challenge, held in conjunction with the Singapore Maker Extravaganza.
2. Let me begin by commending Temasek Foundation and Science Centre Singapore for giving our youths this opportunity to brainstorm, develop and prototype solutions to achieve the United Nations Sustainable Development Goals (UN SDGs).

### **Singapore's Approach to Sustainable Development**

3. Indeed, sustainability has always been a cornerstone of Singapore's own development. Since our independence, we have sought to balance economic development with environmental protection and social inclusion.
4. This unwavering principle has enabled us to provide our people with a clean and green environment, and access to secure supplies of food and water. According to the 2018 Sustainability Cities Index, Singapore is Asia's most sustainable city and fourth globally. For a very small island-city state like Singapore, that is not only land, but resource- constraint, this is no mean feat. Last year, Singapore also presented our first Voluntary National Review on the implementation of the 2030 SDGs at the UN High-Level Political Forum in New York, to share our experiences and also to learn from other countries.
5. We will continue to work on this. Our journey towards sustainable development is a continuous one, especially in the face of existential threats such as climate change.

As a low-lying island city state, Singapore is especially vulnerable to rising sea levels. To ensure the survivability of our future generations, we must work to put sustainability at the centre of everything we do.

### **Noteworthy Projects**

6. It is apt that the organisers for the Challenge chose sustainable development as the theme. Platforms such as this serve as an excellent launch pad for youths to conceptualise and showcase your sustainable innovations.
7. I am heartened that more than 200 students took part, and that over 70 projects were submitted to prototype solutions for two of the 17 UN SDGs: Affordable

and Clean Energy (SDG 7); and Responsible Consumption and Production (SDG 12).

8. Let me highlight some interesting projects. One team created a model of a rainwater-powered hydroelectric generator, for installation in the rainwater drainage systems of households. The idea is to use kinetic energy from falling rainwater to run a turbine to generate power. If successfully implemented, such an innovation could potentially provide us with greater access to clean energy sources. This is important because Singapore is an alternative-energy disadvantaged country. What does this mean? Our small size, urban density, low wind speeds, relatively flat land and lack of geothermal resources limit our access to alternative clean energy options available to other countries. Such options include nuclear, hydroelectric, wind, and geothermal power. Solar energy is our most promising renewable energy option but our limited land makes it challenging to deploy solar power on a large scale. We have to resort to innovative solutions like deploying floating solar PV farms on our reservoirs. That is why we welcome innovative ideas for renewable clean energy solutions.
9. Many of you have also come up with ideas to help people reduce waste and recycle right. For instance, a project team developed an app called KaGu, which connects Karang Guni traders to potential sellers. Through this, items which would otherwise have been disposed of could be recycled or given a new lease of life. This would benefit both the seller and the Karang Guni trader. Such a practice is aligned with the circular economy approach that the Government is advocating in our drive to become a Zero Waste Nation. We just launched the Zero Waste Masterplan, and this year has been designated as the Year Towards Zero Waste. The key idea is to promote a circular economy approach where we engage in sustainable production and consumption, and reuse and recycle precious resources for as long as possible. Just like what we have done to close the loop for water, where we re-use and recycle every drop, we want to do the same with our resources too – turn trash into treasure.
10. Another interesting 3R-related project is a prototype of a robotic system that washes plastic bottles before they are recycled. This is a potentially useful solution as currently, up to 40 per cent of items placed in recycling bins end up not being recycled due to contamination from food or liquids.
11. All these initiatives are excellent examples of how our youths, with their exuberance and creative ideas, have the potential to make a positive impact on the environment by becoming agents of sustainability and climate action. I look forward to seeing these projects later, as they form part of a larger showcase of

over 250 community exhibits of STEAM (Science, Technology, Engineering, Art and Mathematics) solutions for sustainability.

## **Conclusion**

12. Let me conclude. As a nation, we have always taken a long-term, forward-looking approach to sustainable development. Just like how we have tackled our challenges in the past, we must continue to work together, plan ahead and invest well to ensure that Singapore remains a vibrant and liveable city for future generations.
  
13. Our youths play an important role in this journey towards sustainable development. I encourage you to step forward, and channel your energy and ideas to develop solutions that will make a positive difference to our environment.
  
14. Congratulations to all our winners of the Young Technopreneurs for a Sustainable 2030 Challenge.
  
15. I wish everyone a fruitful day ahead. Thank you.

Good afternoon everyone.

## **Introduction**

I am happy to join you again today for the final session of the #RecycleRight Citizens' Workgroup. Thank you for your presentations.

2 Recycling is an important enabler of the circular economy. Through recycling, we hope to keep our precious and finite resources in use for as long as possible by turning trash into treasure. Doing so will result in less waste and less carbon emissions – a key strategy in Singapore's fight against climate change.

3 The Government cannot fight climate change alone. We need everyone to join this journey towards sustainable development, because every positive action counts. That is why we set up this #RecycleRight Citizens' Workgroup, to work together with Singaporeans like yourselves to co-create solutions.

## **Commitment of Workgroup members**

4 Among you are youths, working professionals and retirees. You came with different levels of knowledge about recycling, and different life experiences. Over the last four weeks, you have worked hard to learn all about our recycling system, to put together ideas and suggestions on how we can improve household recycling in Singapore.

5 Many of you have embarked on prototyping and spent considerable effort to engage and survey residents, to test and improve on your ideas. One group reached out to close to 1000 respondents for your survey. Some of you even roped in your friends and family members to help in this project. You have gone over and beyond our expectations.

6 We are very encouraged by the passion you have all shown throughout this process. Everyone has invested an impressive amount of effort in this Workgroup amidst work and other commitments. Thank you for your willingness to give your time and energy to recycle right in Singapore. I hope the journey has been as meaningful for you as it has been for me and my colleagues at the Ministry of the Environment and Water Resources (MEWR) and the National Environment Agency (NEA).

## **Diversity of project ideas**

7 This afternoon, I heard six of your ideas. A few are aligned with what MEWR and NEA have been thinking about. The idea for a deposit refund scheme for beverage bottles and cans to encourage recycling is one such example. Fraser & Neave (F&N) paired up with NTUC FairPrice and Frasers Centrepoint Malls to launch a number of reverse vending machines at a number of FairPrice outlets last year. So I agree that more can be done on this front.

8 Another idea you presented was to look at how we can tap on existing influencers and networks in the community, and ride on existing activities to spread our #RecycleRight messages. I personally agree that everyone has a role to play in encouraging others to take positive action for our environment.

9 The third idea was on nudging behaviours through monetary incentives. The group which presented on the Dabao Right app mentioned that you have reached out to merchants and consumers to gauge the feasibility of an app to incentivise the use of reusables for food takeaways. I understand that you are considering engaging app developers after today's session to further explore this idea. This is commendable.

10 Many of you also looked at improving the communication of recycling messages — by suggesting ways to insert the messages into the current school curriculum in a systematic way, by redesigning the recycling bin and the recycling experience, and by doing more to reach out to specific groups such as foreign domestic workers. These are interesting ideas that we will look at.

## **Co-creating Solutions with Singaporeans for a Sustainable Singapore**

11 After we receive your report today, we will study it carefully, and provide a response to your recommendations by the end of November. Importantly, we hope to continue to partner you to pursue some of your recommendations, or related initiatives. I am heartened that some of you are interested in continuing with your pilot projects. We appreciate the time and effort that you are willing to invest, to work together with us to encourage more households to recycle right.

12 Our journey doesn't end here. For MEWR, this is just the beginning of our efforts to work closer together with Singaporeans, for Singaporeans. I understand that one common point that has come up in many of your discussions throughout this process is the importance of personal connection and human touch. Several of you experienced this when you set up chat groups and went door-to-door to involve residents in your pilot projects and surveys. People were more willing to listen when you reached out to them as a member of the community, or through an existing network.

13 Your experience is why we believe that Government cannot do this alone. MEWR will continue to partner Singaporeans like yourselves to co-create and co-deliver solutions to address our evolving environmental challenges. This includes a separate Citizens' Workgroup that will look at how we might reduce the consumption of single-use plastics.

14 For you, I hope you will continue working with us to make Singapore sustainable. Please build on the network of friends you have found through this Workgroup. Be ambassadors, advocates and partners in sustainability. Encourage your family and friends to adopt sustainable consumption as a lifestyle, by practising the 3Rs of Reduce, Reuse and Recycle actively.

15 Once again, thank you for your hard work over the past month, and I look forward to reading your report.

Dr Lee Hoesung, Chair of the IPCC  
Distinguished Guests

1. Good morning, and a warm welcome to Singapore. This is the first time that Singapore is hosting a meeting of the Intergovernmental Panel on Climate Change (IPCC), and we are honoured to do so. This Scoping Meeting is an important session that will lay the foundation for drafting the next Synthesis Report of the Sixth Assessment Report (AR6). This meeting, as with recent IPCC meetings, is carbon neutral. I would like to commend the IPCC for practising what you advocate.

2. This meeting takes place at a time of turbulent change. We are seeing geo-political shifts, rapid and disruptive technological advancements, and changing trade patterns that are forcing us to rethink traditional models and practices.

3. To effectively address any global issue, including climate change, we need a strong united global response. However, the multilateral system is under strain, with the rise of nationalist, isolationist and protectionist sentiments. Despite awareness and concern about climate change being at its highest, some governments at one end of the spectrum allow forests to be burned to clear land for economic development, and use coal for energy generation. At the other end, other governments respond to green demands, and threaten to impose green border taxes and trade barriers.

4. We all have to work together to counter these forces and strengthen the support for multilateral cooperative frameworks. We must not take our eyes off the long-term, existential challenge of climate change. Otherwise, citizens will take their cause to the streets and reason will fail to rule.

5. Citizens around the world have come to recognise climate change for what it is – the defining issue of our times. We saw last month many climate strikes and rallies held by young people all over the world demanding urgent and ambitious climate action. Young people echo each other very quickly. In Singapore too, our youth turned out for the first ever Climate Rally. Young people are rightly concerned about climate change and how this impacts their future. We have to give them the confidence that we are taking their concerns seriously. It is our responsibility to work together with them to address this challenge.

6. We are pleased that the UN Secretary-General convened the Climate Action Summit last month. It has helped to galvanise global climate action. But we need to work to sustain the momentum and widen the circle of support for the many initiatives launched at the Summit. Everyone, every country, matters.

7. So, even though Singapore contributes only 0.11 per cent of global emissions, we will demonstrate our commitment to support the global effort to address climate change. This is why at the UN Climate Action Summit, Prime Minister Lee reiterated our commitment to do our full share. It is not going to be easy for countries to deliver on their Paris pledge. Singapore too needs to work hard to curb our carbon emissions growth so that we can peak and stabilise our emissions around 2030. This is a stretch target as we have limited access to clean energy – we are a small and highly urbanised city state – but we will not let up.

### **TACKLING CLIMATE CHANGE**

8. Of late, like many countries, Singapore is experiencing the effects of climate change. Last month was our hottest and driest September on record. The highest mean daily maximum temperature reached 33 degrees, exceeding the previous record of 32.2 degrees set in September 1997. Our weather is getting warmer, our rainstorms heavier, and dry spells more pronounced. Sea level rise threatens our island nation.

9. Nevertheless, we are not paralysed by despair. Since our early days as a fledgling nation facing great odds, Singapore has always faced our problems squarely. We even found ways to turn a challenge into an opportunity. It is with this resolve that we must tackle climate change. It means we will act with the boldness and vision that is part of our Singapore DNA. Let me share three key ways in which we are planning ahead and taking decisive action.

### **TAKING EARLY, DECISIVE ACTION FOR MITIGATION AND ADAPTATION**

10. First, we have been taking early action and stepping up efforts to mitigate and adapt to climate change. The IPCC Special Report on Global Warming of 1.5 degrees Celsius (SR1.5) highlighted that global warming could reach 1.5 degrees Celsius above pre-industrial levels by as early as 2030, should we continue along today's trajectory. We knew early on we cannot continue with business-as-usual.

11. Although we have very limited sources of renewables apart from solar, we are pushing the boundaries and developing innovative ways to transition to a low-carbon future.

12. Singapore is the first country in Southeast Asia to put a price on carbon. Our carbon tax came into force this year, without exemptions for any industry or sector. The carbon tax sends a crucial economy-wide price signal to reduce emissions. The tax is not raised for fiscal purposes and we are prepared to spend more than the estimated \$1 billion in

carbon tax revenues collected in the initial years, to incentivise and support companies in their transition towards green, carbon-efficient technologies.

13. We are making hefty investments into research and development for longer-term solutions to decarbonise our grid, industries, and even our buildings. \$900 million has been set aside for the Urban Solutions and Sustainability domain under our national Research, Innovation and Enterprise plan. We welcome multi-disciplinary collaboration to discover new knowledge and solutions across areas such as water and food supply resilience, urban mobility, energy and land management. For example, we are driving the adoption of super-low energy and zero-energy buildings. We are also studying the potential of “clean fuels”, such as hydrogen, and carbon capture, utilisation and storage.

14. Because water has always been a matter of national security concern, we have diversified into weather-resilient sources like NEWater and desalinated water. Energy has become central to our water resilience. PUB – Singapore’s National Water Agency – is therefore studying the potential of generating energy through water. Blue energy, or osmotic energy, arises from the salinity gradient across water streams. With the co-location of our NEWater and desalination plants, we could recover blue energy from the plants’ waste brine streams. The pilot projects will demonstrate the potential in harnessing water-waste- and energy synergies. If PUB succeeds, we will one day be producing energy from water even whilst we produce water from energy.

15. We have rightly put mitigation action as a key focus of our contribution against climate change. But we are also mindful that we are unable to reverse climate change completely. So adaptation must take equal importance. As Singapore is vulnerable to sea level rise, our Prime Minister recently announced a comprehensive nation-wide effort to further protect our coasts, low-lying areas and communities. As a low-lying island, this will be a huge but necessary undertaking, even while the world works towards climate change mitigation. This will possibly cost Singapore \$100 billion or more over the next 50 to 100 years.

16. To adapt to climate change, our plans will incorporate nature-based solutions. To boost our natural defences such as mangroves, we take both hard and soft engineering approaches to mitigate coastal erosion and actively restore our mangrove areas. Beyond coastal protection, we integrate nature-based solutions into our city planning. Over the years, we have planted here in tiny Singapore over 2 million trees, and built more than 350 parks and four nature reserves, including our UNESCO-listed Botanic Gardens right in the heart of the city. Under the Forest Restoration Action Plan, additional 250,000 native trees and shrubs will be planted. The benefits are multi-fold – this will support our biodiversity, and importantly, further drive climate mitigation and strengthen our resilience.

**OUR ACTIONS MUST BE BASED ON ROBUST SCIENCE**

17. Second, our policies must be evidence-based, even as we harness science and technology, both to take a measured approach against climate change as well as to develop meaningful solutions to tackle climate change problems. This is why Singapore is supportive of the IPCC.

18. The IPCC is regarded as the authoritative voice on climate science, and IPCC's Assessment Reports and publications are widely used by policy- and decision-makers, including in Singapore, in developing our climate change projections and policy responses. The IPCC plays an important role as an independent body that provides robust, objective and transparent scientific assessments. In today's world where the discourse on climate change has become politically heightened, the IPCC's role is even more critical in imbuing greater objectivity and scientific rigour in our dialogues and policy choices.

19. The three Special Reports released over the past two years have significantly shaped our thinking on climate change and sea level rise. The SR 1.5 was a landmark report that made clear that deep emissions cuts are needed to achieve the Paris Agreement goals. The two Reports released this year brought to the forefront our planet's natural defences to climate change – our land, oceans, and cryosphere. The Special Report on Ocean and Cryosphere in a Changing Climate tells us in no uncertain terms that global mean sea levels are rising and this may happen more quickly than previously thought, due to increasing rates of ice loss, as well as ocean thermal expansion.

20. The upcoming release of the AR6 is thus timely – at this juncture where governments and other stakeholders around the world are re-assessing their climate commitments and developing their long-term emissions plans. AR6 will provide critical scientific evidence for governments to step up our commitments under the Paris Agreement and to assess if the adaptation plans that we have put in place are adequate.

21. In Singapore, robust, credible and objective scientific assessments form the cornerstone of our climate change strategy. We took early action and established the Centre for Climate Research Singapore (CCRS) in 2013. CCRS is one of the few dedicated centres in the region that focuses on research in tropical weather and climate. We are expanding CCRS and will set up a new Programme Office in CCRS next year. The Programme Office will drive the formulation and implementation of our national climate science research masterplan and systematically build up our climate science capabilities in Singapore. CCRS and our research institutes and universities, together, will pursue cutting-edge, inter-disciplinary climate science research.

22. The Programme Office will oversee the recently-launched National Sea Level Programme. This \$10 million Programme will, over the next five years, fund pioneering

proposals and collaborations, to help us better understand long-term sea level rise and its variability, regional patterns, and extreme weather events. I am pleased to share that CCRS has launched a grant call for proposals, and I look forward to learning about the projects.

23. CCRS will be updating our climate projections in Singapore's Third National Climate Change Study, which will be delivered in 2022. Our scientists have already begun work on this. The study will take into account findings from the international scientific community, including the IPCC AR6 when it is published, the latest Global Climate Models, as well as the National Sea Level Research Programme.

24. Climate science tailored to the tropics is still a nascent area of research. Through our efforts, we hope to work more closely with the IPCC to further strengthen and advance the understanding of tropical climates. We will share our knowledge and expertise with countries in our region and work with them to enhance capacity to tackle climate change.

### **EVERYONE HAS A PART TO PLAY IN CLIMATE ACTION**

25. Third, we are strengthening partnerships at all levels, with businesses, individuals, communities and organisations. Ultimately, people are at the core of our sustainability efforts. We are doing this so that our people, and our young people in particular, are assured of a good future. But Governments alone will not be able to tackle climate change. We need to work together and galvanise collective action, both locally and internationally.

26. I am heartened to see many initiatives in every sector. Let me highlight a few:

a. In the community sector, Repair Kopitiam, a ground-up initiative in Singapore, brings together and teaches the community how to repair damaged household items. To date, they have given more than 3,000 items a second lease of life, and are cultivating a more sustainable lifestyle amongst Singaporeans.

b. Industry too is doing its part. Ricoh Asia Pacific is contributing to a circular economy at every stage of their operations, such as by employing more recycled materials, and making their products lighter, more compact and durable. Not forgetting the community, Ricoh organises the annual Eco Action Day in Singapore to drive awareness and action for the environment.

c. My Ministry also works closely with the Monetary Authority of Singapore, Singapore's central bank, to promote green financing. By spurring climate-

friendly investments and lending, the financial sector plays a unique role in catalysing the adoption of sustainability practices in the economy.

d. On the regional and international front, Singapore hosts the World Meteorological Organisation's (WMO) Regional Office for Asia and South-West Pacific, as well as the ASEAN Specialised Meteorological Centre (ASMC). Through the WMO Regional Office, we are collaborating to implement WMO programmes and capacity development initiatives. We have also committed \$5 million to the ASMC for a five-year regional capability development programme for Southeast Asia. This will strengthen regional cooperation through the sharing of technical knowledge and skills in weather and climate prediction.

27. No action is too small. I therefore encourage the scientists and experts gathered here to share and communicate climate science to the public, to spur the growing global movement for climate action. As for young people, let us put into the hands of our youth the tools of science, to take on the environmental challenges of tomorrow.

#### **CONCLUSION**

28. Let me conclude. The UN Secretary-General Antonio Guterres has declared that "climate change is still running faster than we are".

29. Singapore is clear-eyed about our vulnerabilities; but we can face the future with confidence, for we know we are taking early, decisive action that is underpinned by robust science. This is why Singapore strongly supports the work of the IPCC, as the leading international body for the scientific assessment of climate change.

30. I wish you all a fruitful meeting. Thank you.

Professor Lily Kong, President of the Singapore Management University

Mr Abdalah Mokssit, Secretary of the IPCC

Distinguished guests

1. Good evening and a warm welcome to the Symposium on Sea Level Rise in Southeast Asia. I am glad to see so many of you here this evening.
2. First, let me thank the Singapore Management University and the Intergovernmental Panel on Climate Change (IPCC) for their strong partnership in organising this Symposium.

### **Sea Level Rise is an Existential Challenge for Singapore**

3. We are here today to discuss sea level rise because as we are all aware, climate change, and in particular sea level rise, poses an existential challenge for many small island states, including Singapore.
4. Singapore is a low-lying city; a third of our island is less than 5 m above mean sea level. We are not alone. About two-thirds of Southeast Asia's population live in low-lying coastal areas. However, unlike larger countries, we do not have hinterlands to retreat to. If nothing is done, rising sea levels will significantly impact not only our coastal landscape, but also our communities, businesses and our very way of life. This is an issue that we have been studying carefully for some time and as PM Lee announced recently in his National Day Rally speech, we are ready to put in place an island-wide approach to protect our city state from the rising seas.
5. It is hence timely that the IPCC released its third and final Special Report of the Sixth Assessment Cycle on Oceans and Cryosphere in a Changing Climate last month. The report is sobering. Ice sheets and glaciers worldwide are losing mass and sea levels are rising at an accelerated rate, twice as fast as compared to the 20th century. Just as alarming is the assessment that historically rare extreme sea level events occurring from storm surges and high tides, are projected to occur more frequently, as often as every year by the end of the century, especially in the tropical region. Many low-lying megacities and small islands at almost all latitudes are projected to experience such events at least annually by 2050, 50 years earlier than most other locations.
6. These grave findings from the Special Report underscore the urgency of global climate action. Singapore is committed to doing our part. We contribute actively to regional and international efforts to reduce greenhouse gas emissions. At the same time, we will need to make massive long-term investments to protect Singapore from climate change impacts. Even if the whole world stopped emitting greenhouse gases from tomorrow, sea levels will continue to rise for centuries because the ocean system reacts slowly. It would also take centuries or more to halt ice sheet melt and ocean warming.
7. In Singapore, we took early steps and adopted a three-pronged strategy to tackle climate change.

### ***Building Local Climate Science Capabilities***

8. First, our climate projections must be built on robust science. We set up the Centre for Climate Research Singapore (CCRS) in 2013 under the Meteorological Service Singapore (MSS). It is the first research centre in the world dedicated to advancing the science of the tropical climate and weather of Singapore and the Southeast Asian region. Since its inception, CCRS has made significant progress in pushing the frontiers in this challenging and complex field.
9. For example, CCRS has developed a cutting-edge weather model named SINGV tailored to Singapore and the region. SINGV allows us to predict heavy rainfall at longer lead times and over higher spatial resolutions, which gives us more time to prepare for flash floods.
10. CCRS has also launched the National Sea Level Programme this year to enhance our understanding of how the different components of sea level rise will affect Singapore and our region. This is important given that the Special Report points out that sea level rise is not globally uniform and regions could be

affected by up to 30% more than the global average. For example, the impacts of sea level rise can be affected by regional factors such as local land subsidence and the occurrence of extreme events such as storm surges.

11. Climate science is a rapidly evolving and complex endeavour that requires the integration of wide-ranging expertise across many disciplines. I was told that just understanding sea level science alone, for example, requires expertise in oceanography, atmospheric science, cryospheric science and geoscience. Similarly, understanding rainfall patterns and temperature trends also requires multi-disciplinary expertise.

12. To tackle climate change effectively, we need to bring together and build up diverse expertise and capabilities, and we are committed to do so, starting with climate science. The national Climate Science Research Programme Office, to be set up in CCRS next year, will work closely with scientific talent in our research institutes and universities, to harness their expertise to do focused, inter-disciplinary climate science that will put us in good stead to deal with climate change for the long haul.

13. Youths are important agents of change and play a crucial role in shaping the future. I am heartened that our youths are especially passionate about making a positive change for the environment. Singapore is growing our own pool of experts to help us understand changes to our weather and climatic systems, and what these may mean for areas such as our water and food supply or the health of the population. I encourage our young participants here today to consider climate science as a potential career. It is a challenging yet meaningful field with much promise for growth.

#### ***Mitigating to Reduce GHG Emissions whilst Adapting to Build Resilience***

14. Even as we build up our capabilities in climate science, we must at the same time undertake climate mitigation to reduce our carbon footprint and climate adaption to build resilience against the impacts that climate change brings. Many of our strategies fall within two key shifts that our economy and society are making, namely, towards decarbonisation and circular economy. Decarbonisation and circular economy will be key to Singapore's long-term climate, resource and economic resilience.

15. Singapore has adopted forward-looking domestic mitigation measures such as switching to a cleaner fuel mix for electricity generation, pricing carbon, reducing our waste, and greening our buildings and transport. For industry in particular, as the largest energy consuming sector in Singapore, improving energy efficiency is a key strategy in mitigating carbon emissions. We have a suite of measures in place to enhance the industry sector's energy management practices and incentivise emissions reductions. We will improve energy efficiency across all sectors of the economy, develop low-carbon technologies and solutions, and push the envelope on our climate efforts, in close partnership with both businesses and the community.

16. On the climate adaptation front, Singapore has adopted a forward-looking approach in protecting our coasts, enhancing flood resilience, and strengthening our resource resilience and security. For example, to improve stormwater flow and reduce flood risk in the Orchard Road area, we invested more than \$200 million to put in place two important infrastructural projects in 2018, the Stamford Detention Tank and Stamford Diversion Canal. During heavy rainfall, the Stamford Detention Tank, will be able to store excess stormwater, with its capacity of 38,000 cubic metres or 15 Olympic sized swimming pools. The 2-kilometre long Stamford Diversion Canal will relieve Stamford Canal of a portion of stormwater through upstream diversion into the Singapore River. Our adaptation efforts are complemented by research that guides planning, which will be overseen by the new Climate Science Research Programme Office in CCRS.

17. Beyond the efforts of the government, businesses and institutions, every individual action counts and all of us can do our part in this fight. Simple behavioural changes and actions go a long way. As the saying goes, the "sum of the parts is greater than the whole".

18. We can all play our part to reduce our carbon footprint through efforts such as taking public transport rather than driving, using appliances which are more energy efficient and climate friendly, or even simple actions such as not using air-conditioning unless really needed, and setting the room temperature at 25 degrees Celsius. Every little action counts and together, this will help us to reduce our carbon footprint collectively as a country.

19. Even as climate change brings daunting challenges, within them lie opportunities to develop new solutions and growth industries that benefit society, both in mitigating climate change and adapting to it. An example is how we are making a paradigm shift in the way we use resources – from the ‘take-make-throw’ linear model to the circular economy where resources are used over and over again. In this regard, my Ministry launched Singapore’s inaugural Zero Waste Masterplan in August, that lays out our strategies and policies to close our resource loops. Adopting the circular economy will help us to reduce emissions and become more resilient against climate change impacts. To give effect to the policies and targets outlined in the Masterplan, the Resource Sustainability Act was introduced just last month, and it will play an integral part in contributing to environmental sustainability. We are also working closely with industry and academic partners to develop innovative technologies and resource-efficient solutions that not only address our local challenges, but can also be applicable to other urban centres.

### ***Cooperating with the Region***

20. Singapore is doing what we can to address climate change. But however hard we try, Singapore will not be able to do it alone. Therefore, we are committed to supporting other countries in their efforts to address climate change.

21. We launched the Climate Action Package in July 2018 to provide training and capacity building for countries to take climate mitigation and adaptation measures, which in turn also help to make their economies more resilient. Since its launch, we have organised a number of workshops under CAP, including one with New Zealand earlier this month to help countries in the region to better implement their commitments under the Paris Agreement and enhance our collective ambition.

22. We also revamped our Small Island Developing States (SIDS) technical assistance package to better meet the development needs of our fellow SIDS. It will offer high quality programmes through enhanced partnerships with international organisations such as the UN, particularly on climate change and disaster risk reduction.

23. Closer to home, Singapore is supporting efforts to improve the region’s meteorological capabilities, which would in turn strengthen countries’ own efforts in climate projections and adaptation planning. We committed S\$5 million to the ASEAN Specialised Meteorological Centre (ASMC) hosted by Singapore, for a five-year regional capability development programme for Southeast Asia.

24. Singapore is committed to helping ASEAN countries to advance our scientific understanding of tropical climate variability and change, and its associated impact on the Southeast Asian region. CCRS is building itself up as the regional centre for tropical climate science, and they are committed to sharing their climate projections data and findings for the region with other ASEAN countries. We hope that this will deepen the region’s understanding of climate science and help the region better prepare and plan for different climatic contingencies.

25. Given the scale and magnitude of climate change, it is not an issue that any country can tackle alone. However, the call for action is clear. Singapore, as well as countries in the region will need to work together to strengthen adaptation planning capabilities and resolve challenges presented by climate change.

26. Thank you.

## **Introduction**

Good afternoon everyone

1 Today we are here to launch the Recycle and Save Programme, a joint initiative by the National Environment Agency (or NEA) and F&N Foods.

2 This initiative will tackle packaging waste in Singapore, one of the priority waste streams identified by the Ministry of the Environment and Water Resources (or MEWR). The initiative will tackle packaging waste through reverse vending machines, or RVMs. What are RVMs, you may ask? Instead of putting money into the machine to get a drink, you place empty drink bottles or cans into the machine and receive a voucher!

## **Making a Difference by Recycling Drink Containers**

3 I remember when I was a child, having a can or bottled drink was a luxury. Today, most of us can purchase them easily anywhere and at any time. And we do not think about the journey a plastic bottle goes through to reach us — from the factory where it is manufactured, to where it is filled with a drink, transported to Singapore, and finally to the store or vending machine that we buy it from. Every step in this chain consumes resources and energy, leaves a carbon footprint, and contributes to climate change.

4 While it may not be possible to eliminate single-use plastic drink bottles, we can make a positive contribution by choosing to recycle these bottles after they are used. Many of us habitually throw away our used drink bottles and cans, and they end up being incinerated and landfilled.

5 However, your used aluminium can or plastic drink bottle can have a new lease of life outside the rubbish bin! They are actually high-value packaging, which can be recycled to manufacture new products. Studies have shown that making a can out of recycled aluminium uses less than five per cent of the energy required to make virgin aluminium cans.<sup>[1]</sup> Recycling one 500 ml plastic bottle can save carbon emissions that is equivalent to fully charging a flat mobile phone battery six times!<sup>[2]</sup> By recycling these drink containers, we help to cut down carbon emissions, conserve resources and prolong the lifespan of our only landfill at Semakau.

## **Government Efforts to Achieve Zero Waste**

6 It is fitting to launch the Recycle and Save Programme in this Year Towards Zero Waste. Recently, the Government launched Singapore's inaugural Zero Waste Masterplan, and put in place the Resource Sustainability Act to address three priority waste streams – e-waste, food waste and packaging waste, which includes plastic bottles and aluminium cans. We are particularly concerned with packaging waste, as it is generated in large quantities but has low recycling rates. We are studying various measures to tackle packaging waste, including an Extended Producer Responsibility (or EPR) framework for packaging waste which we will put in place no later than 2025, or even earlier. This framework will place the responsibility for the collection and proper treatment of packaging waste on producers.

### **Launch of RVM programme in Singapore**

7 In January this year, when I launched the Year Towards Zero Waste at this same location, I spoke about how our zero waste efforts must be built on the foundation of a national consciousness to care for the environment. I am heartened that NEA and F&N, with the support of NTUC FairPrice and other location partners such as Frasers Property, have jointly launched an RVM programme. Fifty RVMs, including the one here at Our Tampines Hub, will be progressively rolled out across Singapore over the next few months. You can find the locations of these RVMs on the website *RecycleNSave.sg*. This island-wide RVM programme will allow us to study the effectiveness of RVMs in increasing our recycling rates and the feasibility of deploying them on a larger scale.

8 We hope that this RVM programme will encourage more people to think about recycling bottles, especially after they have consumed their drinks. You will get a 20-cent NTUC FairPrice voucher for every four plastic drink bottles or aluminium drink cans that you deposit into the machine. This is a great way to do your part for the environment, and save some money at the same time.

### **Partnering Industries and the Community in our Journey Towards Zero Waste**

9 Realising Singapore's vision of a Zero Waste Nation will require strong partnerships between the government, people and businesses to co-create and co-deliver pragmatic solutions for our environment. Today's event is a wonderful example. We look forward to having more industry partners on board for future Zero Waste initiatives.

10 Besides partnership with the industry, the support of the community is crucial in our journey towards Zero Waste. MEWR recently convened a Citizens' Workgroup comprising Singaporeans from diverse backgrounds to come up with solutions to improve household recycling rates. One of the project teams had suggested the adoption of a deposit refund

scheme for drink bottles and cans to encourage recycling. I must commend the team for conducting a survey which reached out to close to 1,000 respondents. I understand that close to 90 per cent of the respondents were supportive of such an initiative. We will study the team's recommendations, together with the findings from this initiative, as we evaluate the effectiveness of RVMs in improving our recycling rates.

## **Conclusion**

11 In conclusion, I encourage everyone to start collecting your drink bottles and cans, and recycle them at your nearest RVM. And get your friends and family to do the same! Do remember to empty and rinse them first, because drink containers contaminated with food and liquid waste cannot be recycled. Every effort counts. Let us all adopt this positive habit for the environment, and leave this planet a better place for our future generations.

Thank you.

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[1] European Aluminium (2016), "[https://european-aluminium.eu/media/1712/ea\\_recycling-brochure-2016.pdf](https://european-aluminium.eu/media/1712/ea_recycling-brochure-2016.pdf)"

[2] According to WRAP UK, recycling one tonne of plastic bottles saves around 1-1.5 tonnes of CO<sub>2</sub> (WRAP UK, "www.wrap.org.uk/content/plastic-packaging"). According to the Carolinas Plastic Recycling Council, 1 tonne of PET = 36,000 16-ounce (approximately 500ml) plastic bottles. (Carolinas Plastic Recycling Council). It requires an average of 0.0105kWh to charge an iPhone 6 (Oracle). Using our local 2019 grid emission factor of 0.46kgCO<sub>2</sub>/kWh, CO<sub>2</sub> emissions from charging a handphone – 0.00483kg CO<sub>2</sub>. Recycling one PET bottle saves 0.028 to 0.042 kg CO<sub>2</sub>, which can charge a handphone (iPhone 6) 5.8 to 8.6 times.

Mr Tan Juay Hwa, City Gas Vice President for Commercial and Industrial Sales  
Mr Bernard Choo, Editor of Shin Min Daily News, Singapore Press Holdings  
Award Winners  
Ladies and Gentlemen

1 Good morning everyone. I am happy to join you again this year to present the awards for City Hawker Food Hunt.

2 I remember attending the first City Hawker Food Hunt awards presentation ceremony in 2008. That year, we recognised the best stalls across four popular food categories — *nasi lemak*, *char kway teow*, *laksa* and coffee and toast. The City Hawker Food Hunt is now in its 12<sup>th</sup> run, and it has recognised more than 400 hawker stalls in various food and award categories over the years.

3 Today, 30 hawkers will receive awards across three categories — Local Food, Healthier Choice and the new category of International Food. This new category bears testament to the rich diversity of Singapore's hawker food. Many of the hawker dishes that we are familiar with originated from food cultures of early immigrants who came to Singapore and settled here. I am glad that we are also recognising hawkers who have introduced international cuisines such as Japanese, Moroccan and Thai food to Singapore's colourful food scene.

#### **Celebrating and Sustaining the Hawker Trade**

4 Hawker centres and hawker culture are part of our Singaporean identity, and an integral part of our daily lives. Over the years, hawker centres have become community dining rooms where Singaporeans from all walks of life come together to enjoy a variety of tasty and affordable hawker food. Our hawkers have built the culinary heritage of Singapore hawker food over decades, and are central to our hawker culture. This is why we have and will continue to support our existing hawkers and attract new hawkers to sustain the hawker trade.

5 At the Hawkers' Seminar organised by The Federation of Merchants' Associations, Singapore (FMAS) recently, I announced that the National Environment Agency (NEA) and SkillsFuture Singapore are developing a new Hawkers' Development Programme to train both existing and aspiring hawkers. I also shared NEA's enhancements to the Incubation Stall Programme (ISP) where ISP stallholders will receive 25 per cent rental rebate for another six months. This is on top of the current 50 per cent rental rebate for nine months. In addition, NEA will offer ISP stallholders the option to continue their business at the existing stall where they have built up their clientele. With these initiatives and other ongoing grants and programmes, we hope to help our hawkers to manage operating costs, and also attract young hawkers to the trade to sustain our hawker culture.

#### **Choosing Healthier Options at Hawker Centres**

6 Today, our hawkers do not just provide us with delicious and affordable food, but healthier options as well. This is important, as six in 10 Singaporeans eat out at least four times a week. As a meal outside usually contains an average of 700 to 800 calories, we can easily exceed the recommended daily energy intake.

7 To help Singaporeans make healthful choices when they dine out, the Health Promotion Board (HPB) aims to make healthier dining options more common and accessible to consumers under the Healthier Dining Programme. HPB has partnered F&B operators to offer meals or beverages that have lower calories, or use healthier ingredients. Food establishments that offer healthier options are easily recognised by the Healthier Choice labels on their store fronts.

8 As of March this year, 2,400 F&B operators, hawker centres and coffee shops have served a total of 180 million healthier meals. The 10 Healthier Choice award winners this year offer lower-calorie and wholegrain options, such as *ban mian* and brown rice. This is good news for fans of hawker fare – we can enjoy food that is not only tasty but also healthy!

#### **Conclusion**

9 Let me conclude. Hawkers and hawker culture are part of Singapore's living heritage. All of us can help sustain this heritage by visiting not just the veteran hawkers who have honed their craft over the years, but also the new entrants who have taken the step to pursue their passion for cooking. By patronising hawker centres, we can help to ensure that the hawker culture lives on for future generations.

10 I would like to thank City Gas, Shin Min Daily News and the supporting public agencies – NEA, HPB and STB – for organising this award to celebrate our hawkers. My warmest congratulations to our winners today

- I hope your achievements will motivate current and aspiring hawkers to follow in your footsteps. Let us continue to work together to sustain our hawker culture.

11 Thank you.

大家早上好!今年很高兴再次参加“城市小贩美食奖”的颁奖典礼。“城市小贩美食奖”已迈入第十二个年头,多年来有超过400位小贩获颁奖项。

今年,除了“最佳本地小贩美食奖”和“最佳较健康小贩美食奖”之外,也添加了“最佳国际小贩美食奖”。这个新奖项反映我国小贩美食的多元化。其实,许多大家所熟悉的小贩美食源于早期移民到新加坡的先辈们,由各国的美食演变成新加坡独特的本地佳肴。我很高兴小贩们把日式、摩洛哥式和泰式等菜肴带入小贩中心,让国人享有更多样化的选择。

小贩中心和小贩文化是新加坡历史和传统的重要元素,也是我们日常生活中不可或缺的一部分。多年来,小贩中心已成为“社区饭厅”,国人不分种族、宗教和收入高低,都能齐聚小贩中心,一起用餐。在保存新加坡独特的小贩文化的同时,政府也会继续帮助小贩行业与时俱进,并吸引更多小贩入行。

最近,我在新加坡全国商联总会首次主办的小贩座谈会上宣布了几项新措施,其中包括国家环境局和精深技能发展局推出的“小贩培训计划”,还有为培育摊贩提供额外的六个月培育期和百分之25的租金回扣。希望这些措施能帮助小贩应付成本方面的问题。

除了让国人享用美味可口的本地美食,我们也帮助大家建立良好的健康意识。新加坡人普遍在外解决三餐。目前就有六成的国人每个星期在外用餐至少四次。为了鼓励国人吃得更健康,保健促进局与餐饮业者合作,推出了“较健康选择饮食计划”。参与计划的小贩会在摊位贴上“较健康选择”标签。获得今年“最佳较健康小贩美食奖”的十位小贩都提供较低热量和使用全谷物的健康餐食选择,让我们在享用美味小贩美食的同时,吃得健康!

我在此感谢城市燃气和《新明日报》联合主办“城市小贩美食奖”,汇集国人参加遴选活动,给予优秀小贩们肯定,让小贩文化得到传承。我衷心祝贺今天得奖的小贩们,希望你们的成就能启发其他小贩,也吸引更多新小贩入行。我也呼吁大家以实际行动支持我们的小贩,多与家人朋友到小贩中心用餐,让小贩行业继续蓬勃发展,代代相传。

谢谢。

Mr Neil McGregor, Group President & CEO, Sembcorp Industries

Dr Teo Ho Pin, Mayor of the North West District

Distinguished guests

Residents

## **INTRODUCTION**

1 Good evening everyone. It is my pleasure to join you here today for the launch of the ezi app.

2 Let me first commend Sembcorp and your partners DBS and Republic Polytechnic on this initiative to make recycling more convenient for households.

## **YEAR TOWARDS ZERO WASTE AND NEED TO RECYCLE RIGHT**

3 Why is it important to recycle, you may ask. Recycling is a key enabler of the circular economy that Singapore aspires to achieve. If we can improve the way we recycle, we can turn recyclable items into new products, instead of trashing them. By converting what might have been trash into treasure, we can keep our finite resources in use for as long as possible. This would extend the lifespan of Semakau Landfill, and also reduce greenhouse gas emissions – a key strategy in Singapore’s fight against climate change.

4 Our domestic recycling rate has not been ideal. In fact, it has stagnated at 20 per cent over the past few years. As Neil mentioned, recent surveys conducted by my Ministry and the National Environment Agency (NEA) indicate that many people still do not know or have misconceptions about how to recycle correctly. This explains why our blue recycling bins have a high contamination rate — about 40 per cent of the items deposited inside the blue bins are either non-recyclable items or are recyclables that have been soiled by food and liquid waste.

5 Getting people to recycle more and recycle right is one of the key reasons why my Ministry designated 2019 as the Year Towards Zero Waste. We want to raise public awareness of the increasing amount of waste that we are generating, and rally Singaporeans to Reduce, Reuse and Recycle Right. As part of the #RecycleRight movement, my Ministry, NEA and our partners, including Sembcorp and Eco-Business, have been publicising how to recycle correctly using multiple channels and in different places, including TV, social media, bus

stops, MRT stations and shopping malls. By recycling right and adopting circular economy strategies, we can overcome our resource constraints. This is important as Singapore is a small city-state with limited resources.

6 2019 has been a fruitful year in Singapore's journey towards Zero Waste. We have launched Singapore's inaugural Zero Waste Masterplan, which charts the Government's strategies to build a sustainable, resource-efficient and climate-resilient nation. The Masterplan also unveiled a new ambitious target – to reduce the waste sent to Semakau Landfill by 30 per cent by 2030. If we can achieve this, we will be able to extend the lifespan of Semakau Landfill beyond 2035.

7 This year, my Ministry also introduced the Resource Sustainability Bill in Parliament, another significant milestone in our Zero Waste journey. The Bill puts in place legislative powers to tackle electrical and electronic waste, food waste, and packaging waste including plastics. These are priority waste streams that we have identified, because they are generated in large quantities but have relatively low recycling rates.

8 While the government will continue to put in place legislations and policies, we need the support of businesses, civil society groups and individuals to turn our Zero Waste vision into reality.

9 Businesses, with their influence and reach, play an important role in encouraging community action. I am glad that many businesses have taken the initiative to support our Year Towards Zero Waste. A good example is NTUC Fairprice's recent "no plastic bag" trial to reduce the excessive use of plastic bags. I am glad that the trial received positive response from the public, and that NTUC FairPrice is extending the trial to 25 outlets for a year. I encourage more retailers to explore similar measures to reduce excessive use of disposables, and help promote sustainability.

## **SEMBCORP APP**

10 The ezi app is another commendable ground-up effort, and exemplifies how different organisations can work together to undertake collective action for the environment. I encourage all of you to use the app, and to tell your friends and family about it.

11 With the app, residents can now easily book an appointment for Sembcorp to collect recyclables from their homes. Users can also learn how to recycle right from the interactive and educational tips. While this service is currently only available in Woodlands, other residents can also download it to learn from the educational components. I understand Sembcorp will look to extend the service to other areas.

12 We welcome more innovative ideas from everyone, so that we can co-create and deliver practical solutions to overcome our environmental challenges. A case in point is the Citizens' Workgroup convened by MEWR recently, where citizens were invited to propose solutions to improve household recycling. We are currently studying these proposals and will provide our recommendations at the end of this month.

## **CONCLUSION**

13 Let me conclude. Singapore's journey towards Zero Waste is an ongoing effort. With collective action, we can do more and go further to move Singapore towards becoming a Zero Waste Nation. Let us continue to work together on this journey.

14 Thank you.

Ms Goh Swee Chen,  
President of Global Compact Network Singapore,  
Your Excellencies,  
Ladies and Gentlemen,

Thank you for giving me the opportunity to address you this evening.

2 Many things have changed since I joined the Ministry of the Environment and Water Resources in 2015. For one, the temperature of our air conditioning is much better than it was then, and many of you are not wearing jackets. Secondly, I do not see plastic bottles on the tables. There have been big changes optically and substantially. Businesses should take notice. If you still do business as usual, you may be left behind. Customers want a change. They want to see sustainability in our production.

3 This annual event is an important gathering of businesses and other key stakeholders to raise awareness of sustainable development. I hope the discussions have given you useful insights, and allowed you to exchange ideas, strengthen your businesses, and ultimately contribute to a sustainable economy.

4 Singapore has always put sustainability at the front and centre of what we do. Since our independence, we have sought to balance economic development with environmental protection and social inclusion. This is the unwavering principle that has enabled our small nation to become one of the most sustainable cities in Asia and globally. The outcomes that you see today are not the result of actions taken five, or even 10, years ago — they are the results of what we have done since independence. We are also the world's most competitive economy, according to a recent ranking by Switzerland-based research group IMD World Competitiveness Centre.

### **Threat of climate change**

5 With the threat of climate change, it has become even more important to put sustainability at the centre of everything we do. Climate change will pose serious threats to our access to essential resources such as food, water and energy — three of the most important resources for humanity. Business supply chains are becoming increasingly at risk. Our future generations are at stake if we do not act. As UN Secretary-General Antonio Guterres said: “We are in a battle for our lives (against climate change).”

6 But Singapore is a resilient nation. We have weathered many storms in the past, and put in much effort to protect our environment, even as we grow. As long as we continue to work together and do our part, we can overcome the challenges posed by climate change.

## **Building a Sustainable Future for Singapore**

7 The Government is doing its utmost to mitigate and adapt to climate change. For those who are still not familiar, mitigate means trying as much as possible to reduce our greenhouse gases, and adapt is to do whatever we can when we cannot mitigate it and climate change is upon us. We are boosting Singapore's defence against sea level rise and enhancing our flood resilience measures. We are also investing in climate science research, to ensure that our adaptation plans for both sea level rises and flood resilience measures are based on robust data and projections.

8 We have also, from early on, undertaken a suite of measures to reduce greenhouse gas emissions across all sectors. Singapore is the first country in Southeast Asia to implement an economy-wide carbon tax with no exemptions. To create a sustainable energy future, the Government also recently announced a new solar target of at least 2 gigawatt-peak (GWp) by 2030. That will supply about 10 per cent of Singapore's peak daily electricity demand today.

9 The Government is also taking the lead to catalyse a shift towards a circular economy. My Ministry designated this year our Year Towards Zero Waste. We have launched Singapore's first-ever Zero Waste Masterplan, which charts the Government's strategies to build a sustainable, resource-efficient and climate-resilient nation. Parliament has also passed the Resource Sustainability Act, which puts in place legislative powers to tackle our priority waste streams.

## **Businesses Play an Important Role**

10 Businesses play an important role in these efforts. This year's summit theme, Reimagining Businesses for Resilience, is apt. It is timely to look ahead at the journey that businesses must take in order to continue thriving in a carbon- and resource-constrained world. Let me suggest two areas.

11 First, businesses can help to mitigate climate change by adopting energy-efficient and low-carbon technologies and solutions. Over the years, the energy efficiency improvement rate has increased from 0.4 per cent in 2014 to 1.4 per cent in 2017. This alone has resulted in \$370 million worth of energy savings. We must sustain this rate of improvement in the years ahead. The Government will continue to enhance our funding programmes to give stronger support to companies to be efficient.

12 Second, businesses can support our transition to a circular economy by engaging in sustainable production and consumption, and reusing and recycling our resources for as long as possible. Besides protecting our environment, we can catalyse the growth of new industries if we scale up the extraction of resources from waste. We have an opportunity to turn trash into treasure, and to

turn Semakau Landfill into an urban mine. This would mean new jobs and economic opportunities for citizens and companies. Preliminary estimates have found that if Singapore recovers and reuses valuable materials found in e-waste, we can reap a net benefit of \$40 million.

13 Businesses can support more sustainable consumption and production practices, by integrating Environmental, Social and Governance (ESG) principles into their decision making. Such practices make financial and practical sense, as consumers increasingly look to a brand's sustainability practices when making their purchasing decisions.

### **Reimagining Businesses for Resilience, Together**

14 Businesses can also partner Non-Governmental Organisations, or NGOs, to advance their sustainable goals. I commend GCNS for organising this annual event as part of their efforts to encourage sustainable business practices. GCNS and the World Bank's Carbon Pricing Leadership Coalition, or CPLC, launched the CPLC Singapore chapter at the last Summit. Since then, CPLC Singapore has been engaging companies to implement internal carbon pricing. I encourage companies to do so as internal carbon pricing can be used as a planning tool to help identify revenue opportunities and risks, as an incentive to drive energy efficiencies to reduce costs, and to guide capital investment decisions.

### **Conclusion**

15 Let me conclude. The challenges which businesses face are complex but not insurmountable. To continue thriving in a carbon- and resource-constrained world, we all have to build up climate, resource and economic resiliencies. Then, we can be ready to tap on new opportunities in a circular and green economy.

16 Thank you.

Mr Ho De Leong, Board Member of the International Solid Waste Association and Asia-Pacific Representative of Regional Development Network

Ms Melissa Tan, Chairman of the Waste Management and Recycling Association of Singapore

Distinguished Guests

Ladies and Gentlemen

Good morning and a warm welcome to the International Solid Waste Association or ISWA Beacon Conference.

2 I am heartened to see so many local and overseas industry professionals gathered here to exchange knowledge and expertise on the circular economy, ranging from technology and infrastructure, to operations and new business models. These topics are trending globally because they offer solutions for countries to overcome numerous challenges on the path to sustainable development. Climate change, growing population, rapid urbanisation, and over-consumption are all global trends that we are grappling with.

3 Singapore faces the same challenges. In addition, we also face land constraints as a city state. Semakau Landfill, our only offshore landfill, is projected to completely fill up by 2035.

4 To overcome these challenges, we have adopted a circular economy approach and have designated 2019 as the Year Towards Zero Waste. We believe that this will bring us closer towards sustainable production and consumption, and allow us to achieve sustainable development in the long run. Let me share with you a few strategies that we have adopted.

5 First, we will close individual resource loops and reuse resources endlessly. Many of you would be familiar with how Singapore has closed our water loop by collecting and treating every drop of used water and turning much of it into "NEWater". We can apply this approach in many other areas. For example, the National Environment Agency (NEA) is working to turn incineration bottom ash into construction material, or what we call "NEWSand". NEA has developed provisional environmental standards for the use of NEWSand, and field trials will start next year. If successful, NEWSand will literally allow us to turn trash into treasure, and extend the useful life of Semakau Landfill beyond 2035.

6 Second, we will put in place a facilitative regulatory environment to support a circular economy. The new Resource Sustainability Act will establish a systems-level approach that

mandates key responsibilities to enable nation-wide re-using and recycling of our three priority waste streams –packaging waste including plastics, e-waste and food waste. This approach reinforces our first strategy to close individual resource loops.

7 Under the Resource Sustainability Act, producers of packaged products will need to report data on the packaging used, and submit plans to reduce, reuse or recycle packaging. This will be implemented next year. We will also impose the Extended Producer Responsibility (EPR) framework on producers of Electrical and Electronic Equipment (EEE) in 2021, and mandate the segregation and treatment of food waste by large food waste generators by 2024.

8 These regulatory measures are expected to drive demand and create a viable industry for resource recovery in Singapore. It also encourages innovation and redesigning of products that require less materials, last longer and are more easily recycled. The regulatory framework will also fund the recovery and aggregation of useful materials such as metals from e-waste, which makes recycling more viable. It is estimated that the e-waste EPR alone could bring a net benefit of \$40 million from re-used or recovered material, including indirect benefits such as helping our companies export overseas and job creation. There is thus great potential for the regulatory framework to create net economic benefit for Singapore and provide an early-mover advantage in the global push towards a circular economy.

9 Third, we will harness synergies across closing different resource loops. We believe taking such a systems approach will yield better results than a sum of each part of the puzzle. A good example is the upcoming Tuas Nexus, which will be the world's first fully energy self-sufficient greenfield facility that will integrate used water treatment and waste management in a single facility to harness synergies between water, waste and energy. The Tuas Nexus will co-digest food waste with used water sludge to triple biogas yield, as compared to digestion of used water sludge alone. We estimate that this will result in overall carbon savings of more than 200,000 tonnes of carbon dioxide emissions every year – equivalent to taking 42,500 cars off the roads.

10 Fourth, we are actively investing in developing solutions, enterprises, and a skilled workforce to support a circular economy. This is why we have launched the Environment Services Industry Transformation Map (ESITM) in 2017 to facilitate the local industry in developing higher-value jobs and new innovative solutions, and in exporting these solutions overseas.

11 I am glad that we are already seeing early milestones. NEA launched a regulatory sandbox last year under the ESITM to provide a safe space for companies to trial new solutions. One of the projects is an onsite gasification system pilot at Gardens by the Bay by Singapore Power Group (SP Group). The system has the potential to close the waste loop

by converting waste into solid carbon material which can be used for horticulture at Gardens by the Bay. Waste heat is also recovered to provide hot water for F&B outlets.

12 We are also glad to see our local companies developing successful and innovative solutions that are well-received overseas too. Westcom Solutions collaborated with researchers from the A\*STAR Institute of Chemical and Engineering Sciences to successfully develop microbes to break down food waste at a lower temperature than current food waste conversion processes in the market, making it more energy efficient. The company has since exported the solution overseas, and 70% of its revenue is now generated from overseas sales.

13 In conclusion, the global demand for waste management and recycling solutions will grow, particularly in this region. Singapore's approach is thus to promote innovative circular business models that will position our companies to seize opportunities in emerging areas like specialised waste treatment, recycling or remanufacturing. I welcome all of you to work together with us to tap on the potential here, in the region, and across the world.

14 I hope the ISWA Beacon Conference will provide a good platform for the exchange of ideas and the forging of new partnerships and collaborations. It also gives me great pleasure to share that Singapore will be hosting the prestigious ISWA World Congress 2021 at the Marina Bay Sands. Singapore had the privilege of hosting it in 2008 and we are glad to do so again. The organising committee, led by Ms Melissa Tan, Chairman of the Waste Management and Recycling Association of Singapore (WMRAS), is working hard to ensure that the Congress will be another great learning platform and exhibition showcase for the global environmental waste management and resource recovery industry.

15 I wish you all a fruitful conference ahead. Thank you.

Mr Tony Gourlay, CEO, Global Initiatives

Distinguished guests

Ladies and Gentlemen

1 Good morning. I am pleased to join you at this 8th edition of the Responsible Business Forum on Sustainable Development. To our friends from overseas, a very warm welcome to Singapore.

### **Singapore's Approach to Sustainable Development**

2 Sustainability has always been an integral aspect of Singapore's development, long before it became a buzzword. Since our nation's independence, we have sought to balance economic development with environmental protection and social inclusion. In the face of climate change, it has become even more crucial now for us to put sustainability at the centre of everything we do.

3 Climate change will increasingly threaten our access to essential resources such as food, water and energy. New studies have found that rising seas could affect three times more people by 2050 than previously thought, with many Asian cities in danger of being inundated. As a low-lying island city state with no natural resources, Singapore is vulnerable to all of these threats, particularly the effects of sea level rise. To prepare Singapore for these challenges, we are building three types of resilience — climate resilience, resource resilience, and economic resilience.

4 The first – climate resilience – is about protecting our environment from the impacts of climate change. We may need to invest S\$100 billion or more over the next 100 years to protect ourselves against rising sea levels. To ensure that our adaptation plans are based on robust science, the Centre for Climate Research Singapore has recently launched a S\$10 million National Sea Level Research Programme, which will develop more robust projections of sea level rise. A new Climate Science Research Programme Office will also be set up to lead, formulate and implement our National Climate Science Research Masterplan, and to build up climate science capabilities in Singapore. We will share our findings with our neighbours to help them plan for climate change adaptation also.

5 Second, we are building resource resilience to ensure we have a safe and secure supply of critical resources. One of the key things we are doing is to strengthen our food security. Singapore imports more than 90 per cent of our food today. This makes us vulnerable to external factors, such as volatilities of the global food market, the impacts of climate change, and even disease outbreak. To make our food supply more resilient, we intend to increase local food production to meet 30 per cent of our needs by 2030. We are also working

to maximise resource efficiency and close our resource loops. I will elaborate on this later.

6 Third, we are building economic resilience to ensure that our economy continues to thrive in a carbon and resource-constrained future. Singapore is the first country in Southeast Asia to implement a carbon tax, with no exemptions. This is to incentivise emissions reduction across all sectors and transition to a low-carbon economy. The government is prepared to spend more than the estimated \$1 billion in carbon tax revenues collected in the first five years to help businesses become more energy and carbon efficient.

7 By building climate, resource and economic resilience, we are confident that we can ensure a sustainable future for our people in the face of challenges brought by climate change. However, climate change is not the only threat we face. Urbanisation and unbridled consumption are also causing a strain on the world's essential resources and raw materials. We must take action now to prepare for resource scarcity in future.

### **Building a Circular Economy**

8 The theme for this year's forum, #Circularity2030, is timely. Singapore designated this year our Year Towards Zero Waste, to rally Singaporeans and businesses to move towards more sustainable consumption and production, and to adopt circular economy strategies for our waste management.

9 A good example of how Singapore has successfully implemented circular economy strategies is in our water story. Over the last 50 years, Singapore has developed a robust and diversified water supply system called our Four National Taps. One of these taps is recycled wastewater, which we call NEWater. By endlessly recycling the water we use into NEWater, and putting it back into the system, we have closed the water loop.

10 We will do the same with our waste and resource loops. This year, we launched our inaugural Zero Waste Masterplan. The Masterplan provides a comprehensive update on Singapore's strategies to build a sustainable, resource-efficient and climate-resilient nation. It covers areas such as infrastructure, research and development, and outreach and engagement. The targets outlined in the Masterplan are supported by the Resource Sustainability Act which was passed recently. The Act provides legislative effect to regulatory measures for the three priority waste streams in Singapore – e-waste, food waste and packaging waste, including plastics. It will also create opportunities for companies to tap on rising demand for resource recovery.

11 Besides putting in place legislative frameworks, we are also making significant investments in research and development to spur innovation. Under the 'Closing the Waste Loop' initiative, we have set aside \$45 million to develop technologies

and solutions to tackle challenges posed by increasing waste generation, scarcity of resources and land constraints for waste management. To date, this programme has funded eight projects worth almost \$20 million.

12 Let me share two projects made possible by R&D, that demonstrate our circular approach:

- First, to maximise resource recovery, we are planning to turn our incineration ash into construction material for roads and non-structural concrete. We are calling the material NEWSand. The National Environment Agency, or NEA, has developed provisional standards for NEWSand. Field trials are set to commence next year.
- Second, we are co-locating an Integrated Waste Management Facility with a Water Reclamation Plant to harness synergies between water, waste and energy to maximise resource efficiency. This important infrastructure, known as Tuas Nexus, will embody circularity. Food waste from the waste management facility will be co-digested with used water sludge from the water reclamation plant to triple biogas yield, generating energy to power the entire facility.

### **Working together for a Sustainable Future**

13 These examples represent what the government is doing to move Singapore closer to becoming a Zero Waste Nation. But we recognise that the government cannot achieve this vision alone. As the saying goes, “If you want to go far, go together.” We need industries and businesses to be at the forefront of these efforts.

14 One key strategy of a circular economy is sustainable production and consumption. The majority of global greenhouse gas emissions comes from the production and consumption of goods and services. Businesses can support the transition from a linear to circular economy, if they can turn trash into treasure by reusing and recycling our limited resources for as long as possible.

15 Adopting a circular economy approach will not only reduce our carbon footprint and benefit the environment. New opportunities for our companies and good jobs will be created if we scale up the extraction of resources from waste, and generate economic value from something that would have been thrown away. For example, according to preliminary estimates, if Singapore recovers and reuses valuable materials found in e-waste, we can reap a net benefit of \$40 million.

16 One company that recognises the value of a circular approach is Fuji Xerox. The company has sought to recover and reuse parts of its products. This has enabled it to save around 30 per cent in new materials for manufacturing products. Another example is Ricoh Asia Pacific. Ricoh ensures that its products

use less new resources, and strives to use recyclable parts in their products. I understand that close to 90 per cent of Ricoh's products are made of recycled parts.

17 Businesses can also collaborate and work together to close the loop. For example, Australian Fruit Juice, or AFJ, has partnered with UglyGood, an upcycling solutions provider. Instead of being thrown away, waste fruit peels from AFJ are processed and used by UglyGood to make organic cleaning agents.

## **Conclusion**

18 Let me conclude. There are many challenges ahead for sustainable development, but many opportunities too, if businesses are willing to transform themselves. I am glad that platforms such as the Responsible Business Forum are bringing like-minded individuals together to create conversations on circular economy solutions.

19 I understand that Global Initiatives will also be live-streaming tomorrow's discussions to partner universities and business schools across the world. This is a commendable effort to engage the next generation of sustainability leaders. Given the increasingly transboundary nature of operations, we all need to work together, plan ahead and invest well not just for a sustainable nation, but a sustainable world.

20 Thank you, and I wish you all a fruitful event ahead.

Mr Ho Chee Kit, President of Restroom Association (Singapore)

Distinguished Guests,

Award Recipients,

Ladies and Gentlemen,

## **Introduction**

1 Good afternoon everyone. Let me first congratulate our award recipients who have provided clean and hygienic toilets for all of us. Thank you for your hard work and contribution to the high toilet standards in Singapore. It is apt that today's event is held on World Toilet Day — a day designated by the United Nations to raise awareness of the sanitation crisis that many developing countries face.

2 From the video shown earlier, 4.2 billion people do not have access to proper sanitation and some 763,000 children die because of this. And indeed, when I was a young, collectors would go from house to house every night to collect night soil buckets containing toilet waste, which was terrible for your health. Imagine the hygiene and sanitation issues. And if they don't collect the night soil buckets, you would be in trouble.

3 Singapore's public health infrastructure and environmental standards have come a long way since those early days. We have much improved sanitation and cleaned up our polluted waterways, such as the Singapore River. I remember when I worked at City Hall many years ago, the food at the hawker centre was very good, but not the smell of the Singapore River right next to it. The clean-up of the Singapore River was made possible due to the careful planning by the government, and the efforts of communities past and present which have dedicated themselves to cleaning and greening Singapore. We must continue to maintain our high standards of cleanliness for future generations to enjoy.

## **Committed Owners, Operators and Cleaning Companies**

4 I am pleased to see toilet owners, operators, and cleaning companies being recognised at today's ceremony, for your efforts have helped Singapore achieve a world-recognised standard of restroom hygiene and cleanliness.

5 Many of our award recipients have started to adopt smart technologies in their toilets. Smart solutions increase productivity as defects or problems are quickly detected and cleaning companies are kept automatically informed through WhatsApp for instance, or messaging. With real-time information, restroom attendants and maintenance crew can be more effectively deployed. This allows for timely resolution of issues and cost-savings in the long term, as well as address our manpower challenges.

6 SMRT Trains Ltd and Sentosa Development Corporation are good examples. Both organisations have leveraged technology to improve their restroom operations and raised

productivity. For SMRT, more than 70 toilets in train stations have been certified as Happy Toilets. At Sentosa, Happy Toilets at Palawan East and Palawan West were awarded the ASEAN Public Toilet Award in January this year. And in May, nine of Sentosa's Happy Toilets were upgraded from four to five stars. I think we should give them a round of applause. And I hope their achievements will inspire more owners and operators to adopt smart solutions.

### **Paying Tribute to Outstanding Restroom Attendants**

7 While modern toilets are well-designed and equipped with smart solutions, dedicated restroom attendants still play an important role. Indeed, our maintenance crew and our toilet attendants are all very important.

8 This year, we want to recognise 10 outstanding attendants from the pre-school, school, and commercial sectors. One example is Madam Yeo Yoke Soi from APSN Katong School. Madam Yeo has worked in the cleaning sector for 16 years. She consistently upgrades herself, and has completed six WSQ environmental cleaning modules. Madam Yeo, your commitment is an inspiration to all of us and I sincerely congratulate you for receiving the highest score in this category. Let's give a big round of applause to all our cleaning attendants.

### **Recognising our Young Champions**

9 Today, we also want to celebrate partnerships between schools and the Restroom Association (Singapore), as they work together to cultivate gracious attitudes amongst our younger generation. Indeed, it is important to nurture good toilet habits from young. This year, four outstanding primary school students will receive awards for actively advocating a range of toilet-related causes.

10 Emma Chan from Chongfu Primary School led her team in restroom decorations, poster designs, and conducted assembly sharing sessions to encourage her peers to keep the school toilets clean. As an active member of the 'Friend of Singa' programme, Shuanne Seah from Convent of the Holy Infant Jesus (CHIJ) Kellock, and her team created restroom etiquette slides for sharing with other students. Similarly, Taylor Kenneth James Tadlas from Park View Primary School shared about the importance of restroom etiquette and showing kindness to cleaning attendants, at his school assembly. He also took up an active role as a restroom inspector in his school. Well done! Meanwhile, West Wood Primary School's Tricia Chan conducted outreach to SilverAce Eldercare Centre and to MOE Kindergarten pupils.

11 Indeed, our four young award winners have demonstrated that everyone, regardless of age, can make a positive difference to Singapore's living environment.

### **CONCLUSION**

12 Let me conclude. All of us, from service providers to restroom users, have a role to play in keeping our environment clean in Singapore. I would like to commend RAS for their efforts in recognising our everyday restroom heroes through these awards. My heartiest congratulations to all our award recipients for your contributions.

13 Thank you.

Good morning everyone.

It is a great pleasure to see all of you again.

2 Thank you Szue Hann for the insightful presentation. Miniwiz is at the forefront of the circular economy approach. The company has shown the transformational possibilities of closing the waste loop, by upcycling industrial and consumer waste like cigarette butts and plastic bottles into products of exceptional quality and design. This includes the furniture that you see here today.

3 Indeed, recycling is the fundamental enabler of a circular economy. It allows us to convert trash into treasure, and recover precious resources that would otherwise be disposed or adding to pollution. This is why we have chosen to work on improving our household recycling rate, through the Citizens' Workgroup.

### **The Citizens' Workgroup Journey**

4 Our journey with you — the #RecycleRight Citizens' Workgroup — has been meaningful and enriching. You have dedicated significant time and effort to find thoughtful solutions to improve household recycling in Singapore. Some of you have even conducted field trials to test and refine your ideas. The final report you submitted was beautifully put together. It is a reflection of your care and dedication to this effort. Congratulations on a job well done!

5 My colleagues at the Ministry of the Environment and Water Resources (MEWR) and the National Environment Agency (NEA) have studied your ideas in detail. Today we would like to provide our response to your recommendations, and the possible avenues for us to take them forward together.

### **Four pilot projects to improve household recycling**

6 You have submitted a broad range of proposals in your final report — including more targeted education and awareness campaigns, engaging communities on a deeper level to effect change, and developing incentives to drive positive behaviours.

7 We note that some of your ideas had complementary themes and approaches. To tap on potential synergies between the ideas, we have streamlined them into four pilot projects — “Developing A Sustainable Community”, “Piloting a New Blue Bin Design”, “Study of the Deposit Return Scheme (or DRS) System” and “Developing the #DabaoRight app”.

8 For example, under the “Developing A Sustainable Community” pilot, MEWR and NEA will identify suitable communities or neighbourhoods, and work with you and relevant stakeholders to trial the various community-based recommendations proposed by the Workgroup. These will include targeted outreach to foreign domestic workers and the elderly in the community to raise awareness on recycling, identifying and training community influencers and eco-champions to nudge behavioural changes towards recycling, and encouraging food waste segregation in the community. My MEWR colleague will be elaborating on these four projects after my speech.

9 We hope to formalise the four pilot projects and their scope of work by the first quarter of next year. We will trial these projects, evaluate their outcome before deciding if some of these initiatives could be scaled up. To ensure the success of these projects, we need your continued support and participation. I would like to invite you to sign up for the projects and work with us to see your ideas through to fruition.

## **Working together towards a Sustainable Singapore**

10 We are excited to embark on this next phase with you. We hope that you will keep the conversations going, and cherish the friendships and community that you have forged through this Workgroup. And do rally your family and friends to take positive action for the environment too!

11 In addition to working with you on implementing your ideas, we will provide regular updates on MEWR family's initiatives, and invite you to our events. We also welcome any further suggestions and ideas to address our evolving environmental challenges. We hope that you will become our Green Advocates and Champions in the community!

12 On behalf of the MEWR family, I would like to extend our sincere appreciation to each and every one of you for joining us on this journey. This is just one of many steps, as we collectively work towards Singapore's vision of a Zero Waste Nation. I look forward to seeing you again on Monday at our year-end appreciation lunch.

13 Thank you.

Excellencies,

Ladies and Gentlemen,

## **Introduction**

Good afternoon. This lunch celebrates our successes in the Year Towards Zero Waste. I would like to say a few words of thanks to everyone here today.

2 2019 has been an eventful year for sustainability and climate change. Globally, we witnessed a strong push for ambitious climate action at the UN Secretary-General's Climate Action Summit, and from ground-up movements across the world. At home, PM Lee set out Singapore's approach to understand, mitigate, and adapt to climate change at the National Day Rally, and at the UN Climate Action Summit the month after. Our youth also turned out for a climate rally to express their concern about climate change. Around the same time, we launched Singapore's inaugural Zero Waste Masterplan and enacted the Resource Sustainability Act, two key pillars to build a more sustainable and waste-free Singapore.

## **A Sustainable Future Demands Climate Action Today**

3 Climate change is the defining long-term challenge which governments and societies all over the world must tackle today. Time is running out. Just this month, over 11,000 scientists declared that the world is in a "climate emergency". This is not an abstract statement. Bushfires have been ravaging New South Wales, causing human and wildlife casualties, and widespread property loss. Two weeks ago, Venice suffered its worst flooding in over 50 years, costing upwards of a billion Euros, not to mention damage to historic landmarks.

4 Singapore, too, is not spared from the impacts of climate change. We are already feeling the heat. Singapore has been warming at twice the average global rate; this year saw the hottest and driest August and September months on record. But we have also had record-breaking rainfall, such as on 8 January last year, when half of January's average rainfall fell in 4 hours. The impacts of climate change will only worsen in our lifetime. Some, like sea level rise, have already taken on a life of their own, and cannot be reversed in the foreseeable future even if the world completely stopped emitting greenhouse gases today.

5 The Singapore Government is working hard to lay a strong foundation to give future generations adequate resources and capabilities to tackle climate change. We are proud to have hosted the Scoping Meeting for the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) Synthesis Report last month. The AR6, which will be published in 2022, will guide global policy-making on climate change for the next decade. The new Climate Science Research Programme Office, to be set up under the Centre for Climate Research Singapore, will build up critical climate science capabilities across our local research landscape. And as PM Lee announced, we are embarking on plans to strengthen our coastal defences over many decades to protect Singapore against the rising seas.

6 We are pushing hard on climate mitigation. Recently, the Government doubled our solar deployment target, to at least 2 gigawatt peak by 2030. That will make up about 10 per cent of our peak daily electricity demand today. We are the first country in Southeast Asia to introduce a carbon tax, with no exemptions for any sector. We will spend more than the estimated \$1 billion in carbon tax revenues collected in the first five years, to help companies invest in energy- and carbon-efficient technologies.

7 We must improve our industrial energy efficiency to be on par with leading countries. For example, about 70 per cent of chilled water systems in industrial facilities systems today are not efficiently optimised. **Therefore, starting next year, NEA will set minimum energy efficiency standards (MEES) for chilled water systems in industrial facilities.** MEES will introduce baseline standards to help companies reduce their energy consumption by an estimated 245 gigawatt hours. This can help them save about \$37 million in energy costs a year by 2025, and avoid 100,000 tonnes of carbon emissions annually, equivalent to taking more than 21,000 cars off the road.

8 Singapore's efforts alone are not enough. The global community must reduce emissions to avert the worst impacts of climate change. I will be attending the UN Climate Conference or COP-25 in Madrid soon, and will bring a message on the need for strong and timely climate action, and signal Singapore's readiness to continue working with other countries to keep up the global momentum.

### **Zero Waste and Circular Economy a Key Pillar of Climate Action**

9 Climate change demands a fundamental shift in what we do today. Everything we produce, consume and dispose of has an impact on our environment and climate. The 'take-make-throw' economy is unsustainable in an increasingly resource- and carbon-constrained world. But this dilemma also presents an opportunity to rethink how we deal with waste, and forge new paths for growth.

10 To produce and consume sustainably, we need to adopt a circular economy approach, where materials are retained and reused in the value chain for as long as possible. This complements and supports our climate agenda. Extracting fewer raw materials from the ground, designing products that last, and repurposing our waste all help to reduce emissions. This was why we designated 2019 as Singapore's Year Towards Zero Waste, reflecting our ambition to design waste and wastefulness out of our economy.

11 Singapore's Zero Waste Masterplan charts our strategies towards this future. We have set an ambitious target to reduce the amount of waste sent to the Semakau landfill by 30 per cent over the next 10 years. The Resource Sustainability Act supports the Masterplan, by providing the legislative framework to better manage our three priority waste streams of e-waste, packaging waste including plastics, and food waste.

12 Through science and technology, we have found a way to convert residue from waste incineration into useful construction material, which we call NEWSand. Like NEWater, NEWSand is born out of our drive to overcome constraint, and to create a precious resource from waste. NEWSand will help Singapore to close our waste loop, and extend the lifespan of Semakau. We have already developed provisional environmental standards, and tested possible uses for NEWSand in the lab. These standards are more comprehensive than those of other countries, given our unique circumstances as one of the few countries in the world to harvest urban stormwater on a large scale for consumption. Our scientists and engineers are being challenged to break new ground.

13 We will soon begin a field trial to assess the real-life performance of possible NEWSand materials. **I am happy to announce that NEA has awarded the field trial tender to 3 companies – Zerowaste Asia, Inashco and REMEX. Field trials will begin in the middle of next year along a section of Tanah Merah Coast Road.**

14 Another form of NEWSand is developed from “slag”, the by-product of the gasification of solid waste. **This form of NEWSand has already been used to construct a footpath at Our Tampines Hub. We will also be using it to pave a footpath right in front of the Environment Building along Scotts Road next year.**

15 We are looking at many more uses for NEWSand, including making benches! Just outside this banquet hall, you will see a 3D-printed bench made from NEWSand. It was fabricated by a Singapore company, Pan-United Corporation. We have the supply. We need your innovation. I encourage companies to work with us to create beauty from ashes, and make environmentally-sustainable and beautiful products with NEWSand.

16 The circular economy approach will open new frontiers for economic growth, even as we strengthen our climate and resource resilience. Take e-waste for example. Last month, TES Singapore announced a \$25 million investment to develop two facilities, one locally and another in France, to recycle lithium-ion batteries using proprietary technology. Apart from creating economic value for Singapore and solutions that we can export to the rest of the world, we also are creating higher-value jobs. By 2025, we expect about 30,000 people to benefit from transformation efforts in the Environmental Services industry, through skills upgrading and technology adoption.

### **Everyone Has to Take Action and Work Together**

17 The Government can make the right policies, but we need the strong partnership of all stakeholders, including our partners here today, to take climate action and work together. This is a whole-of-nation effort.

18 **As the driver of economic growth, the private sector is key in our transition to a sustainable future.** Opportunities abound for low-carbon growth, today and in the long term.

19 One good example is Pan Pacific Hotels Group’s sustainability efforts, in particular, their participation in NEA’s “Towards Zero Waste Premises” innovation call. **The redeveloped Pan Pacific Orchard will reduce single-use plastics and strive to be zero-waste when it is ready in 2021.** Other new green initiatives, including the use of smart sensors in its Guestroom Energy Management System to improve energy efficiency and the use of a Food Waste Management System to reduce food waste, will also be introduced.

20 On 31 October, NEA and F&N Foods, supported by NTUC FairPrice, launched the “Recycle N Save” programme, which will place a total of 50 smart Reverse Vending Machines (RVMs) across Singapore by March 2020. **The response has been overwhelmingly positive. Since the launch of the first 10 RVMs, around 1,000 plastic drink bottles and aluminium drink cans have been collected from each machine daily!**

21 I am also heartened by NTUC and BreadTalk’s initiatives to trial a plastic bag charge to reduce excessive use of disposables. I encourage other supermarkets and retailers to follow suit.

22 **The financial sector plays a pivotal role in directing capital flows to sustainable projects, to meet the burgeoning demand for sustainable solutions.** MEWR is working with the Monetary Authority of Singapore (MAS) to support the growth of the sustainable financing industry.

23 The Green Investments Programme recently launched by MAS will place up to US\$2 billion in public market investment strategies with a strong green focus, to foster the growth

of green financing capabilities in Singapore. We will also harness the power of Fintech to spur the development of innovative green finance solutions. I urge financial institutions and businesses to tap these opportunities to power the next era of sustainable growth.

**24 Civil society and businesses have a crucial role to play in educating the public and galvanising collective action.** I am grateful for our 3P partners' strong support throughout our Year Towards Zero Waste.

25 In June, 59 partners supported the launch of NEA's "Say YES to Waste Less" campaign, covering more than 1,600 premises, to reach out to consumers at key touchpoints and encourage them to reduce the use of disposables.

26 I am heartened by the energy and passion of the community. **We set up the 'Towards Zero Waste Grant' this year, and it has supported 270 ground-up initiatives that drive waste reduction and recycling.** Among them was youth interest group Project bECOME's Bread Without Bags initiative, which encourages customers to bring their reusable containers and bags to buy bread. The initiative reached out to more than 20 bakery brands to try out a bring-your-own (BYO) scheme at their stores. Another example is the Swapathon event organised by Swapaholic Pte Ltd, where participants swapped pre-loved clothing and accessories with one another. **Together with our partners, we have engaged more than 670,000 people in Zero Waste initiatives this year.**

27 **This year, we also ramped up our engagement efforts in a new way,** to tap the unique strengths, experiences and ideas of all Singaporeans. In September, we convened our first ever Citizens' Workgroup on #RecycleRight, to find ways to improve household recycling in Singapore. There was strong interest from the public – we received over 300 applications to join the Workgroup. From these, about 50 Singapore residents of diverse ages and backgrounds were selected. Notably, some of the Workgroup members did not recycle actively but still chose to join us. This reflects the growing public commitment to take climate action. Many Workgroup members are here today, and I thank you for your efforts.

28 I am encouraged by the range of ideas you have developed. As shared by SMS Dr Amy Khor last Saturday, we will work with you to take them forward. We will continue on this journey with you, to co-create solutions to environmental challenges, and build a sustainable Singapore together.

## **Conclusion**

29 At the launch of the Year Towards Zero Waste in January, I drew an analogy to redwoods, which stand tall because their roots are intertwined, giving them collective strength. More than ever, Singaporeans are united on the need for climate action. By working together, the seeds we have planted can take root, and future generations can reap a bountiful harvest.

30 Some of our youth leaders are here with us today. You have told us that the future is here and now, and there is no time to lose. We agree. This is why we are working with you to drive change. MEWR has been partnering the National Youth Council (NYC) and youth leaders from various sectors, including NGOs such as Zero Waste SG, Singapore Youth for Climate Action and LepakInSG. Over the past year, we have benefited from your perspectives, passion and energy. **We will continue to partner and empower our youth to build a more environmentally-conscious Singapore.** We have many educators among us today too. I hope that our young people will be inspired by you to contribute to our sustainable future.

31 This event marks the close of the Year Towards Zero Waste. But it does not end here. In fact, it will pave the way for next year's theme. **Carrying on the momentum on climate action across all domains, we will focus on the Singapore Food Story in 2020.** We have an ambitious vision — to produce 30 per cent by 2030 of our nutritional needs in Singapore. We will work with all stakeholders to encourage Singaporeans to grow and eat local. As a start, some of the food served for lunch today is locally sourced. We look forward to hearing your ideas on how we can do this.

32 Let me conclude. Climate change is a multi-generational challenge, with devastating effects that respect no geographical boundaries. In the face of such a threat, we can give in to despair, or use it to transform things fundamentally for the better. Singapore's DNA has always been to resolutely face the challenges – be it combating a potential water crisis, or overcoming a global recession. With long-term planning, robust scientific research and innovation, and importantly, the partnership of all Singaporeans, I am confident we can turn the climate challenge into new opportunities, and ensure the continued happiness and prosperity of our future generations.

33 I invite you to work with us to forge a vibrant, climate-resilient and sustainable future. Thank you.

Mr Marcus Hanna, General Manager of Fairmont Singapore and Swissôtel The Stamford

Distinguished Guests

Ladies and Gentlemen

Good afternoon. It is my pleasure to be here at the official opening of the aquaponics garden at the Fairmont Singapore and Swissôtel the Stamford. This is the first time an aquaponics installation of this scale has been set up by a hotel in Singapore. I congratulate Mr Hanna and his team for bringing this farm to fruition.

### **Singapore's Challenges**

2 As a small island city-state, Singapore faces many developmental challenges. We have little land to cultivate food, no natural resources, and remain one of the most water-stressed countries in the world. And climate change will increasingly put pressure on our essential resources such as water and food. We have been emphasising the need to overcome resource constraints and move Singapore towards zero waste. Going forward, we will also need to look at how we can enhance Singapore's food security. As with fighting climate change and building climate resilience as well as working towards a zero waste nation, everyone can play a part to strengthen our food security.

### **Enhancing our Food Security**

3 Singaporeans are fortunate to be able to enjoy a wide variety and steady supply of food. Take one of our beloved national dishes for example — chicken rice. Our rice is imported from several countries, such as Thailand, Vietnam, India, Myanmar and Cambodia. And chicken is sourced from countries such as Malaysia and Brazil.

4 The variety and number of countries we import from may surprise you. In fact, Singapore imports more than 90 per cent of our food supply. This makes us very vulnerable to the volatilities of the global food market and external conditions. To better secure our food supply, we have embarked on extensive efforts to source food from different geographical areas. Today, we import food from over 180 countries and are still seeking new sources to import from.

5 Diversifying import sources is one of our three main strategies – or what we call our “Three Food Baskets” – to strengthen our food security. Our second strategy is to ‘Grow Local’. This is where we look at self-production to reduce our reliance on imports.

6 As I had mentioned earlier, we do not have large tracts of land for agriculture, but this constraint does not stop us from growing our own food.

Today, farms grow upwards by utilising vertical as well as rooftop farming systems, like this aquaponics installation that you have here. We are increasingly seeing such facilities sprout

up island-wide on the rooftops of shopping malls, in schools, in hospitals, and even in carparks. One example is Citiponics, the first commercial urban rooftop farm located at a HDB multi-storey car park in Ang Mo Kio. Edible Garden City is another urban farm that makes good use of unconventional spaces such as containers and vacant State buildings and technology like LED lights for indoor farming. Such innovative farming approaches are encouraged because they maximise land use, and can introduce greenery into the built environment at the same time. They also contribute towards our strategy to “Grow local” and increase self-production to strengthen our food security.

7 We are nurturing talent, working with partners to build up a vibrant agri-food ecosystem, and encouraging the public to support home-grown produce. We are also supporting the local farming industry in harnessing agri-tech to improve productivity and yield.

8 One of the ways that we are doing this, is through the \$63 million Agriculture Productivity Fund (APF) that was set up to co-fund systems to better control environmental variables and boost production capabilities. Farmers can also tap on the APF to co-fund R&D and test-bedding of technologies. As of 30 September 2019, a total of 107 farms have benefited from the APF. These farms include vegetable, fish, hen egg, shrimp and beansprout farms. They also include commercial rooftop farm ComCrop.

9 The third strategy to strengthen our food security is to grow overseas. By supporting our local companies to expand and grow overseas, whatever they produce can then be exported back home.

10 Our eventual target is to achieve a 30-by-30 vision – to locally produce 30 per cent of Singapore’s needs by 2030. This is an ambitious target considering that we currently produce less than 10 per cent locally. Achieving this vision would require our agri-food industry to transform and adopt new solutions to raise productivity, apply R&D, strengthen climate resilience, and overcome our resource constraints.

### **Aquaponics Garden**

11 The launch of the urban aquaponics garden at Fairmont Singapore and Swissôtel the Stamford directly supports our effort to grow local and aligns closely with our 30-by-30 vision. It is also an excellent platform to engage your hotel guests on sustainable food production.

12 Instead of importing produce from overseas, the hotel chefs can simply pick from the ones grown on your very own rooftop. This helps to cut down carbon emissions and fight climate change because the produce does not need to travel vast distances to get here. Best of all, the produce is much fresher too as you can literally harvest your crops and eat it on the same day.

13 This aquaponics installation is also a good example of circular economy in action. Fish waste provides organic nutrients for plants. So, in short, one fish’s trash is another plant’s treasure! Furthermore, the plant roots help keep the water clean by acting as a natural filter.

## **Conclusion**

14 Let me conclude. Fairmont Singapore and Swissôtel the Stamford was presented with the National Environment Agency's 3R Award for Hotels in 2018 for its commitment to sustainable development. I am glad to see that your eco journey continues with the launch of this aquaponics farm. I hope your efforts will inspire other industry players to join us on this journey towards sustainable development. I encourage other industry players and the community to bring food production closer to the community, and raise awareness and interest to grow locally and support the farming industry.

15 Thank you, and I wish all of you a great day ahead.

Mr Lee Koh Yong  
Executive Chairman of 800 Super Holdings Limited

Mr William Lee Cheng Chye  
CEO of 800 Super Holdings Limited

Distinguished Guests

Ladies and Gentlemen

1. Good morning everyone. I am honoured to officiate the opening of the 800 Super Holdings Limited Tuas integrated energy and resource recovery facility.
2. Let me begin by congratulating 800 Super Holdings Limited on this occasion. The opening of this facility demonstrates the company's commitment towards our national effort to adopt a circular economy approach to waste and resource management.

### **Key Initiatives in the Year Towards Zero Waste**

3. 2019 has been a milestone year for Singapore's journey towards Zero Waste. In August this year, we launched our inaugural Zero Waste Masterplan, which sets out our strategies to build a sustainable, resource-efficient and climate-resilient Singapore. We have set a new target — to reduce the waste sent to Semakau Landfill by 30 per cent by 2030. This is an ambitious target, but if we can achieve this, we will be able to #SaveSemakau and extend its lifespan beyond 2035.
4. The Resource Sustainability Act, which supports the strategies outlined in the Masterplan, was passed by Parliament in September. The Act puts in place a legislative framework to mandate key responsibilities for producers of electrical and electronic waste, food waste and packaging waste, including plastics.
5. We are also harnessing innovation and R&D to bring Singapore closer to our vision of becoming a Zero Waste Nation. Our efforts include the S\$45 million 'Closing the Waste Loop' initiative and the upcoming NEA-PUB Tuas Nexus, which will harness synergies between water, waste and energy to maximise resource efficiency.

6. Through investments in science and technology, we are also transforming incineration bottom ash (IBA) into useful construction material, which we call NEWSand. NEWSand is born out of our drive to create precious resources from waste. Just like how we have closed the water loop with NEWater by recycling water endlessly, we can potentially close the waste loop with NEWSand.
7. Just last week, the National Environment Agency announced the award of a tender to conduct a field trial on the use of IBA. This brings us another step closer to achieving our Zero Waste vision.

### **New Integrated Facility**

8. The opening of 800 Super's new Tuas integrated energy and resource recovery facility is yet another milestone in this Year Towards Zero Waste. By co-locating its biomass combustion plant, sludge incinerator and industrial laundry plant, this facility becomes an integrated energy ecosystem that is self-sustaining and supports multiple business applications.
9. For example, the biomass plant makes use of horticultural waste from the company's landscaping business and garden waste collected under the public waste collection contracts to produce electricity. Every day, up to 120 tonnes of wood and horticultural waste are combusted to generate electricity. The resulting energy is used to power all operations and business activities on this site.
10. Separately, a sludge incinerator treats the sludge from Singapore's water reclamation plants. The treatment process produces steam which is used to wash, iron and sterilise items from the company's laundry business. In fact, the steam produced exceeds the laundry business' requirements, and the excess is channelled to two additional facilities and services – animal feed drying and the third-party ISO tank heating services.
11. In this way, the integrated facility has adopted a sustainable circular business model to create synergy among its operational activities. Nothing goes to waste, as the by-products from one business activity are used to generate green energy for another.
12. I understand that the facility is also moving towards achieving carbon neutrality – this is a commendable effort which will support Singapore's fight against climate change.

13. 800 Super's new Tuas integrated facility is a good example of what can be achieved if we change our mind-set to view waste as a resource, and to design waste and wastefulness out of our economy. I hope that such a business model will become a future norm, and that it will inspire other companies to explore solutions that enable the recovery and recycling of energy and resources which is not just environmentally friendly but makes business sense too.
  
14. As we continue our journey Towards Zero Waste, adopting such a circular economy approach also allows companies to create new and good job opportunities to drive innovation and adopt greater use of technology to raise productivity. In doing so, businesses can close the waste loop to become more sustainable over the long term.

## **Conclusion**

15. Let me conclude. There are many challenges ahead in our journey towards sustainable development, but opportunities abound too, if businesses are willing to transform themselves to become energy- and carbon-efficient. The Government can lead the way with the right policies, but we need the strong partnership of all stakeholders, including our industry partners, to achieve a Sustainable Singapore for future generations. I hope the opening of this facility will inspire even more initiatives to adopt a circular economy approach to waste management.

Thank you.

Good afternoon. I am very pleased to be here at the official opening of NEA's new *Wolbachia* mosquito production facility. This is a milestone for Project *Wolbachia* and for dengue control in Singapore. I am also delighted that the opening coincides with the International Atomic Energy Agency's (IAEA) Regional Training Course on Methods for the Mass-Rearing, Irradiation and Release of Sterile Male *Aedes* Species. A warm welcome to all participants. We are very glad to have you here to share this happy occasion with us.

2 Novel dengue control tools, along with platforms to share expertise about such tools, are urgently needed. The World Health Organization estimates that fifty to one hundred (50 to 100) million new dengue infections occur annually in more than one hundred and twenty-eight (128) endemic countries in tropical and subtropical regions. This translates to 100 to 200 new cases every minute globally. There is also worrying evidence of a geographical expansion of mosquito vectors and viruses to temperate countries where local dengue transmission has not previously been observed. This can be attributed to global warming leading to higher average daily temperatures in many countries.

3 In Singapore, we face many challenges in fighting dengue. Singapore's tropical climate and urban environment is ideal for *Aedes aegypti* mosquito breeding. Our status as a travel and business hub facilitates the introduction and spread of dengue viruses. In addition, we have low population immunity to dengue, due to the relatively low dengue transmission after decades of good vector control. All these together make us vulnerable to dengue outbreaks. Despite increased vigilance from NEA and the public against mosquito breeding sites, we experienced a surge in dengue cases this year. Close to fifteen thousand (15,000) cases and, unfortunately, twenty (20) deaths have been reported so far. This surge in transmission is likely due to increased mosquito populations coinciding with very warm weather this year.

4 Over the next few decades, global warming along with climate change will likely worsen the dengue situation in Singapore and in other countries. This is because mosquitoes breed faster at higher temperatures, and the dengue virus also replicates faster, allowing it to be transmitted more efficiently.

5 In Singapore, we know that if we are serious about confronting climate change and other challenges, dengue control cannot simply be just "business as usual". We cannot just do more of the same. Singapore's National Environment Agency therefore continues to augment our integrated vector control programme by building in new tools and innovations, one of which is Project *Wolbachia*.

6 The first three phases of Project *Wolbachia* demonstrated that male *Wolbachia-Aedes* releases are safe and can be used to reduce the urban *Aedes aegypti* population. In Phase 3, from February to November 2019, we achieved a 90 percent suppression of the *Aedes aegypti* populations in study sites in Tampines and Yishun. But our field trials so far have

only been carried out in small study sites comprising 284 apartment blocks in Tampines and Yishun. Moving forward, this new facility will give us the production capacity we need to expand our coverage to understand its impact on dengue.

7 The boost in production capacity at this new facility will be achieved through the incorporation of automated technologies such as larvae and pupae counters, high throughput larval rearing systems and male-female mosquito sorters. These automations are made possible by our collaborations with Orinno Technology, a local startup, Verily and the IAEA. To date, five patents have already been filed on the intellectual property arising from innovations with Orinno.

8 We have also worked closely with the IAEA to incorporate low-dose X-ray irradiation of size-sorted pupae into our workflow. This step is to render infertile any *Wolbachia-Aedes aegypti* females that may be inadvertently released alongside the males and prevent any buildup of female *Wolbachia-Aedes* mosquitoes. We want to avoid this propagation, because our suppression approach exploits the biological incompatibility between *Wolbachia*-carrying males and non-*Wolbachia*-carrying females, which results in these females laying non-viable eggs. A build-up of female *Wolbachia-Aedes* in the community will hamper the effectiveness of male releases in suppressing field mosquitoes.

9 Moving forward, the facility will continue to serve as an incubator and test bed for new solutions that are now in various stages of development. Therefore, Project *Wolbachia*'s impact goes beyond the realm of public health. The innovative solutions developed and collaborations formed through this important scientific initiative have also advanced research and economic opportunities in Singapore.

10 Another special feature of this facility is that it was designed with the environment in mind, and incorporates an automated water recycling system that treats wastewater from larvae rearing for re-use.

11 This facility was built with one more important function in mind. It provides a space for learning and mutual exchange of ideas, through platforms such as this week's IAEA Regional Training Course. NEA's Environmental Health Institute is honoured to co-organise and host this course.

12 Since NEA embarked on Project *Wolbachia*, we have learnt many valuable lessons about how to test and implement this novel technology. We are happy to share what we have learnt, and are also eager to learn from the experiences of other countries.

13 While Singapore has decided to focus on a sterile insect technique that combines *Wolbachia* and X-ray treatment, there are other plausible approaches, such as the classical sterile insect technique that relies only on radiation. Countries are opting for the technology that is best suited to their local contexts.

14 The various sterile insect technique-based approaches share many common components and challenges. These include ensuring the fitness and quality of the mosquitoes released, developing the capacity to produce large numbers of mosquitoes, and effectively engaging the public. The Regional Training Course is therefore a wonderful opportunity for participants to share expertise and initiate collaborations. This exchange of ideas will accelerate the development of novel technologies to tackle dengue, Zika, and other *Aedes*-borne diseases.

15 Even as we work towards the deployment of *Wolbachia* technology in Singapore, I would like to emphasise that we do not see it as the silver bullet for dengue control. *Wolbachia* is meant to enhance, not replace, our existing vector control strategies, which are focused on source reduction. In the absence of effective vaccines, we need continued community efforts to keep our homes free of mosquitoes, so that we can protect ourselves against dengue, chikungunya, Zika, and other mosquito-borne diseases. Indeed, any breeding of *Aedes* mosquitoes in the community will cancel out the positive impact of *Wolbachia* technology.

16 I hope all course participants will take home valuable ideas on how novel technologies can be integrated into their countries' unique contexts, as well as how these technologies can work in concert with existing vector control programmes. This will go a long way towards enhancing global resilience to dengue.

17 Thank you.

Associate Professor Lim Tit Meng,  
CEO of Science Centre, Singapore

Ladies and Gentlemen,

Good evening.

Thank you for inviting me to be part of your celebrations.  
Let me begin by congratulating all winners of this year's awards.

### **The importance of STEM**

This year's competition theme – STEM (which stands for Science, Technology, Engineering and Mathematics) and Sustainability – is apt. Singapore has always put sustainability at the front and centre of everything we do. Since our nation's independence, we have sought to balance economic development with environmental protection and social inclusion. The environmental challenges we face have grown increasingly complex over the years.

2 STEM therefore enables us to make informed decisions as we implement policies for a sustainable Singapore, and develop solutions to our challenges, be it shortage of land, water or energy. Many of you know that STEM has helped us to close our water loop. We have developed four national water taps of imported water, local catchment, NEWater and desalination.

3 We will soon be conducting a field trial of a new material which is derived from incineration bottom ash, along a stretch of Tanah Merah Coast Road. If successful, we will be able to turn what would have been dumped at our only landfill at Pulau Semakau as trash, into a treasure, as useful construction and road material. Just like NEWater, we have christened this new material, NEWSand.

4 One of our biggest challenges today is climate change. Climate change poses serious threats to all of us, for generations to come. It threatens our access to essential resources such as food, water and energy. As a low-lying island city state, Singapore is especially vulnerable to rising sea levels. We are well aware of the challenges ahead, but we can face the future with confidence knowing that we are taking early, decisive actions that are underpinned by robust science. Let me give an example involving the climate.

5 In 2013, we set up the Centre for Climate Research Singapore (CCRS) to build up knowledge and expertise in climate science. CCRS is one of the few dedicated climate facilities in Asia Pacific focusing on research in tropical weather and climate. CCRS works closely with our neighbours to study how climate change is affecting Southeast Asia and organises programmes to build regional capability in climate science.

6 We also need to better understand how sea level rise affects Singapore. To deepen our understanding of sea levels around Singapore, CCRS has launched a \$10 million National

Sea Level Research Programme (or NSLP) over the next five years. A new Climate Science Research Programme Office will also be set up to lead, formulate and implement the National Science Research Masterplan.

### **Communicating Science Effectively**

7 Ladies and Gentlemen, building a sustainable future is not just the job of policymakers, scientists and engineers. Education in STEM will play an important role in helping our present and future generations to understand climate change and be adequately prepared to adapt to and mitigate its impacts. Both scientists and mainstream media can help by explaining discoveries and findings in a clear, concise and engaging manner. This is where science communication comes in. Publications like the Asian Scientist Magazine play a big role in piquing our interest in science, by highlighting scientific developments from Asia to a global audience.

8 Science is not just work or words, and no play. Many Singaporeans will remember visiting the Science Centre in their childhood days. Since its opening in 1977, the Science Centre has been a go-to place to see science come to life. I remember my children being absolutely enthralled by the egg incubator – everyone remembers this one - where we were able to see chicks hatch from eggs, and riding on the VR simulator machine was always a treat. These activities sparked their interest in science at an early age.

### **The Asian Science Writing Prize 2019**

9 The biennial Asian Scientist Writing Prize has done a good job in highlighting the work of the region's best science communicators and shining a spotlight on the excellent research being done in Asia. Assoc Prof Lim mentioned earlier 450 entries – a record breaking number – were received this year. I understand the entries came from writers as young as 13 years old and as senior as over 80 years of age! Topics discussed in the entries included renewable fuels, plastic pollution, the collapse of ecosystems, and sustainable agriculture.

10 These are all important issues of our time, with no straightforward solutions. However, through science communication, we are able to raise awareness of these issues, and help spur action among the general public.

11 For example, the issue of loss of pollination was highlighted by Ms Aimeirene Yzabel Ines, winner of the first prize in the youth category.

12 Regrettably, I've heard that Ms Ines is unable to join us today, as she is unable to fly to Singapore, due to the typhoon in the Philippines. I would like to take this opportunity, to send my well wishes to Ms Ines, and all who have been affected by Typhoon Kammuri.

13 In her piece, Ms Ines wrote about how she used to be scared of bees, but now fears losing them. Not many people know about the positive impact that bees have on our

environment. They pollinate flowers that bear fruit and vegetables, providing a food source to humans.

14 With warmer temperatures from climate change and the use of commercial fertilisers, bees are dying off. This means that producing countries may no longer have enough to sell for export. With the drop in supply, prices of food will increase.

15 For import-dependent countries like Singapore, this is bad news. We will either have to contend with higher prices, or face a food shortage. Therefore, it is important for Singapore to strengthen our food security – through food source diversification, growing local and growing overseas.

16 In fact, we will need to fully apply STEM to achieve our grow local target of “30-by-30. That is, to grow 30 per cent of our nutritional needs by 2030. This is a significant increase from less than 10 per cent today. To do so, we will need to push the frontiers of STEM to develop high-tech, climate-resilient and resource-efficient farms. How can we grow food with the least water, energy and carbon footprint possible? This includes indoor vertical vegetable farms, close containment floating fish farms, and even alternative proteins, such as the plant-based Impossible Meat.

17 Next year, my ministry will launch a campaign on the Singapore Food Story, to encourage Singaporeans to grow and eat local produce. I encourage publications like the Asian Scientist to continue to raise awareness about food security for Singapore and the region, and the potential for STEM to help to address our pressing food and climate challenges.

## **Conclusion**

18 Let me conclude by once again congratulating all winners of the Asian Scientist Writing Prize Award 2019. Your works have helped to generate awareness of pertinent environmental issues. I hope they will encourage more to take collective action. Only then, can we make meaningful change in our environment and society.

19 Thank you.

SGX Chairman  
Mr Tan Boon Gin,  
CEO, SGX RegCo  
Ladies and Gentlemen

Good morning to all. I am pleased to be here this morning at the launch of “SGX’s Review of Sustainability Reports Produced by Singapore-listed Companies”. This is a timely review, as global environmental challenges grow more pressing, and sustainable practices are more important than ever before.

2 The threat of climate change is growing more salient each day. In the past two months, extreme weather events in Japan, Australia, and Italy have caused extensive damage to human life and property.

### **BUSINESSES FACE NEW RISKS IN THE FACE OF CLIMATE CHANGE**

3 Businesses too are not spared from the challenges and impacts of climate change. The *Wall Street Journal* featured Matteo Wahba, a restaurant owner whose shop was devastated by the floods in Venice. Faced with up to 35,000 Euros worth of damages he cannot afford, Matteo now has to contend with the possibility of closure.

4 As climate change brings disruption to operating environments, we may see more stranded assets. Business models and costs may also be affected by climate-related policy changes. For example, the prices of carbon credits for transport fuel on the US west coast have soared to new highs as states toughen standards.

5 And consumer demands are changing with growing concerns about climate and sustainability issues. Increasingly, consumers, particularly the millennial generation, consider businesses’ sustainability profiles when making consumption decisions. Businesses that do not keep pace with these developments will be left behind.

### **NEW OPPORTUNITIES AMIDST CLIMATE RISKS**

6 But not all is doom and gloom. Climate change also brings new and exciting opportunities for businesses.

7 For one, the trend towards sustainable consumption is an opportunity to be seized. A 2019 research paper from NYU Stern found that 50 per cent of the growth in Consumer Packaged Goods between 2013 and 2018 came from sustainability-marketed products.

8 Solutions to climate challenges are also catalysing the growth and development of new industries. The same policy changes in the US that caused skyrocketing carbon credits prices have also driven investment in clean energy and biofuel. Right on our doorstep, in

ASEAN, there is increasing demand for renewable energy.

9 These opportunities can be found in the finance sector too. According to the Business and Sustainable Development Commission, the shift to sustainable economies in Asia represents some \$5 trillion of investment opportunities between now and 2030. In Singapore alone, over \$6 billion of green bonds have been issued to date.

10 In this new landscape of risks and opportunities, corporations are at a crossroads – those that wish to remain relevant must actively transition towards a more sustainable way of doing business. Allow me to share three ways in which businesses can do so.

## **PROMOTING A SUSTAINABLE ORGANISATIONAL CULTURE**

11 First, businesses can shape a culture of sustainability in their organisations. Many companies in Singapore are stepping up. For example, HSBC has set targets to reduce their carbon emissions, energy, waste, water, and paper; and aims to source 100 per cent of their electricity from renewable sources by 2030. They also have an active staff volunteer community that gives its time and energy to nature conservation initiatives.

12 But promoting a culture of sustainability does not only entail ambitious or large-scale change. Start small. Keep the air-conditioning temperature at 25 degrees Celsius. I don't think we need to add clothes to wear every day. Eliminate or reduce the use of disposable cutlery in the office. Install recycling facilities. Educate employees on sustainability best practices. Every effort, added together, and kept up over time, will have a real and sustained impact.

## **FACTORING SUSTAINABILITY INTO COMPANY DECISIONS**

13 Second, businesses should factor Environmental, Social and Governance (ESG) principles into their decision-making processes. By doing so, businesses will be better prepared for climate risks among others, and be well-positioned to take advantage of the opportunities.

14 Companies should also assess and manage sustainability risks when considering new ventures. DBS Bank recently adopted the 'Equator Principles', a globally recognised framework for financial institutions to determine, assess, and manage environmental and social risk in projects. Adopting established frameworks such as these is one way for businesses to ensure proper risk accounting.

15 Another way that businesses can account for risks is through shadow carbon pricing, to capture the external costs of carbon emissions. Through this, businesses will be able to make more informed cost-benefit analyses when assessing the viability of a certain project, and stay ahead of the curve as the world undergoes its low-carbon transition.

16 Sustainability is an important consideration when deciding what opportunities to pursue. Last month, Temasek Holdings announced their goal to halve the greenhouse gas

emissions of its entire portfolio by 2030. Tiong Seng Holdings recently announced that it has secured a \$70 million green loan to finance construction projects with "clear environmental benefits".

17 These businesses demonstrate that economic growth can go hand in hand with protecting the climate and environment.

## **UPHOLDING TRANSPARENCY AND ACCOUNTABILITY AS CORE VALUES**

18 Finally, to complement their sustainability efforts, businesses should uphold transparency and accountability as a cornerstone.

19 Sustainability reporting is an important piece of the puzzle. Transparent reporting protects against 'greenwashing', or the practice of advertising a company as more environmentally friendly than it really is. This helps investors make better informed decisions when considering where to direct their capital.

20 Where companies are doing well, investors and clients will be able to see this. Where there is room for improvement, companies will be able to identify where they are currently lagging behind, and develop targeted strategies to improve.

21 SGX has played an integral role in catalysing a shift towards increased transparency in sustainability reporting in the private sector. In 2011, SGX introduced a voluntary sustainability reporting regime. In 2016, it expanded this regime, requiring listed issuers to publish annual sustainability reports on a 'comply or explain' basis.

22 I am delighted to report that with the implementation of SGX's mandatory reporting requirements, the number of Singapore-listed issuers communicating their sustainability disclosures has increased substantially. Furthermore, almost all listed companies produced their sustainability reports on a timely basis following the mandating of the requirement. I understand that many of these companies are represented today. Congratulations to all for taking this first important step.

23 I encourage all companies to do more, be it to improve the quality of reports or expand the scope of reporting. For companies not under the SGX regime, this could mean taking the initiative to publish sustainability reports on their own accord.

## **GOVERNMENT SUPPORTING BUSINESSES' SUSTAINABILITY TRANSITION**

24 To support businesses and empower them to become more sustainable, the Government has several policies in place. We have enhanced our industry energy efficiency schemes. We have also introduced a carbon tax, to send an economy-wide price signal on the need to reduce emissions. The government is prepared to spend more than the estimated \$1 billion in carbon tax revenues collected in the first five years of its implementation, not to fund its fiscal expenditures, but to help businesses become more

energy and carbon efficient.

25 On the green financing front, the Monetary Authority of Singapore (MAS) recently announced a green finance action plan. To be a leading centre for green finance in Asia and globally, MAS will drive efforts that build financial resilience to environmental risk, and develop green finance solutions and markets. A major component is the Green Investments Programme, which will invest up to US\$2 billion in public market investment strategies that have a strong green focus. Grant schemes that support the mainstreaming of green and sustainability loans will also be developed.

26 In addition, MAS will support the expansion plans of external reviewers and rating agencies to deepen technical expertise, and anchor Centres of Excellence from leading institutes and universities that can contribute to Asia-focused climate research and training programmes.

27 MAS will also issue Environmental Risk Management guidelines across the banking, insurance, and asset management sectors. These guidelines will set standards on governance, risk management, and disclosure. MAS will also continue to encourage financial institutions to take reference from the recommendations of the Task-force on Climate-related Financial Disclosures (TCFD) in their climate disclosures. This will enhance the quality of decision-useful, forward-looking information on the material financial impact of climate-related risks and opportunities.

## **CONCLUSION**

28 To conclude, the transition to a low-carbon future is a given. Every sector, every stakeholder, has a critical role in securing a sustainable future for Singapore. We must change the way we consume resources and grow our economy, and businesses have a key role to play in this change. Together, we can create a world that serves both present and future generations.

Thank you.

Mdm President,

1. I congratulate you on your election as President of this conference. We wish Chile a quick and peaceful resolution to the unrest. We thank Spain for stepping up to host COP-25. I would also like to express my sincere gratitude for Poland's outstanding stewardship in successfully delivering the Katowice Rulebook. The onus is on us to build on this and achieve a successful outcome for COP-25 so as to maintain the momentum for global climate action. You can count on Singapore's support.

2. We are meeting at a time when multilateralism is under strain. We are witnessing a resurgence of isolationist, protectionist, and even nationalistic sentiments across the world. We all have to work together to counter these forces and strengthen the support for multilateral cooperative frameworks. We must not take our eyes off the long-term, existential challenge of climate change. Our responses to climate change must be anchored in urgent and robust implementation of our goals and initiatives under the UNFCCC framework; and recognise that sustainable development and free trade can be enablers for climate action, particularly, if we harness the power of finance, technology, and innovation.

3. Impacts of climate change are being felt around the world and we can anticipate these to worsen over time if we do not act now. Like many Small Island States, Singapore is vulnerable, especially to the effects of global warming, and especially the rise of sea-levels. For us, climate change is existential. We strongly echo the call by so many, notably our youths, for more action and collaboration. I have four suggestions on how we can strengthen the multilateral system of climate action.

#### Honour and Implement Our Pledges

4. First, we need to honour and faithfully implement our Paris commitments.

5. Under the Paris Agreement, we need to update our 2030 Nationally Determined Contributions (NDCs) and communicate long-term low emission development strategies by 2020. This is what we agreed in Paris and we need to deliver.

6. We are heartened by the outcomes of the Climate Action Summit (CAS), which included pledges by countries to communicate new and updated NDCs, as well as new pledges of support to developing countries. We should consider how the outcomes of the CAS can be folded into the UNFCCC process, while respecting the different mandate and nature of the UNFCCC process. A practical suggestion could be for Parties to incorporate their CAS announcements into their NDC updates and/or long-term low emissions strategies.

7. Singapore will play our part. We will update our NDC and communicate our long-term low emissions strategy soon. We will also work with others to support the efforts of developing countries. For example, we will co-organise with the NDC Partnership, with support from the UNFCCC Secretariat, a workshop on updating NDCs for ASEAN countries in January 2020, which will also include sharing of best practices and support available for the preparation of long-term low emissions strategies by the 2050 Pathways Platform.

#### Complete the Paris Agreement Work Programme

8. Second, we need to complete the Paris Agreement Work Programme. Article 6 is the last remaining piece to complete the rulebook. The effectiveness of the multilateral rules-based system of global climate action that we established in Paris and Katowice rests on us completing this outstanding work. It is imperative that we adopt a credible, clear, and coherent set of rules to govern the effective use of international carbon credits across different forums, including the International Civil Aviation Organisation (ICAO), to deliver higher ambition while ensuring environmental integrity. At the same time, these rules must ensure inclusivity. All Parties, regardless of their NDC forms, should be able to participate in international cooperation under Article 6.

9. We need to move quickly to identify the key decision points needed to reach agreement on the various mechanisms and approaches under 6.2, 6.4, and 6.8 to begin its operationalisation, for Parties and non-Party stakeholders to have sufficient confidence in the architecture, and for private sector to plan and structure investments. For us, the key issue we need to resolve here in Madrid is how to avoid double

counting. Paris Agreement requires a new paradigm around accounting for underlying emission reductions that are transferred internationally, and we should have clarity on how the concept of corresponding adjustments is operationalised.

#### Mobilise National Climate Actions

10. Third, we need effective action at the national level, across all sectors and stakeholders. Countries' headline pledges must be backed by clear, effective domestic policies and plans. The focus must be on how we can generate and use energy sustainably. This includes energy's consequent impact. Which is why Singapore has implemented an economy-wide carbon tax – the first in Southeast Asia to do so – as a key plank of our mitigation strategy. To ensure that this new money does not inadvertently cause even more carbon emissions, revenue will be recycled to support emission reduction projects and help businesses become more resource and energy efficient. As we have limited access to alternative sources of energy, we will leverage long-term planning, innovation, and international cooperation to address climate change. We have also put focus on resource management – to make sure that we apply processes to use as little energy and carbon footprint. For this, we have launched a Zero Waste Masterplan and enacted a Resource Sustainability Act to design waste and wastefulness out of our economy in an increasingly resource- and carbon-constrained world. Our efforts to promote a circular economy, where materials are retained and reused in the value chain for as long as possible, will help to reduce our carbon footprint and complement our efforts to address climate change.

11. We thank the Chilean Presidency for giving focus to four key sectors: energy, transport, agriculture, and finance. Singapore is taking active steps to drive action, innovation, and international cooperation in these sectors.

12. Through our early actions, 95 per cent of our electricity is currently generated from natural gas. Moving forward, we hope to accelerate our energy transformation by harnessing solar, regional power grids, and emerging low-carbon alternatives. Together with more efficient use of energy, this will allow us to secure more sustainable, affordable, and reliable energy supplies.

13. Singapore is already amongst the 20 best-performing countries in terms of carbon intensity, based on 2018 data from the International Energy Agency (IEA), but we will continue to improve our industry energy efficiency, by one to two per cent annually. We have rolled out initiatives under the Enhanced Industry Energy Efficiency Package to give stronger support to companies in their drive to become more energy efficient and reduce emissions.

14. The deployment of renewables will be ramped up, particularly solar. Notwithstanding our small size and dense urban landscape, solar installations have increased a hundred-fold from 30 to over 3000 in Singapore over the last decade. We will continue to push the envelope, through innovative approaches such as floating solar PVs to overcome our land constraint. We aim to increase our 2020 solar target by more than five times to at least 2GWp by 2030.

15. We hope to realise the possibility of regional power grids to leverage on the immense potential for renewables in the region, and provide greater resilience and stability for the entire system. We have also commissioned studies to evaluate the feasibility of other low-carbon alternatives, such as hydrogen and carbon capture, utilisation and storage (CCUS) technologies, and will work with industry, the research community and other countries to explore pilots, domestically and internationally.

16. Singapore will move further on greening our transport. On land transport, by 2040, 9 out of every 10 peak period journeys will be made via “walk, cycle and ride” transport modes; “ride” referring to public rail and bus, and shared transport. We also aim to have 100 per cent cleaner energy public bus fleets (EV or hybrid) by 2040. We are developing the infrastructure for the extensive use of electric buses and taxis, as well as electric cars. Sustainable, green land transport infrastructure, ports and airports are also being designed and built, incorporating new energy efficient and carbon mitigation features and technologies, such as solar photovoltaics. Singapore will also continue to actively support the efforts led by the ICAO and IMO (International Maritime Organisation) in addressing the emissions of the international aviation and maritime transport sectors on a global basis.

17. On agriculture, Singapore currently imports over 90 per cent of our food. Like water, disruptions to our food supply is an existential threat for Singapore; but, we will seize this opportunity to transform our local food industry. To enhance our food security and resilience, we aim to produce 30 per cent of our nutritional needs by 2030. We will adopt new solutions to raise productivity, apply R&D, strengthen climate resilience, and overcome our resource constraints. We have partnered United Nations Development Programme (UNDP) to launch a global sustainable agriculture challenge that seeks to ideate, design, and scale-up solutions that address sustainable agriculture challenges at a global scale.

18. As a global financial hub, we are making strides to leverage green growth opportunities. To date, over US\$4.4 billion of green bonds have been issued here. The Monetary Authority of Singapore introduced the Green Bond Grant Scheme in 2017 to spur the use of capital markets instruments for green financing. This has since been expanded and renamed the Sustainable Bond Grant Scheme. Last month, we unveiled a new US\$2 billion Green Investments Programme, which will support public market investment strategies that have a strong green focus. There have also been positive developments in sustainability reporting. With the implementation of SGX's mandatory sustainability reporting requirements, the number of Singapore-listed issuers communicating their sustainability disclosures has greatly increased; by about 3.8 times. 495 listed issuers have published their sustainability reports as at 31 December 2018, complying with the reporting deadline SGX stipulated. About 80% of the 495 listed issuers are first-time reporters.

#### Strengthening Solidarity through Partnerships

19. Fourth, we need to strengthen our solidarity in the fight against climate change. Even as we mitigate rising emissions, we must also be prepared for the worst. We therefore support a strong outcome on the review of the Warsaw International Mechanism to better support our efforts to minimise, avert, and address loss and damage from the adverse effects of climate change, which is a key issue of concern for many Small Island Developing States (SIDS) and the Least Developed Countries (LDCs). Singapore is doing our part through the Southeast Asia Disaster Risk Insurance Facility to enhance pre-disaster planning and post-disaster relief and reconstruction funding. We are also supporting efforts to improve the region's meteorological capabilities through the ASEAN Specialised Meteorological Centre, which runs a five-year capability development programme for the region.

20. But we should each take steps to be more climate resilient. Singapore is incorporating nature-based solutions into our adaptation plans. To boost our natural defences against sea-level rise, we take both hard and soft engineering approaches to mitigate coastal erosion, such as restoring our mangrove areas. Beyond coastal protection, we have planted in tiny Singapore over 2 million trees, and built more than 350 parks and four nature reserves, including our UNESCO-listed Botanic Gardens right in the heart of the city. These efforts will not only support our biodiversity, but further drive climate mitigation and strengthen our resilience.

21. We also need to prepare our society for a low-carbon future. The Singapore Government will put in place the appropriate incentives and facilitate capacity development, to ease the transition and allow our economy and workforce to adapt to the new circumstances. Climate change is both a threat and an opportunity. The challenge is to find new opportunities for growth and jobs, particularly for displaced workers, so that workers can continue to have a stake in the transition to the greener and low-carbon future.

22. To succeed in our efforts to address climate change, we need to work hand-in-hand with all stakeholders to co-create and co-deliver solutions to solve our environmental challenges. Youths, businesses and civil society will be an important part of this effort. We are encouraged by the leadership shown by the private sector in championing environmental, social, and corporate governance principles. We are committed to work with our stakeholders to deliver a better and more sustainable future.

Mdm President

23. We are in an increasingly polarised and uncertain world; we all need to do our part to meet these challenges and strengthen the multilateral framework under the Paris Agreement. Singapore stands ready to support the Presidency to deliver a strong outcome in Madrid.

Thank you.



Mr Tan Meng Dui, CEO of the National Environment Agency

Distinguished guests,

Ladies and gentlemen,

1. It gives me great pleasure to be here today to commemorate Semakau Landfill's 20th Anniversary.
2. Semakau Landfill is Singapore's first – and only – offshore landfill. In fact, it is the first of its kind in the world! Developed in response to growing waste volumes amidst land constraints, Semakau Landfill was a uniquely bold and innovative approach, which has enabled us to achieve land use optimisation, efficient waste management and biodiversity conservation, all at the same time. You can say it is a “three-in-one”! It is a testament to Singapore's engineering capability. It also demonstrates Singapore's adaptability and ingenuity in coming up with novel solutions to meet our developmental needs in a sustainable manner.

### **History of Semakau Landfill**

3. Let me share how Semakau Landfill came about. The name Semakau comes from the word *bakau*, which means “mangrove trees” in Malay. The development of Pulau Semakau into a refuse landfill was first outlined in Parliament in 1989. The ash from our incinerated waste, as well as a small amount of non-incinerable waste, were previously disposed of at two landfills located at Lim Chu Kang and Lorong Halus. As no other suitable landfill sites could be found on the main island, a decision was made to create a landfill by enclosing the waters between the eastern part of Pulau Semakau and the western part of Pulau Sakeng, thereby merging the two islands to form the new landfill.

4. Semakau Landfill was constructed in two phases. The construction for Phase I began in 1995 and was completed in 1999 with a landfill capacity of 13.6 million cubic metres. Phase II, completed four years ago in July 2015, provides an additional 14.5 million cubic metres of landfill capacity, which is equivalent to nearly 5,800 Olympic-sized swimming pools, bringing the total capacity to about 11,240 Olympic-sized swimming pools.

### **Pioneers Behind Development and Successes of SL**

5. Today's achievements would not have been possible without our capable team of pioneer engineers who drove the development of Semakau Landfill with dedication and determination. I am happy to see some of them here with us today, including Mr Koh Hee Song and Mr Ong Seng Eng. Mr Koh was the Head of then Engineering Services Department and was instrumental in the successful planning, design and construction of Phase I. Mr Ong Seng Eng, was the former Director of the Waste & Resource Management Department and had overseen the planning and development of Phase II. Both of them have played key roles in shaping the Semakau Landfill that we all see today. Thank you for your contributions, and the legacy that you have left behind.

6. Our pioneer engineers faced a multitude of challenges before the landfill operations even began. Deep-sea piling and open sea construction required the use of large floating cranes for installation of the roof structures. All construction had to be executed in a safe and efficient manner. Adding to the challenges, care had to be taken to preserve the island's thriving biodiversity, which risked being destroyed by the construction of Semakau Landfill.

7. In line with Singapore's focus on maintaining a clean and green environment, a strict process was put in place to ensure that incineration ash is landfilled properly, and any displaced seawater is treated before being discharged into the sea.

8. The far-sighted and meticulous efforts of our Semakau pioneers have paid off. Today, the marine ecosystem on and around Semakau Landfill is teeming with marine life such as sea anemone and barracuda. Varieties of birds, such as the endangered great-billed heron, have made Semakau Landfill their home. Mangrove saplings planted on the northern tip have grown into forests and act as bio-indicators. Semakau Landfill is truly a symbol of sustainability and an attraction by itself. It serves an educational role in raising public awareness on waste management, biodiversity conservation and sustainable development.

9. In fact, various projects and businesses are located on and around Semakau Landfill today. A micro-grid was installed on Semakau Landfill in 2016, which converts sunlight and wind into electricity. And part of the sea space nearby is being used as a fish farm to rear barramundi.

### **H.J. Sabbagh Award for Excellence in Engineering Construction**

10. Just last month, NEA was awarded the 2019 Hassib J. Sabbagh Award for Engineering Construction Excellence by the World Federation of Engineering Organisations, for its outstanding engineering feat in the development of Semakau Landfill. This prestigious international award affirms NEA's efforts to leverage technology to manage our country's waste effectively and sustainably.

### **Looking to the Future of SL**

11. Even as we celebrate our achievements, we must plan for the future. Today, we send more than 1,400 tonnes of incineration ash, and slightly more than 600 tonnes of non-incinerable waste, to our landfill each day. If we do not reduce the amount of waste we throw away, our only landfill will be full in 2035 — in just 16 years. That is not too far away. This highlights the urgent need to Save Semakau and find ways to extend its lifespan beyond 2035.

12. To this end, my Ministry has set an ambitious waste reduction target — to reduce the amount of waste sent to Semakau Landfill by 30 per cent, by 2030. A suite of initiatives was announced under Singapore's inaugural Zero Waste Masterplan to achieve this target. These include a new Resource Sustainability Act — a legislative framework which targets the management of three key waste streams, namely e-waste, food waste and packaging waste, including plastics. We are also converting residue from waste incineration into useful construction material, which we call "NEWSand". This will help close our waste loop, reduce the waste residues landfilled and further extend the lifespan of Semakau Landfill. We will need to continue to leverage on technology and adopt the same dogged determination, boldness and innovative mindset to save Semakau and in the process also fight climate change!

13. However, the Government's efforts alone will not be enough. Extending the lifespan of our only landfill requires a whole-of-nation effort involving the Government, industry, community, households and individuals. I am very heartened to see representatives from various community groups, nature groups, ground-up initiatives, as well as members from MEWR's #RecycleRight Citizens' Workgroup present here. Today is not just a celebration of Semakau Landfill's past and present, but also an opportunity for us to celebrate our nation-wide zero waste efforts as we look to the future.

### **Conclusion**

14. Semakau Landfill is a shining example of how waste management can be done in an environmentally sustainable way. Drawing on the inspiration of Semakau Landfill, I strongly encourage everyone to continue our 3R efforts to reduce waste generation and disposal. It is only by working together that we can save our only landfill.

15. Thank you and I wish you a pleasant afternoon ahead.

Mr VR Alagappan, President of Sri Ruthra Kaliyamman Temple  
Patron Mr Shriniwas Rai, Trustees  
Mr Anbarasu Rajendran, CEO of SINDA  
Award Recipients  
Ladies and Gentlemen

1 It is my pleasure to join you to present the Sri Ruthra Kaliyamman Temple annual scholarship and bursary awards this year.

2 This is the 24<sup>th</sup> year of the awards, and I understand that the Temple disburses about \$75,000 in scholarship and bursary awards every year to students in need, regardless of race or religion. This embodies our spirit of national solidarity, and is aligned with the Commitment to Safeguard Religious Harmony, which the Temple affirmed last year. I commend the Temple for upholding our treasured values, and for reaching out to families from other faiths.

#### **Community Support to Help Our Students Excel**

3 I am also heartened that many organisations and individuals have contributed to the Temple's Scholarship and Bursary Fund over the years. The fund was started in 1996 by the late Mr S Rasiah, a former vice-president of the Temple. To this day, his family continues to make contributions to the fund. In 2015, another temple devotee Mdm Alamelu Arunachalam contributed about \$500,000 to the fund in honour of her late parents Mr Arunachalam Chettiar and Mdm Mangayakarasi Achi.

4 Besides financial assistance, the Temple also partners organisations like SINDA and the Hindu Endowment Board to conduct regular supplementary classes for students to help them in their studies. Through these classes, students bond with volunteers from various backgrounds who make the time to mentor and help them to achieve their potential.

#### **The Importance of Paying It Forward**

5 Such community support is invaluable in helping our students achieve their hopes and dreams, and many of them pay it forward by helping others. One of them is 24-year-old Mr Ginesh S/O Kasi. Ginesh received the scholarship in 2014 and 2015, and it helped to support his pursuit of a diploma in electrical engineering at Nanyang Polytechnic. Ginesh is now serving in the Republic of Singapore Navy as a platform technician and intends to study accountancy in the future.

6 Ginesh has gone on to help others in his community. He has been an active volunteer with the Temple for the past 12 years. In addition to regularly helping with the major temple activities, he mentors the children who attend religious classes in the temple. I encourage all the student recipients today to similarly do your best, pursue your aspirations, and help to lift others in our society.

#### **Conclusion**

7 Let me conclude. For more than two decades, the Sri Ruthra Kaliyamman Temple has worked with donors, volunteers and partners to organise this annual award, which has benefitted thousands of students. This shows the good that a community can achieve when it comes together. My warmest congratulations to the 206 students from primary to tertiary levels who will receive scholarships and bursaries today. May it help you to go further and do better.

8 I wish you all a Happy New Year. Thank you.

Mr Tan Cheng Guan,  
President of the Singapore Water Association

Distinguished Guests

Ladies and Gentlemen

Good evening. It is my pleasure to be here today to commemorate the Singapore Water Association's (or SWA's) 15<sup>th</sup> Anniversary.

2 Since its inception in 2004, the SWA has been bringing together local water companies, facilitating collaboration, and fostering the exchange of ideas and knowledge amongst member companies. The SWA has also worked to effectively profile and promote Singapore as a pivotal regional hub for all water-related services and water technologies. Today, the SWA has over 260 members, which is almost a ten-fold increase from its initial membership of 27. This bears testimony to its efforts over the years, and the impact that it has made in bringing together and developing Singapore's water industry.

3 This is an exciting year for our water industry, with the upcoming Singapore International Water Week taking place on 5-9 July at the Marina Bay Sands. SWA is co-organising the Singapore Business Forum and Singapore Pavilion, which provides a useful platform for our industry to forge partnerships with foreign stakeholders. I thank SWA for its active support of the Singapore International Water Week.

### **Journey towards Sustainable Development**

4 SWA's growth in many ways is synonymous with Singapore's journey of sustainable development. To a small low-lying city state like Singapore, sustainable development is a necessary means to survival.

Since our independence, Singapore has always sought to balance economic growth with environmental protection and social inclusion. This unwavering principle has enabled our people to live in a clean and green environment, and have access to essential resources.

### **Our Singapore Water Story**

5 One of the best examples that demonstrates Singapore's commitment to sustainable development is our Water Story. Over the years, we have taken

decisive steps to ensure a safe and secure supply of water through the “Four National Taps”, and maximise resource efficiency and recovery.

6 We have embarked on an integrated, effective and cost-efficient way to meet our water needs with investments in research and technology to treat, recycle and supply water. In addition to developing solutions like NEWater, we have also integrated our used water into our water system in a closed loop, which enables us to reuse every drop of water by recycling it endlessly. As one of the most water-stressed countries in the world, our Singapore Water Story is an achievement that we can be proud of. We are taking the ideas of the circular economy and closed loop further with the development of Tuas Nexus. When completed, it will be the world's first facility to co-digest wastewater sludge and food waste into biogas which, in turn, will help power the co-located waste-to-energy and water reclamation plants.

### **Growing Water Demand and the Threat of Climate Change**

7 However, there continues to be challenges ahead. Singapore’s water demand is currently at about 430 million gallons a day - enough to fill 782 Olympic-sized swimming pools. By 2060, our total water demand could almost double, with the non-domestic sector accounting for about 70 per cent. As our water demand increases in tandem with economic growth, we must continue to invest in research and technology, and develop innovative solutions.

8 This is important because climate change will increasingly threaten our access to essential resources, including water. Today, we are already facing some of the effects of climate change, such as more intense rainfall and prolonged dry spells. Climate change will no doubt place greater stress on our water system, and it is critical that we continue to put sustainability at the centre of what we do.

9 I encourage SWA and its member companies to rise to this challenge, and continue to catalyse collaborations in capacity building, innovation and internationalisation, to address our water challenges in the face of climate change. In so doing we also create good job opportunities for Singaporeans.

### **Conclusion**

10 Let me conclude. Ensuring a safe and secure water supply for Singaporeans and our future generations is a national effort, and one that requires all

stakeholders to work together. Despite being a small island with limited water resources, Singapore is internationally recognised as a model city for integrated water management and an emerging global hydrohub - a leading centre for business opportunities and expertise in water technologies.

11 We have also won accolades for our innovative projects and solutions. Under the Global Water Awards by Global Water Intelligence, Tuas Desalination Plant was awarded 'Best Desalination Plant of the Year' last year. In 2018, the Ulu Pandan Wastewater Treatment Pilot was recognised as 'Water/Wastewater Project of the Year'. These achievements would not be possible without your support.

12 Let us continue to work together to grow the industry, and ensure that Singapore remains a thriving, liveable and climate-resilient city for our future generations.

13 Thank you, and I wish all of you an enjoyable evening.

Mr Ong Ye Kung, Minister for Education

Guests

Ladies and Gentlemen

1. Good morning everyone. I am happy to see many familiar faces here today. This is a gathering of a community which shares a common cause -- to nurture and sustain Singapore's much loved hawker trade and culture, and support more Singaporeans who wish to pursue a career as a hawker.

*Encouraging New Entrants to Join the Hawker Trade*

2. As mentioned by Minister Ong, our hawker culture is a defining aspect of the Singaporean way of life. And our people are at the heart of our hawker culture. We are proud of how Singaporeans of all races and religions, and from all walks of life, regularly gather at hawker centres or community dining rooms to bond over good food. This is why we are aspiring to inscribe our hawker culture on the UNESCO intangible cultural heritage list. Hawkers are key custodians of Singapore's hawker culture. And we celebrate every accolade received by our hawkers. Their passion and hard work have built a treasured legacy of local flavours, and we want to continue to build on this with new generations of hawkers. But with the median age of our hawkers at 60 years old, it is important to grow the pool of hawkers to sustain the trade.

3. This is why the National Environment Agency (or NEA) has been working closely with the hawker community, to nurture and support young Singaporeans who wish to join the trade. Since 2017, my Ministry and NEA have rolled out several initiatives recommended by the Hawker Centre 3.0 committee to sustain the hawker trade. These include providing affordable training programmes to support aspiring hawkers. Let me share some examples.

4. One of the critical factors for success of a hawker is how good your food is. If your food is good, Singaporeans will travel from across the island for it. For aspiring hawkers, it can be struggle to get your dish from good to great. This is where advice from veteran hawkers can be invaluable. So NEA and the People's Association's Hawker Fare Series has been bringing in veteran hawkers to share their recipes and nifty cooking tips with aspiring hawkers. We have been very fortunate to get veteran hawkers like Mdm Hajjah Roziah, who has her own stall at Bedok Food Centre. She has taught participants her technique for making curry and flipping Roti Prata, just like how she learnt from observing another stallholder do it many years ago. Many other veteran hawkers have generously shared their secrets in the Series, and a total of 308 participants have benefitted from the Hawker Fare Series since 2017.

5. Another step to being a successful hawker, is to run your business well. So NEA and the Institute of Technical Education (or ITE) developed the "Introduction to Managing a Hawker Business" course to help new hawkers. A total of 329 have benefitted.

6. New hawkers also need time to learn the ropes and build up their clientele. And perhaps there are some who would like to try their hand at the trade, but are deterred by the upfront costs. To address these concerns and needs, the NEA launched the Incubation Stall Programme, or ISP, in February 2018. The Programme provides eligible new hawkers with pre-fitted stalls located at existing hawker centres to run their business. They also benefit from subsidised rentals for a period of 15 months. We have received over 70 applications for the incubation stalls to date, and allocated 25. I am delighted to share that two of the stallholders have since become full-fledged hawkers. They are Mr Kwan Yee Liang, who is selling handmade noodles at Block 163 Bukit Merah Central, and Ms Michelle Yee who is selling Hakka Thunder Tea Rice and Yong Tau Foo at Chinatown Complex. Both offer delicious food – do visit them and try their dishes!

*Hawkers' Development Programme*

7. As part of our ongoing efforts to engage industry in co-creating solutions with us, we set up a Workgroup on Sustaining the Hawker Trade in 2019 comprising stakeholders with diverse experiences such as hawkers and food advocates. Collectively, they emphasised the importance of tapping on experienced hawkers to share recipes and culinary practices, as well as to provide mentorship. Building on the

Workgroup's recommendation, NEA and SkillsFuture Singapore (SSG) worked together to launch the Hawkers' Development Programme, or HDP.

8. The HDP will complement our existing efforts to support aspiring hawkers to enter the hawker trade. The HDP is also open to existing hawkers. This could, for instance, help our existing hawkers to upskill and upgrade their business, by leveraging social media platforms or utilising food delivery mobile apps to reach out to more customers. Based on feedback from the workgroup and our experience running the current programmes, we have included a two-month apprenticeship as well as three-month mentorship programme with experienced hawkers to better enable the aspiring hawkers to successfully become permanent hawkers.

9. Although today is the official launch of the HDP, 26 aspiring hawkers have already completed an abridged version of the programme, as part of MediaCorp's upcoming reality TV show, "Hawker Academy". I was glad to hear that the participants found the modules on the basics of food safety and hygiene, as well as business marketing, to be relevant and useful. They have also gained confidence to embark on their journey as budding hawkerpreneurs. Do look out for this programme on Channel 8 to follow the journey of these budding hawkers!

10. To create greater awareness of the HDP, the Federation of Merchants Associations of Singapore (or FMAS) will be signing a Memorandum of Understanding (MOU) with the Nanyang Polytechnic-Asian Culinary Institute (NYP-ACI) today. Under the MOU, FMAS will promote the programme to aspiring and existing hawkers, and encourage them to participate in it.

#### Conclusion

11. Let me conclude. Singapore's hawker culture belongs to all of us. I am grateful to the hawker community, which has built our distinctive food heritage through generations of hard work, and I am heartened that many continue to go the extra mile to safeguard the hawker trade. To recognise their efforts, last September, we celebrated experienced hawkers who have made significant contributions to the trade at the inaugural Hawkers' Seminar organised by FMAS.

12. The HDP is one of many good examples of how we can all work together to sustain our hawker culture which as Minister Ong has said is well and alive. We will continue to partner the community to ensure that our existing and new hawkers are well-supported.

13. With the Lunar New Year just around the corner, let me wish all of you a very happy and prosperous Year of the Rat! 祝大家鼠年行大运!

Your Excellencies,

Ladies and Gentlemen,

1. Good morning and thank you for being here.
2. As seen in the [video](#) earlier, we need to act early and decisively to tackle climate change. The tag line “Let’s Game Change Climate Change” builds on my Ministry’s campaigns over the past two years. In 2018, we launched the Year of Climate Action, and more than 340,000 people and organisations have pledged to take climate action. In 2019, we had a successful Year Towards Zero Waste, where we launched our inaugural Zero Waste Masterplan and the landmark Resource Sustainability Act was enacted. We will continue this momentum and work closely with our partners to game change climate change.

### **The Next Chapter - 2020: Singapore Food Story**

3. This morning, we launch 2020: Singapore Food Story. We will focus our efforts on enhancing Singapore’s food security.
4. The allotment gardens you see around us reflects our community’s growing interest in gardening and planting edibles. Nearly 80 per cent of the gardening groups in HDB estates under NParks’ Community-in-Bloom programme grow edibles, such as fruits and vegetables.
5. Before we started urbanising in the 60s and 70s, we were self-sufficient in many types of food such as hen eggs, poultry meat and pork. But farming then was pollutive, backbreaking and low in productivity. Over the decades, farming in Singapore has declined significantly, until today, where we import over 90 per cent of our food and less than 1 per cent of our land is used for agriculture.
6. Such heavy reliance on food imports makes us vulnerable to short term disruptions arising from supply shortages, crop failures or animal diseases. We have proven resilient to such disruptions, largely thanks to the astute planning of then-AVA, and the logistics and connectivity of our transport network. That is why, when some Singaporeans started buying up food last Friday, and photos of empty supermarket shelves were circulated, we were able to say with full confidence that there is enough food for everyone. There is no risk of us running short of essential food and household items.
7. But climate change will seriously challenge our food supply strategy. All around the world, we see erratic weather, changes in crop growth patterns, water shortages, and other natural and human-related disasters, sometimes all happening close to and one after another. Population growth will further increase the stress on demand for food, at the same time when crop yields are projected to decline.

### **Food Security cannot be taken for granted**

8. This is why Singapore cannot take food security for granted, nor can we rely on the same old game plan. While the Global Food Security Index assessed Singapore as one of the most food secure countries in the world, climate change requires us to act early; climate change requires us to game change food security.

9. We have made some early moves. Last April, the Singapore Food Agency, or SFA, was established under my Ministry, putting all food issues – from farm to fork under one agency. Our mission is to ensure a safe and secure supply of food for Singapore. It goes without saying that SFA will work closely with other agencies, the industry and the community to fulfill this broader mission.

10. Second, for better food security, we will move from standing on one leg of relying only on diversifying our food supply, to focusing on managing our food supply in three baskets; that is, we will: (i) diversify our food sources; (ii) support our companies to grow overseas; and (iii) grow local under our “30 by 30” vision. These three baskets are like the three legs of a tripod that will give stable support to our 2020 Singapore Food Story.

11. Our “30 by 30” vision is to grow enough food in Singapore to meet 30 per cent of our nutritional needs by 2030. This is by far the most ambitious leg to build. It is a big challenge, as we are aiming to meet these needs using less than 1 per cent of our land area in Singapore. However, this is also the most critical piece, much like enabling NEWater was a critical step in our pursuit of a resilient supply of water. If successful, the “30 by 30” vision also means that we will own technologies and unique processes that will become the value-add our companies can bring to growing food overseas, which is the second leg of our food security. This will require a whole-of-nation effort.

### **Game Change Food Security through the 3 Resiliences**

12. To enhance Singapore’s food security, we will be guided by three Resiliences — Climate, Resource and Economic. Let me elaborate.

13. First, our food production must be resilient against changes in climate, weather and environment. Over the past five years, we have committed \$38 million from the Agriculture Productivity Fund, or APF, to support over 100 farms to raise productivity and be climate-resilient. The APF has supported vegetable farmers to adopt automated and climate control functions. Productivity levels have more than doubled on average to about 200 tonnes per hectare per year.

14. A recipient of the APF is Aquaculture Centre of Excellence Pte Ltd, or ACE. ACE has developed one of the world’s first purpose-built closed containment floating farm, which will reduce the fish’s vulnerability to external sea water conditions, while ensuring that used water is treated before being returned to the sea.

15. Second, to be resource-resilient, our farms must ensure high food yields on limited land, in a resource-efficient and sustainable manner. Advances such as in LED technology have significantly improved the energy-efficiency of indoor vegetable farms.

Many of our farms are developing high-rise production. Apollo, which grows fish entirely on land, is building a new eight-tier fish farm in Lim Chu Kang.

16. During our Year Towards Zero Waste, I called on companies to adopt circular economy approaches and turn our trash into treasure. Similarly, we should transform food waste and farms by-products into resources for other farms and companies. There are ongoing efforts to valorise food waste, such as using black soldier fly larvae to process food waste into animal feed and fertiliser; and converting tofu dregs into okara for use as animal feed and natural fertilisers for our farms.

17. Third, to be economically-resilient, we must capture value throughout the food supply chain. One of our local egg farms, N&N, has made good progress in achieving this. With the support of the APF, N&N developed automated systems to produce high quality eggs and invested in egg pasteurisation to provide assurance that its eggs are free of bacteria, even if half-cooked. N&N also produces egg products like Japanese onsen eggs, which are sold to supermarkets like Don Don Donki, and ready-to-eat eggs to 7-11 stores.

18. To achieve our three resiliences and enhance our food security, our farms must leverage on science, technology, and innovation. Food production is a promising area where our local researchers and start-ups can push the boundaries which, in turn, can provide new opportunities and good jobs for Singaporeans.

19. Last year, we announced that the National Research Foundation had committed \$144 million to fund agri-food research under the Singapore Food Story R&D Programme. We have since announced the first grant call for proposals for the research themes of ‘Sustainable Urban Food Production’ and ‘Future Foods: Alternative Proteins’. I hope Singapore can play a significant role in agri-food innovation, and help address our national and global challenges in food security.

20. It is only when we lead in new food growing paradigms amidst a challenging environment like climate change, that our companies can also develop partnerships with other countries from a position of strength. These extend to trade links in the areas of food supply chain, safety and technology. SFA and other agencies will invite investments to meet our “30 by 30” vision. We will also learn and exchange ideas with other countries.

21. I will share more plans about how we will achieve “30 by 30” next month at the Committee of Supply.

### **Need for Collective Effort**

22. Now, let me turn to one critical success factor to make this three-food basket strategy work. It is what consumers can do to contribute to Singapore’s food security.

23. The answer is indeed a simple one — **support our local produce**. Local produce is grown close and at home: it is therefore safer, fresher and lasts longer. There is less

spoilage and food waste, as the produce does not need to travel for long periods of time before reaching the consumer. If you are a game changer for climate change, you will know this means a lower carbon footprint to bring food to your tables. Some farms are literally at your doorstep, such as the Citiponics rooftop vegetable farm at an Ang Mo Kio HDB multi-storey carpark.

### **Launch of New Local Produce Label**

24. We want to make it easier for everyone to identify local produce.

25. Over the past year, SFA has consulted industry partners to design a good label to help people identify local produce. The label we are launching today is the result of consultation with farmers, retailers, industry associations and Singaporeans. Over 2,200 people participated in an on-line exercise, and almost 70 per cent expressed a preference for this design. The new label will be rolled out on local produce in August. Please look out for it, and support local produce when you shop. As we nourish our loved ones, we also help to strengthen Singapore's future.



26. SFA will continue to collaborate with retailers like NTUC FairPrice, Cold Storage and Prime Supermarket to organise joint promotions and display in-store branding collaterals with key messages to promote awareness of local produce.

27. To make local produce even more accessible, the Singapore Agro-Food Enterprises Federation (SAFEF), together with Lazada Redmart, has launched an e-SG Farmers' Market page with 17 farmers on-board the platform so far. This has increased the distribution channels of farmers and expanded the reach of Singapore's produce to more consumers through the e-commerce platform.

28. Our Singapore Food Story is a collective effort. Everyone has a role to play.

29. When you arrived at the event today, you would have seen seed packets being offered at the registration table. This is part of Ricoh Asia Pacific's community seed distribution initiative to work with partners like the Community Development Councils and schools to raise awareness of our "30 by 30" vision. We hope Ricoh's efforts will inspire other corporations to step forward.

30. Besides support from corporations, we also want to hear the voices of Singaporeans and co-create solutions together. SFA will form a Citizens' Workgroup to look into ways to increase demand for local produce. We will share more details at the upcoming Committee of Supply.

### **Conclusion**

31. To conclude, food security is an existential challenge for Singapore. But it also offers many exciting opportunities for Singapore and we can create many good and green jobs for Singaporeans.

32. Just like what we have done for water, we can overcome our food challenge by planning and investing for the long term, and working together as a nation. Just like water, the technology we use for food security will also enable our companies to grow overseas with our unique value proposition.

33. Let me end by showing a video we have produced for today's event. I invite all of you and all Singaporeans to partner us to write the Singapore Food Story in 2020 and beyond. Together, let us game change food security.

Distinguished guests,

Ladies and gentlemen,

Good afternoon.

1. It is a pleasure for me to be here to officially open the new Smart Floating Fish Farm by Singapore Aquaculture Technologies (or SAT).

### **2020: Singapore Food Story**

2. Last week, my Ministry launched our 2020: Singapore Food Story campaign. This year-long campaign seeks to raise public awareness on the importance of food security to Singapore, why it cannot be taken for granted, and what all of us can do to strengthen the resilience of our food supply.

3. Singapore imports more than 90 per cent of our food, which leaves us vulnerable to external factors such as supply shortages, crop failures or animal diseases. These challenges are likely to be exacerbated with climate change. Hence, it is imperative that we embark on measures to safeguard our long-term food security.

4. To do this, we will be strengthening our three food baskets by: (i) further diversifying our food sources; (ii) supporting our companies to grow overseas; and (iii) increasing local agri-food production to meet 30 per cent of our nutritional needs by 2030 — what we term our “30 by 30” vision.

5. Many of you here today are probably familiar with this “30 by 30” vision. It is an ambitious but necessary endeavour, and I believe it is achievable with the collective efforts of the People, Private and Public sectors. The potential benefits are manifold. Our efforts to increase local food production through science and technology will not only yield unique solutions that our companies can utilise to grow overseas and contribute to food security elsewhere, it will generate new and interesting jobs for our people.

### **Increasing Productivity with Technology**

6. Today, less than 1 per cent of our land is used for agriculture. This will continue to be the case as we seek to ramp up our local produce. Our food production methods and technology must therefore adapt and improve. In the face of the challenges posed by climate change, our food production must not only be high yielding, it must also be climate-resilient and resource-efficient.

7. SAT is one of the pioneer users of the closed containment system, which better controls environmental factors that may disrupt fish production, such as algae blooms, oil spills and rising sea temperatures. This technology has enabled the company to rear healthier Asian seabass and red snapper in its filtered, UV-treated, oxygenated and

quality-controlled water.

8. SAT has also developed a state-of-the-art system with its digital partner Siemens, to optimise fish production. This new system will ensure a consistent supply of fish, and enhance consumer food safety through its traceability features, which will record the source of fingerlings and the amount and type of feed given to the fishes.

9. In addition, SAT had tapped on the Agriculture Productivity Fund under the Singapore Food Agency, to develop its unique smart recirculating aquaculture system. Using artificial intelligence and Internet of Things, or IOT, the grow-out facility, which we are standing on now, incorporates automatic processes on a single dashboard to centrally monitor each individual fish tank, and alert the operator when there are abnormal fluctuations in water parameters. This allows the operator to take timely action to ensure that the water is kept in optimum condition for the fishes to thrive.

### **Exciting Jobs for Singaporeans in Agri-Food Sector**

10. As our farms adopt such new technologies, they not only increase their production yields, like I mentioned, but also create good jobs for Singaporeans.

11. For instance, the roles of workers at SAT have been enhanced to include the design, operation and maintenance of smart floating fish farms. To upskill and equip them with the required capabilities, SAT had tapped on Workforce Singapore's Capability Transfer Programme. Through the programme, local staff in SAT are now undergoing an 18-month training programme by an expert from Australia to gain new skills in larval rearing, nursery culture and broodstock management. This will not only boost the company's capability to design and run high-tech farms, but also enable local workers to acquire cutting-edge skills to enhance the company's competitiveness.

12. With the various government funding and support available to companies to enable them to transform their production, I look forward to our local agri-food industry rising up to the challenge to produce affordable and accessible food as part of efforts to achieve our 30-by-30 vision.

### **New Local Produce Label**

13. I am encouraged by interest among our local enterprises to contribute to our "30-by-30" vision, and expand our agri-food sector. To rally support for our local farms, the Singapore Food Agency launched a new local produce label last week to enable consumers to easily identify homegrown produce. The new label, which was co-created with our farmers, retailers, industry associations and selected by the public, will be rolled out in August. I hope that SAT will find this label useful to help it expand its sales here.

14. There are many advantages to consuming local produce. As local produce are grown in Singapore, they are fresher, last longer and are easily traceable. There is less spoilage and hence less food wastage. They also have a lower carbon footprint, as the produce is

not delivered over long distances before reaching the consumers. In short, by consuming local produce, we are doing good for the environment, while supporting local farmers!

## **Conclusion**

15. I would like to conclude by congratulating SAT on the opening of its new Smart Floating Fish Farm.

16. Food security is an existential challenge for Singapore, but it also provides the impetus to build a strong and vibrant agri-food industry, and foster national pride in homegrown produce. Let us come together, and jointly write our Singapore Food Story.

17. Thank you.

## ***SEIZING THE OPPORTUNITIES IN BUILDING A SUSTAINABLE AND LIVEABLE SINGAPORE***

### **Introduction**

1. Mr Chairman, as Minister Masagos said earlier, we each have a duty to take climate action, and safeguard Singapore for our future generations.

### **Adopting a Circular Economy Approach Towards a Zero Waste Nation**

2. This was why we designated 2019 as Singapore's Year Towards Zero Waste — to mobilise every Singaporean to do their part to move Singapore towards a Zero Waste nation and a circular economy. To Mr Chen Show Mao's question, 2019 was a busy and successful year. We engaged more than 670,000 Singaporeans, and together with our 3P (People, Public and Private) partners, organised almost 2,000 Zero Waste programmes and activities. We supported ground-up initiatives through the 'Towards Zero Waste Grant', and launched the "Say YES to Waste Less" campaign. All these efforts helped to instil in Singaporeans the 3Rs of Reduce, Reuse, and Recycle.

3. We also made tangible steps to lay the foundation for Singapore's transition to a circular economy. We charted out Singapore's inaugural Zero Waste Masterplan, and set ourselves an ambitious target to reduce the amount of waste sent to Semakau Landfill by 30 per cent by 2030.

4. We can close our resource loops, just as we have done for our Water Story. In fact, we already recycle 99 per cent of our ferrous metal waste, and construction and demolition waste. As shared in Budget 2020, we are also making good progress turning incineration ash into construction material we proudly call NEWSand. We will begin trials to test potential NEWSand materials in road construction along Tanah Merah Coast Road later this year. Going forward, NEA will launch a Request for Information by mid-2020 for a commercial-scale facility to produce NEWSand.

### **Zero Waste: A Whole-of-Nation Effort**

5. Achieving our Zero Waste vision is a whole-of-nation effort. Last year, we convened our first ever Citizens' Workgroup to co-create solutions to #RecycleRight. One follow-up project is the redesign of the blue recycling bin to be more user-friendly. The Workgroup's ideas include a transparent panel on the bin body, eye-level labels with #RecycleRight information, and tailored deposit holes. The Ministry of the Environment and Water Resources (MEWR) and the National Environment Agency (NEA) will support the Workgroup members to fine-tune and trial their prototype. Ms Joan Pereira may also be pleased to know that NEA has already successfully trialled the use of bigger recycling bins, which are collected by side-loader trucks. These will be progressively deployed across Singapore by 2022.

6. As Mr Daniel Goh highlighted, grassroots efforts are also important in encouraging households to #RecycleRight. Our Public Waste Collectors work with the grassroots to organise Cash-for-Trash programmes regularly at convenient locations. NEA is also considering a pilot “recycling bin contamination rate” competition involving several Residents’ Networks.

7. The private sector has also come on board. F&N Foods partnered NEA in the “Recycle N Save” pilot. A total of 11 Reverse Vending Machines (RVMs) have been rolled out and we will deploy 39 more by mid-2020. I am encouraged by the positive response, with over 2 million containers collected since the launch of the RVMs last October. We will continue to refine the pilot.

8. Mr Dennis Tan and Mr Louis Ng spoke about reducing disposables through a ban or charge. We believe that we should take a pragmatic approach and find an inclusive solution that works for Singapore and Singaporeans, taking into account our local context. For example, biodegradable bags provide few benefits in Singapore as we incinerate all household waste. On a life-cycle basis, single-use paper and biodegradable bags also require large amounts of resources like water and land. Hence, instead of pursuing a substitution strategy, we should focus on inculcating the right values. Singaporeans’ actions could then be motivated by a consciousness to safeguard the environment.

9. This is why, in the spirit of Singapore Together, NEA will convene a Citizens’ Workgroup later this year to address the excessive consumption of all disposables, including Styrofoam and single-use bags. We welcome citizens to deliberate the idea of a nation-wide charge for single-use bags as well as other measures such as campaigns and education. We will take the Workgroup’s recommendations seriously, and work with participants to implement them where feasible. I invite Singaporeans to register for the Workgroup later this month.

10. Among the supermarkets, FairPrice has taken the lead with their plastic bag charge trial last year, complemented with educational efforts. The trial has shown promising results, with the majority of FairPrice’s customers receptive towards a plastic bag charge. I commend FairPrice for its leadership and welcome its decision to expand the trial to 25 outlets for one year. I am heartened that Prime has also implemented a plastic bag charge in four of their outlets. I call on other supermarkets and retailers to also pilot this, and urge Singaporeans to support these efforts.

#### Addressing our Three Priority Waste Streams

11. My Ministry is taking the lead to introduce enabling regulations to transit to a circular economy. Last September, we passed the Resource Sustainability Act to address three priority waste streams — packaging waste, e-waste, and food waste.

#### Packaging Waste Including Plastics

12. Packaging waste makes up a third of the total domestic waste disposed of in Singapore. The amount disposed of will only grow as Singaporeans embrace new trends in online shopping and food delivery. We need to find ways to manage packaging waste more sustainably.

13. Er Dr Lee Bee Wah, Mr Chia Shi-Lu and Mr Mohamed Irshad asked for our plans on this. This year, we will introduce regulations to mandate the reporting of packaging data and development of 3R plans by producers of packaged products, as well as retailers and supermarkets. This will make companies more aware of their packaging use and encourage them to optimise it, thereby minimising waste and also reducing business costs. Obligated companies will start collecting the data from 1 July this year, for submission to NEA early next year.

14. As this is the first time we are implementing such a reporting requirement, NEA is partnering the Singapore Manufacturing Federation on a joint capability development programme that will support companies in fulfilling their new obligations. Companies will be offered workshops and training courses to familiarise themselves with the reporting framework. Companies can also exchange best practices in sustainable packaging waste management, and prepare themselves for the upcoming Extended Producer Responsibility (EPR) framework.

#### *EPR for packaging waste*

15. Under the EPR framework, producers are responsible for collecting and recycling their product packaging. We are bringing forward the EPR for packaging waste by implementing it in phases. In the first phase, we will build upon the reporting framework and the Reverse Vending Machine trials to implement a Deposit Refund Scheme (DRS) for beverage containers by 2022.

16. In a typical DRS, producers pay for the system to take back used beverage containers. Consumers get a refund when returning empty beverage containers at designated return points. Countries like Norway and Germany have implemented a DRS, and achieved high recycling rates of over 80 per cent for beverage containers. We are studying international best practices, and will conduct industry consultations and a Request for Information for the DRS later this year.

17. The DRS is also an idea proposed by the Citizens' Workgroup on #RecycleRight. Workgroup members will partner NEA to work through the DRS implementation, such as co-designing surveys to optimise outcomes of the DRS. Together with our industry stakeholders and Singaporeans, we will design a DRS suitable for Singapore.

#### *Developing our local plastic recycling industry*

18. The DRS will aggregate *post-consumer* plastic waste, such as PET beverage bottles. This will supply a steady feedstock to drive demand for local recycling capabilities. With your permission, Mr Chairman, may I display some slides please.

19. We have been working closely with our economic agencies to actively engage interested companies to set up mechanical recycling plants for post-consumer plastic waste here. PET bottles and the like can then be processed locally into plastic pellets, which can in turn be used to make new products. We will announce details when ready.

20. But not all plastic waste is suitable for mechanical recycling — for example, contaminated plastic bags. To treat these, we are also pursuing chemical recycling solutions. Chemical recycling can potentially convert these plastics into higher-value products, like pyrolysis oil, which is a potential feedstock for Singapore’s petrochemical sector. If successful, this will move us closer to both our goals of being a Zero Waste nation and a Low-Carbon economy. We hope that this will become – get ready for this – “NEWOil”, and strengthen our resource resilience, just as we have done with NEWater and aim to do with NEWSand. We are working with the Economic Development Board (EDB) and industry partners to look into establishing a pilot plant that will contribute to and help anchor the chemical recycling value chain in Singapore within the next few years.

#### E-waste

21. Mr Chia Shi-Lu and Mr Mohamed Irshad asked about our progress to address e-waste, which is our second priority waste stream.

22. NEA has started registering producers under the e-waste EPR framework, which will take effect next year. Producers have also recently begun collecting data on the amount of regulated electronic and electrical products supplied in Singapore, for submission to NEA early next year.

23. NEA will launch a tender this month to appoint the Producer Responsibility Scheme (PRS) operator, a key stakeholder in the e-waste EPR framework. NEA is now pre-qualifying organisations for the tender, and aims to appoint the PRS operator by the second half of this year. This will give the operator sufficient lead time to establish its collection and treatment network, and organise public outreach programmes.

24. Similar to packaging waste, the e-waste EPR framework will finance and drive local e-waste recycling capabilities. TES-B, a new lithium-ion battery recycling facility will be completed in the coming months. EWR2 and SMC Industrial are also planning to build two recycling facilities dedicated to large household appliances, ICT equipment, and batteries. They will be completed by mid-2020 and mid-2022 respectively. Together, the three new facilities will be able to process more than 50,000 tonnes of e-waste per year when fully operational. With these additions, Singapore will be ready to treat our e-waste collected under the EPR system.

#### Food Waste

25. Er Dr Lee Bee Wah and Mr Mohamed Irshad spoke about food waste, another major waste stream with high generation tonnage and low recycling rates.

26. Last year, I announced that from 2024, owners and occupiers of commercial and industrial premises that generate large amounts of food waste will be required to segregate their food waste for treatment. Owners and occupiers of new buildings will also be required to treat their food waste on-site.

27. These requirements will apply to hotels and shopping malls with more than 3,000 square metres of F&B area, including function area for hotels; as well as industrial premises that either house at least one food manufacturer of more than 750 square metres, or are above 20,000 square metres and have more than 20 food tenants.

28. NEA is including these thresholds in the Code of Practice on Environmental Health, to ensure that from 2021 onwards, obligated owners and operators will allocate space for on-site food waste treatment systems in their development plans.

29. To support premises to prepare for the mandatory requirements, NEA is developing a guidebook on best practices and case studies on the implementation of food waste segregation and treatment.

### **Building a Liveable and Endearing Home Together**

#### Raising Standards of Cleanliness in Singapore

30. Segregating food waste from the other waste streams will make it easier to maintain cleanliness in premises.

31. Cleanliness and hygiene is a first line of defence against evolving public health threats. Seventeen years ago, when we were battling SARS, we instituted regular “spring cleaning” of our hawker centres to safeguard environmental hygiene and curb the spread of such diseases. Last month, in response to the 2019 coronavirus (COVID-19) outbreak, we launched the SG Clean campaign to rally Singaporeans to keep Singapore clean and to safeguard public health. At the individual level, we call on Singaporeans to practise good personal hygiene and social responsibility through the “7 Habits of Good Public Hygiene”. Concurrently, NEA is working with government agencies and business premises to step up public hygiene standards. We want our hawker centres, public transport nodes, schools, retail malls, shops and various premises to achieve the “SG Clean” quality mark.

32. SG Clean seeks to turn the current crisis into an opportunity, by uplifting the standards of public hygiene and sustaining them. It is to be a whole-of-nation movement to instil a national “keep clean culture” for the long term, beyond the battle with COVID-19. We will need to shift from the current top-down compliance-focused approach towards a more collective approach, where all stakeholders take accountability and ownership to proactively achieve high standards of cleanliness in Singapore.

33. The SG Clean effort is needed even if our regular surveys indicate that we are mostly doing well in keeping Singapore clean. In the last two years, we witnessed multiple incidents of gastroenteritis linked to contaminated environments, including at pre-schools and nursing homes. These incidents underscore the importance of environmental hygiene. So last August, even before COVID-19, NEA convened an interdisciplinary technical committee to develop a set of national baseline cleaning standards for premises. NEA is currently consulting with stakeholders to further develop sector-specific standards.

34. To catalyse this transformation, we will amend the Environmental Public Health Act (EPHA) to introduce mandatory baseline cleaning standards later this year. These standards will comprise a regime for pro-active and thorough cleaning, as well as disinfection, at prescribed frequencies. This will include the often-neglected “back of house” areas such as bin centres.

35. As part of the EPHA amendment, we will place greater accountability on premises managers for the cleanliness of their premises. They will be required to appoint a Designated Person to assist them to develop an environmental sanitation programme and advise on measures to remedy any lapses. We will be mindful to calibrate the standards to minimise compliance costs.

36. We will work with sectoral leads to progressively implement the new requirements from 2021, starting with higher-risk premises with high footfall and immuno-vulnerable occupants, such as childcare centres, schools, eldercare facilities and hawker centres.

37. We do not know how long COVID-19 will last. We are entering a new situation, a new normal, where enhanced personal hygiene habits and social responsibility have to be an integral part of our lives. Let us work together to make SG Clean our new way of life.

### Managing Dengue

38. SG Clean and our fight against dengue go hand in hand, as we remove stagnant water and keep our environment clean and litter-free. In 2019, there were nearly 16,000 reported dengue cases, with 20 deaths. This year, the *Aedes* mosquito population remains high, and we are concerned about the increasing number of cases of the less common dengue virus serotype 3 (DENV-3). We must be careful as Singapore has not seen a DENV-3 outbreak in almost three decades, and population immunity to DENV-3 is low.

39. Let me assure Er Dr Lee Bee Wah and Ms Sylvia Lim that we are addressing these risks through a multi-pronged dengue management approach. First, NEA conducts comprehensive surveillance of the mosquito population via more than 64,000 Gravitraps nationwide. This allows NEA to target its operations early and prioritise areas with higher mosquito population. Second, NEA leverages technology, such as using drones to aid inspections or apply insecticide in hard-to-reach areas. Third, NEA shares data on dengue clusters and areas with higher mosquito population publicly on its website and myENV App. This facilitates early community intervention and pre-emptive measures.

40. Let me emphasise here, that whatever new approaches we take cannot substitute the need for public vigilance and collective action to suppress mosquito breeding and prevent dengue. I strongly urge all Singaporeans, young and old, to take proactive measures to protect yourselves and your loved ones. Actively practise the ‘7 Habits of Good Public Hygiene’ and ‘Mozzie Wipe-out’.

#### Hawker Centres

41. I would like to thank our cleaners who have worked extra hard to keep SG Clean. We can all show our support for the cleaners by playing our part too. At hawker centres, for instance, we can do so by eating from our trays and returning them, as Mr Alex Yam has rightly pointed out. We have achieved a tray return rate of 62 per cent on average at our Productive Hawker Centres, double that of other hawker centres. This was achieved through a suite of efforts such as implementing salient reminders, providing strategically-located Automated Tray Return Stations, and ensuring that trays are clean and dry for use. We will continue working with stakeholders to promote tray return at all our hawker centres. This will also alleviate the cleaners’ workload so that they can focus their efforts on maintaining general cleanliness.

42. As custodians of our much loved hawker culture, we will continue to work closely with stakeholders to ensure that affordable and good hawker food can continue to be a main-stay in Singapore.

#### *New hawker centres*

43. Mr Gan Thiam Poh, Mr Amrin Amin, Mr Liang Eng Hwa and Mr Muhamad Faisal Abdul Manap spoke about new hawker centres and Socially-conscious Enterprise Hawker Centres (SEHCs). Of the 20 new centres we are planning to build by 2027, seven are already in operation. Ten more are in the design or construction stage, and we are working out the details for the remaining three. The next centres to open will be Bukit Canberra Hawker Centre in end-2020, and Fernvale Hawker Centre & Market in early 2021. NEA will tender out these two centres to socially-conscious enterprises. These operators provide active management to build up clientele and vibrancy at hawker centres, such as through curating food mix and programming.

44. Currently, there are seven hawker centres under the SEHC model, and most have done well. Nonetheless, we will constantly review and improve the model. When evaluating tender proposals for operating future hawker centres, NEA will give greater emphasis to footfall, vibrancy, and sustaining the hawker trade. We will also assess operators’ performance in maintaining high footfall and stall occupancy. In the past year, NEA has introduced the Staggered Rent Scheme, and extended the Productive Hawker Centre grant to stallholders at SEHCs. NEA also reviewed the contracts between operators and stallholders to better safeguard stallholders’ welfare, and required operators to conduct regular Hawkers’ Feedback Groups. To Mr Muhamad Faisal Abdul Manap’s question, stallholders’ feedback are usually on what more operators can do to improve vibrancy, attract footfall and help stallholders with their operations. All in, these

measures serve to ensure that the SEHC model continues to benefit residents, and support stallholders at the same time.

*Supporting our hawkers and sustaining the hawker trade*

45. I assure our hawkers that we will always look out for them. As part of the Stabilisation and Support Package announced during Budget 2020, we will provide a one-month rental waiver, with a minimum sum of \$200, to all stallholders in hawker centres managed by NEA or NEA-appointed operators. This will help them with their operating costs during the current COVID-19 situation. Stallholders will receive 50 per cent rental waiver this month, and 25 per cent in April and May. This will benefit about 14,000 cooked food and market stallholders. About one third of the stallholders, whose monthly rentals are below \$200, will in fact enjoy more than one month of rental waiver. We share Ms Joan Pereira's concern. We will monitor the situation and are prepared to provide further assistance if required.

46. Nonetheless, I am heartened to see the resilience of our stallholders. At Chinatown Complex Market, the stallholders are working hard to achieve the SG Clean quality mark for their stalls, and are even organising a promotion event this weekend. So do show them your support! It is okay to gain a few calories or inches.

47. Last year, we also facilitated the formation of two Workgroups, which Mr Liang Eng Hwa spoke about, to co-create solutions to key issues facing our hawker trade and culture. I am pleased to note that even before the Workgroups submit their recommendations, we are already adopting some of their ideas.

48. For instance, we have already implemented one of their ideas, the Hawkers' Development Programme (HDP). Classes start next month, and I encourage aspiring hawkers to apply.

49. The Workgroup also suggested fostering a strong hawkers' network and facilitating hawker-to-hawker sharing. Following the positive feedback for the inaugural Hawkers' Seminar held last year, we will support the Federation of Merchants' Associations, Singapore to organise the Hawkers' Seminar as an annual event.

50. Another Workgroup idea that we are working on is a series of hawker awards to recognise hawkers' efforts and achievements. We will share details on the awards and nomination process later.

51. A key challenge that the Workgroup raised was the physically demanding nature of the hawker trade. We had launched the Hawkers' Productivity Grant (HPG) in 2017 to help stallholders adopt kitchen automation equipment. Close to \$1.5 million has been disbursed to 526 cooked food stallholders. You might have tried the ayam penyet by Mr Abdul Rahman Bin Suradi. He tapped on the HPG to buy a multi-function food processor to prepare his chilli sauce. Now he needs only a quarter of the time to prepare the sauce,

and can ensure the correct consistency and quality. With the time saved, he can serve more customers.

52. To help more hawkers improve their productivity, I am pleased to announce that we have taken in the Workgroup's suggestion to enhance the HPG. From 9 March 2020, we will expand the HPG to market stalls, and the scope of supportable items will be broadened beyond kitchen automation to include service innovation, such as queue management systems. We will also extend the HPG, which would have ended in October 2020, to March 2023.

53. Mr Chairman, in Mandarin please.

54. 小贩们是我们小贩中心和小贩文化的核心。为了帮助小贩们应对2019-冠状病毒疾病疫情的冲击, 政府将免除全114家小贩中心摊位一个月的租金, 免除金额至少为200元。小贩们这个月将获得百分之50的租金免除, 接下来则分别在4月和5月获得百分之25的租金免除

55. 我们也听取了小贩们的反馈, 决定加强“小贩生产力资助金”以鼓励更多小贩借助自动化工序提高生产力。“小贩生产力资助金”将从3月9日起扩展到巴刹摊主并涵盖更多种自动化器材, 包括队列管理系统。我们也将把申请期限延长至2023年3月。

56. Today, as is fast becoming customary of MEWR's COS, Members are in for a treat. I have arranged for some hawker delights to be served in the Members' Room. I urge all of you to tuck into the drool-worthy treats. The Kentang and Sardine epok are from Kalsom Kuih Muih Curry Puff at Yishun Park Hawker Centre, lovingly handmade by Mdm Kalsom Kamis and Mr Zaidi Bin Zainal. They are simply sedap! Also try the exquisite cakes from The Headless Baker at Ghim Moh Hawker Centre – you might just fall head over heels for them! This is a new Incubation Stall run by Ms Amber Pong, who used to work as a pastry chef at a patisserie in Melbourne.

### **A Sustainable and Liveable Singapore Brings Opportunities for All**

57. Building a sustainable and climate-resilient Singapore for ourselves and for future generations is not only about addressing our challenges. As Er Dr Lee Bee Wah, Mr Mohamed Irshad and Mr Desmond Choo pointed out, it also brings economic opportunities for our companies and creates good jobs for Singaporeans.

#### Opportunities for local companies to internationalise

58. Local companies can leverage sustainability as a competitive advantage to export their innovative solutions and grow beyond our shores.

59. An example is Orinno Technology Pte Ltd, one of NEA's key partners in Project Wolbachia. NEA and Orinno have jointly developed innovative Wolbachia-Aedes solutions, and have even filed five patents! Not only has Orinno played an important role in advancing Singapore's public health research, they have also gone on to export these solutions, such as to Thailand and Australia.

#### Higher-value jobs for Singaporeans

60. Through upskilling and technology adoption, more than 45,000 people will benefit from higher-value jobs in the environmental services, water and agri-food sectors over the next five to 10 years.

61. Let me share about Mr Soh Han Hwee, who started 17 years ago as a Site Supervisor in cleaning services company Horsburgh. He believes in constantly upskilling oneself and has completed over 20 courses — from cleaning, work-at-height, productivity management, risk management, to leadership and people management courses, and the list goes on! Through his training, Mr Soh has been promoted to become an Operations Manager and now has more than a hundred people under his supervision.

62. As we move towards a risk-calibrated co-regulation approach, we will support companies and entire industries to build up their competencies and create higher value jobs. Just as how the Water Efficiency Management Plan created Water Efficiency Manager roles in companies, strengthening our environmental sanitation and food hygiene will also create demand for higher-skilled roles, such as the cross-functional Environmental Control Officers (ECOs), and Food Hygiene Officers (FHOs).

#### *Enhancement to ECO scheme*

63. NEA will be enhancing the competencies of ECOs who are currently engaged at construction sites as advisers of good environmental practices. Enhanced vocational training will benefit approximately 2,600 ECOs by equipping them with up-to-date skills to better plan and implement a full array of measures including vector control, environmental sanitation and waste management.

64. We will further review the ECO scheme as a competency-based vocation and broaden their work areas beyond construction sites to more premises types, like shopping malls. In time, ECOs will be valued as certified experts who are well-versed in multiple aspects of environmental management. They are leaders who can drive and raise environmental standards of the premises they oversee. In some ways, ECOs are almost as important as CEOs!

#### *Enhancement to FHO scheme*

65. As part of SFA's regular review of the Food Hygiene Officer (FHO) course curriculum, SFA will enhance the training framework for FHOs. FHOs can look forward to a holistic food safety education to better equip them as food safety guardians at their workplaces.

66. SFA will also be developing a new Advanced FHO framework, which would allow FHOs to upgrade and progress to Advanced FHOs. Advanced FHOs will be trained to develop and implement internationally recognised Food Safety Management Systems. Over the next 10 years, 9,000 new and existing FHOs, and 400 Advanced FHOs will be trained.

67. Courses under these new training frameworks can also be offered as certifiable modules to students in food-related programmes. This enhances their relevant skills and increase their job opportunities.

#### *New jobs in growth areas*

68. There will also be exciting jobs created in new growth areas such as the high-tech agri-food sector.

69. SFA has been working with government agencies, Institutes of Higher Learning and the industry to build competency within the agri-food workforce. This includes developing training programmes at various levels, which will be rolled out at the right time to meet industry needs without creating oversupply.

70. In the last two years, SFA has collaborated with Temasek Polytechnic and Republic Polytechnic to implement two SkillsFuture Earn and Learn Programmes leading to diplomas in Aquaculture and Urban Agricultural Technology respectively. These programmes equip fresh ITE graduates with relevant skillsets to start their careers as Aqua or Agri Technicians.

71. Thus far, there are seven ITE graduates in the two Earn and Learn programmes. Ms Germaine Chong is one of them. As an Aquaculture Technician at Apollo Aquaculture, Germaine benefitted from structured on-the-job training, mentorship and technical training. Recognising Germaine's good work performance, Apollo Aquaculture has even offered to sponsor her for the full diploma.

72. This year, SFA will be working with the Nanyang Technological University (NTU) to launch a new Food Science and Technology post-graduate certificate programme. This programme will cover contemporary topics on urban agri-technology, such as post-harvest of agriculture produce and novel food such as microalgae and insects. I believe technology will remove the "yuck" factor and bring the "yum" factor in.

73. On the Environmental Services side, we have launched the first ever NEA-Industry Scholarship Programme. We will partner the industry to award 20 scholarships to ITE and Polytechnic students in related fields, such as engineering, environmental

technology, and sciences. The scholarship provides scholars with financial support during their studies, attractive salary and a clear career progression path upon graduation.

74. In the recycling industry, the three upcoming e-waste recycling facilities are expected to add another 430 jobs. In tandem with the implementation of the Zero Waste Masterplan and Resource Sustainability Act, industry transformation will create more career opportunities requiring engineering, science and environmental management expertise. I therefore want to assure aspiring entrants into these fields that the jobs are exciting, pay well, leverage on new technology, and most importantly, are Planet-saving!

### Closing

75. Mr Chairman, I want to end off my speech on an optimistic note. Even as the existential challenge of climate change looms over us, opportunities abound. We have to seize them and find creative solutions to make the most out of them. Just take my blouse as an example. Its designer JJ Chuan named it MusicCloth. Ms Chuan told me that 56 million kilograms of plastic have been used to make cassette tapes since they were first introduced in 1963. She gives them a new lease of life by upcycling discarded cassette tapes, weaving them into “fabric” for new products, such as evening bags like the one I am holding, and also this prototype matching blouse.

76. By planning ahead and working together as SG United, we can turn the challenges from climate change into opportunities for our companies to innovate and internationalise, and create better jobs for Singaporeans. That’s really turning trash into treasure!

## ***BUILDING A CLIMATE-RESILIENT SINGAPORE, FOR SINGAPOREANS, WITH SINGAPOREANS***

### **INTRODUCTION**

1. The UN has rightfully identified climate change as the defining issue of our time. For Singapore, like many small nations, climate change is an existential challenge. We feel its effects today, such as in rising temperatures and frequent extreme weather events. Even the seasonality of Singapore's rainy and dry months is now difficult to predict!

2. Scientists in the Centre for Climate Research Singapore have projected that by 2100, the mean sea level around Singapore may rise by up to one metre. Coupled with the frequent and heavy storms also brought about by climate change, low lying areas of Singapore, such as the East Coast may experience more flooding. For all countries, climate change also threatens access to essential resources such as water, food and energy. These affect the security of our nation too.

3. With these said, our history of overcoming challenges gives me the confidence that we need not despair when facing climate change. Just as we have done before, we will create innovative solutions for the hardest challenge, putting Singapore in the unique position we enjoy today. This is Singapore's DNA.

### **WORKING TOGETHER FOR A CLIMATE RESILIENT SINGAPORE**

4. Today, I will update on our plans in three key areas to address the challenges of climate change — first, mitigation strategies to reduce the emissions of greenhouse gases (GHGs); second, adaptation plans; and third, how we can work together, in our communities and as a nation, to collectively realise a more sustainable Singapore.

5. With your permission, Mr Chairman, may I request the clerks to distribute a document to Members?

### **MITIGATING CLIMATE CHANGE**

6. First, on mitigation. The UN Framework Convention on Climate Change (UNFCCC) and the Paris Agreement are pivotal multilateral agreements to address the global challenge of climate change. It has spurred many countries, including those who are large emitters, to enact laws and transform their economies to meet their carbon commitments. It is therefore in the interest of small island states like Singapore, to support this multilateral framework of cooperation.

7. For this framework to stand, every country, large or small, must do its share to reduce GHG emissions. Singapore will also do our part. Last Friday, Senior Minister Teo Chee Hean announced that Singapore will enhance our 2030 Nationally Determined

Contribution to the Paris Agreement later this year. We will also submit our Long-Term Low Emissions Development Strategy, which aspires to halve emissions from our peak to 33 MtCO<sub>2</sub>e by 2050, with a view to achieve net zero emissions as soon as viable in the second half of the century.

8. Halving our emissions, even thirty years from now, is an ambitious target, because Singapore is naturally constrained in alternative energy — this is an attribute recognised even by the UNFCCC. But we will continue to raise our ambitions to limit and reduce carbon emissions over the long term, knowing well enough that it requires transformational change.

9. We are already ahead of the pack by implementing the carbon tax last year — the first country in Southeast Asia to do so. This is a clear signal to the whole of industry that Singapore is moving towards a low-carbon economy, as we give no exemption. Mr Louis Ng and Mr Daniel Goh asked about the carbon tax and emissions reporting. The carbon tax is meant to provide an economy-wide price signal. Hence, only aggregated information will be released. To achieve emissions reductions, rather than scrutinising individual companies, it would be more useful to know which sectors we should concentrate on. The release of individual data could also be commercially sensitive.

### ***Reduce Greenhouse Gas Emissions***

10. What are the major moves that my Ministry will introduce to further reduce our GHG emissions? First, we will implement a package of comprehensive measures to reduce the emission of hydrofluorocarbons (HFCs). As Dr Chia Shi-Lu and Mr Louis Ng have pointed out, HFCs can be found as refrigerants in refrigeration and air-conditioning equipment, and could leak during installation, maintenance and disposal. Some forms of HFCs trap a much larger amount of heat in the atmosphere than carbon dioxide.

11. Later this year, the National Environment Agency (NEA) will launch a training course to train and certify technicians to handle refrigerants properly. From next year, NEA will mandate the proper recovery, reclamation and destruction of spent refrigerants.

12. With your permission, Mr Chairman, may I display some slides on the screens?

13. NEA will also introduce a voluntary climate-friendly label to help households identify refrigerators and air-conditioners that use alternative refrigerants with lower global warming potential.

14. In addition, NEA will launch a new grant to support companies who want to make an early switch to more climate-friendly commercial water-cooled chillers. From 2022, we intend to restrict the supply of commercial water-cooled chillers and household refrigerators and air-conditioners that use HFCs with high global warming potential.

15. To Mr Louis Ng's question, MEWR will initiate a review on our ratification of the Kigali Amendment to the Montreal Protocol later this year.

### ***Improve Industry's Energy Efficiency***

16. Besides HFCs, improving energy efficiency will have a major impact on emissions reduction. Mr Dennis Tan asked about our progress. We have set an ambitious target to improve our industrial energy efficiency to one to two per cent every year. Our industries are on track to meet this target, and we will continue to improve our energy efficiency rate. Last year, NEA announced the Minimum Energy Efficiency Standards (MEES) for industrial-chilled water cooling system. MEES will reduce energy consumption in industrial facilities by at least 245 GWh annually, equivalent to taking more than 20,000 cars off the road. From 2021, energy-intensive companies, including oil-refining companies, will be required to establish facility-wide energy management systems and conduct energy efficiency opportunities assessments.

### ***Energy Self-Sufficiency for MEWR***

17. In MEWR we also live by our energy efficiency creed. Let me illustrate this.

18. We are on track to complete the development of Tuas Nexus by 2027. The Tuas Nexus carries out co-digestion of food waste and used water sludge to generate up to three times more biogas than conventional sludge treatment processes. This biogas will be used to generate electricity to power the plant, and excess electricity will be exported back into the grid.

19. In addition, we will ramp up the generation of solar energy within MEWR. Mr Louis Ng asked if we can deploy more solar panels on reservoirs. This year, PUB will deploy two 1.5 MWp floating solar PV systems at Bedok and Lower Seletar Reservoirs. Next year, PUB will deploy the world's largest single floating solar PV system of 60MWp at Tengeh Reservoir. The power generated from this system alone is sufficient to meet the energy of all our water treatment plants at local reservoirs. With this, Singapore's waterworks will be one of the few in the world to be 100 per cent green. PUB is also making strides towards improving the energy efficiency of NEWater and desalinated water production.

20. Mr Louis Ng also asked if the Government can provide consumers with rebates for using solar energy. Subsidies, such as rebates, distort the energy markets. Pricing energy right will encourage the growth of renewable energy in a commercially viable manner and incentivise consumers to use electricity efficiently, avoiding wasteful consumption. Instead of rebates, the Government has streamlined regulations and funded research to support higher deployment of solar.

21. My Ministry also intends to be exemplary in optimising the water-energy-waste nexus. We will set out to generate sufficient energy from waste incineration and solar photovoltaic systems to power all of my Ministry's needs, especially in the production of water and the projected production of food.

22. In the long run, it is only with ground-breaking technology that we can make huge leaps in climate mitigation. In the horizon are Carbon Capture, Utilisation and Storage technologies and the use of Hydrogen as an alternative fuel. We will stay abreast of these developments.

### ***Public Service Sustainability Plan***

23. Beyond the Ministry, the public sector as a whole is doing more. Mr Louis Ng asked about our efforts. In 2017, we launched the Public Sector Sustainability Plan, which charted out our strategies to reduce electricity and water consumption, and achieve Green Mark standards for 100 per cent of our buildings. Ministries and agencies are working hard, and are on track to meet our 2020 targets. For example, all air-conditioned Government premises should maintain indoor temperatures of 24oC or higher where feasible. All Ministries have also taken the climate action pledge and committed to reducing their plastic, water and electricity consumption.

24. We are reviewing how to bring our plan to the next level. DPM also announced our vision for all vehicles to run on cleaner energy by 2040. The Government will take the lead. From 2023, all new vehicle purchases for Government-owned fleets will be cleaner and greener where feasible. MINDEF for example will replace 400 administrative vehicles with hybrids and later with electric ones when charging infrastructure is ready in 2040. Together, with net-zero buildings, food-waste management our Army is “Green” in more than their uniforms!

25. These are but a few examples of how the UN Climate Change Framework is shaping climate conscious behaviours and decisions. We are also reviewing other measures such as the better management of our carbon emissions and the use of disposables. More details will be announced later this year.

### ***Green Transport***

26. Public transport generates up to three times less carbon dioxide than private transport. Hence, our approach is to encourage public transport and green public transport as far as possible. The Land Transport Master Plan 2040 by the Ministry of Transport supports this. This is how Singapore moves to cut GHG emissions — simply drive less.

27. If driving less is, somehow, not an option, motorists can still practise sustainable consumption by choosing cleaner vehicles that emit less GHG and harmful pollutants. Mr Louis Ng asked about the Vehicular Emissions Scheme (VES). The VES implemented in 2018 has seen positive results and we have since extended the VES until end-2020. This will complement the enhanced incentives and infrastructure to promote the use of electric vehicles announced at Budget. We aim to refine VES further, taking into account its impact on motorists’ purchasing decisions and advancements in technology.

28. The transport of goods and services is a major economic activity in Singapore. Commercial vehicles, especially Light Goods Vehicles (LGVs), are key emission sources and pollute our air due to their high mileage and reliance on diesel.

29. To support the shift to cleaner commercial vehicles, we will introduce a new Commercial Vehicle Emissions Scheme (CVES) for new LGVs, which form the largest proportion of commercial vehicles. Under the new CVES, the cleanest LGVs will receive a \$30,000 incentive, while the most polluting LGVs will incur a \$10,000 surcharge. In terms of Total Cost of Ownership, fleet owners will enjoy overall savings when they purchase EVs as opposed to petrol vehicles, and even greater savings as compared to diesel vehicles.

30. To complement the CVES, we will enhance the Early Turnover Scheme (ETS) from 1 April 2021 until 31 March 2023, including expanding the scheme to cover Euro 4 diesel commercial vehicles. The existing ETS will be extended until 31 March 2021.

## **ADAPTING TO THE IMPACTS OF CLIMATE CHANGE**

31. I have outlined our climate mitigation efforts. Let me now talk about how we will adapt to climate change.

### ***Flood Resilience***

32. Climate change will bring about more frequent and intense storms, which may result in major flooding, especially in low-lying parts of Singapore. Mr Desmond Choo asked about PUB's plans to mitigate inland floods.

33. Since 2011, PUB has spent almost \$2 billion on drainage works, including major projects like the Bukit Timah Diversion Canal and Stamford Detention Tank. We will invest another \$190 million, with six projects commencing this year, including the construction of a detention tank underneath Syed Alwi Road, which will enhance flood protection in the Little India area. Our investments will be complemented with developments in technology, such as short-range radars, to better predict and manage heavier rainfall.

### ***Coastal Protection***

34. These efforts, however, will not be sufficient. With climate change, sea levels will rise faster than its natural cycle, and along with heavy rains, will overwhelm drainage systems. Ms Cheng Li Hui and Mr Desmond Choo asked about our whole-of-nation strategy to coordinate coastal protection efforts. I am pleased to announce that PUB will assume the role of the national Coastal Protection Agency from April. With this new responsibility, one agency – PUB – will study both coastal and inland flooding holistically and develop models to guide our flood protection response.

35. The investments to undertake coastal and flood protection could cost \$100 billion over the next 50 to 100 years. As announced by DPM in the Budget speech, a Coastal and Flood Protection Fund will be set up within PUB, with an initial funding of \$5 billion.

The fund will be used in a fiscally sustainable manner to support the substantial capital outlay. Mr Mohamed Irshad asked about the immediate investments that will be made. Our near-term efforts will focus on studying our coastal areas to ascertain the type, feasibility and extent of measures required. We will phase efforts and start with the City to East Coast stretch and Jurong Island. The funds will also be used to expand and improve our drainage infrastructure to improve flood resilience.

36. As we embark on coastal protection, we will also identify new opportunities for urban development. For instance, we could reclaim a series of islands offshore, and even connect these islands up by building barrages to create community spaces for Singaporeans, and contribute to water resilience. PUB will partner various stakeholders to explore these possibilities.

37. Mr Dennis Tan highlighted the importance of preserving and building our carbon sinks. We will preserve our green carbon sinks and identify nature-based solutions. For example, planting mangroves can both stabilise our coastline by preventing erosion, while preserving our green lungs and supporting biodiversity. Minister Desmond Lee will elaborate in his speech on Singapore's greening efforts.

### ***Water Resilience***

38. Adaptation efforts also involve securing our water supply. Singapore has developed a robust and diversified supply of water, as a result of our early and consistent investments in water infrastructure and research. Along with local catchment and imported water, we will continue to augment our water supply with weather-resilient sources, namely NEWater and desalinated water.

39. With the completion of Marina East and Jurong Island desalination plants this year, we will have five desalination plants. Our NEWater production capacity will also increase over the next five years, with the expansion of the Changi NEWater factory and development of Tuas Nexus.

40. Good water demand management is equally important in complementing efforts in water supply. PUB's water conservation efforts have shown encouraging results, with household water consumption decreasing to 141 litres from 148 litres/person/day in three years. PUB will begin the deployment of 300,000 smart meters next year, as part of efforts to reduce water consumption further to 130 litres/person/day by 2030.

41. To inspire Singaporeans to continue efforts in water conservation, I am happy to launch the 2020 water conservation campaign. Today, PUB will kick off with a new video to remind Singaporeans of how far we have come in our water story. I felt touched and proud of our water story when I previewed the video. So will you, when you watch it

tonight. It will encourage us, all Singaporeans, not to take our clean drinking water for granted.

### ***Vector Control***

42. Besides rising sea levels and water resilience, Mr Amrin Amin, Mr Liang Eng Hwa, Dr Chia Shi Lu and Mr Desmond Choo have rightfully pointed out that warmer temperatures caused by climate change can also affect the everyday lives of Singaporeans, because it leads to an increasing mosquito population! In fact, warmer temperature is one of the factors that led to the surge in dengue cases last year.

43. Project Wolbachia is a tool which NEA is piloting to manage the mosquito population. Mr Louis Ng conveyed feedback that the initial surge of male *Aedes aegypti* mosquitoes released under Project Wolbachia causes discomfort to residents. I hope to reassure residents that these male mosquitoes do not bite or transmit diseases, and ask residents to be patient and bear with the initial surge.

44. I am pleased to say that the Project Wolbachia trials have achieved up to 90 per cent suppression of the *Aedes aegypti* population within the Yishun and Tampines study sites. We are considering the expansion of Project Wolbachia to more neighbourhoods, in consultation with NEA's Dengue Expert Advisory Panel. To do this, NEA has set up a hi-tech mosquito farm which optimises mosquito production, the sorting of male mosquitoes from females, and the transportation of mosquitoes for release. We are scaling up the facility's production to five million male mosquitoes a week, over the next few years, to battle dengue. This is a new and important means to future-proof ourselves against the faster breeding of mosquitoes, as a result of the higher temperatures brought by climate change.

### **WRITING THE SINGAPORE FOOD STORY**

45. Just as NEA is establishing mosquito farms, the Singapore Food Agency (SFA) is transforming food farms. Food, like water, is a resource that can be disrupted by climate change. In Asia alone, we expect an additional 250 million mouths to feed by 2030. Yet, the amount of arable land could fall by five per cent due to climate change and environmental degradation. Singapore, which currently imports more than 90 per cent of our food, will be vulnerable. In the face of these changes, we have developed three food baskets to ensure our food security by diversifying food sources, growing food overseas and growing local. We have designated 2020 as the Year of Singapore Food Story to focus our national effort and attention.

46. Mr Gan Thiam Poh asked about the Government's success in food source diversification and its role in mitigating price hikes during supply disruptions.

47. Today, Singapore's food imports come from over 170 countries and regions. This did not come by chance, but is a result of SFA's continuous efforts. While the Government does our part, we require the industry to also be pro-active in diversifying supply sources

to enhance business resiliency. For example, since last year, SFA has introduced requirements for egg importers to adopt plans to mitigate the impact of any supply disruptions.

48. With a well-diversified food supply, Singapore can reduce the impact of food supply shortages and price changes. However, consumers need to be mindful that the price of any particular food item is determined by a combination of factors, including import prices, exchange rates, and profit margins which suppliers can command.

49. Let me elaborate on our plans to produce food locally, enhance food safety, and encourage Singaporeans to support local produce.

## **PRODUCE FOOD SUSTAINABLY**

### ***Optimise Land and Sea Space***

50. Ms Cheng Li Hui and Mr Gan Thiam Poh asked about how the Government is helping the local agri-food industry grow. Our vision is to locally produce 30 per cent of Singapore's nutritional needs by 2030, from less than 10 per cent today.

51. As a small country with limited space, our land use faces many competing needs. We have dedicated less than one per cent of our land for agriculture today. Within such tight land constraints, the '30 by 30' vision is highly ambitious, especially if we must achieve it within the same one per cent. Yet, having visited some of our new-tech farms, I am optimistic that it is achievable if we invest in an innovative agri-food sector.

52. Since 2017, SFA has been awarding agriculture land, through a competitive land tender basis, to agri-food companies with promising technologies. One such company is Green Harvest a local vegetable farm. The farm uses modern greenhouse growing techniques which mitigates the impact of unfavourable weather conditions. We are helping them to adopt more technology and, with experience, we hope they can produce multiple times more vegetables than average.

53. This year, SFA will study how the larger Lim Chu Kang agriculture area can be planned and redeveloped to enhance our food production. This study will consider feedback from farmers for centralised facilities and services to reduce the cost of food production. The study will also introduce circular economy principles, so that the by-product of one farm can be used as an input for another. SFA will work with farms, including successful tenders in recent land sales exercises, to work towards an exciting vision for Lim Chu Kang.

54. SFA's plans for Lim Chu Kang will complement the development of the Agri-Food Innovation Park, or AFIP, which we announced last year as a high-tech agri-food cluster in Sungei Kadut. The food production innovations developed in AFIP can scale up in Lim Chu Kang to contribute towards our '30 by 30' vision.

55. SFA will also look to unlock the potential of farming at sea. Last week, I accompanied President Halimah to visit Eco-Ark. Eco-Ark's CEO Mr Leow Ban Tat, who had decades of experience in marine and off-shore engineering, including in Keppel, applied principles of oil rigs construction to that of a floating fish farm. He worked with his team to conceptualise, design and integrate a floating platform with closed-containment aquaculture technologies that treat influent sea water used to cultivate fish. These technologies mitigate the effects of pollution and algae blooms that threaten both farms and our marine environment. Ideas like this is how we will transform fish farming practices so that they are more productive, sustainable and climate-resilient.

56. Besides the use of technology, SFA will study the expansion of sustainable fish farming where applicable in the deeper southern waters of Singapore. We will ensure that such aquaculture is productive and environmentally responsible, such as shown by Barramundi Asia, Singapore's first and only deep-sea fish farm. SFA will work with stakeholders to study this.

57. We are supporting different modes of fish farming. Where water quality is good, farms can carry out deep sea farming. Where it isn't, farms can adopt closed-containment technologies. Where there can be synergies with land-based water and waste systems, land-based aquaculture can be conducted. Like land, every space at sea that can be used for food production, must be judiciously managed.

58. Mr Gan Thiam Poh also asked how the Government is helping local farms remain competitive. Over the years, our economic agencies have been supporting local farms in their overseas expansion. Growing their businesses overseas allow farms to tap on land and manpower, lower production costs, and break into new markets. I encourage our farms to take a leaf from the food manufacturing industry, where companies like Tee Yih Jia Food anchor their expertise locally while expanding operations overseas. Some of our farms, like Apollo, have already done so. These food products produced overseas, while not 'Made in Singapore', should be marketed as 'Made by Singapore', since they uphold the same reputation for high quality and standards as those produced domestically.

59. To complement these efforts, SFA, Enterprise Singapore and the industry will be developing a Clean & Green Standard for urban farms which harness resource-efficient technologies to produce food in cleaner environments. They will study ways to incorporate information that more people are concerned about, such as the carbon footprint of food. The standard will serve as a mark of quality assurance that our farms can use differentiate their products in the market.

60. Let me move on to incentives and funding. Over the past five years, SFA has committed \$38 million from the Agriculture Productivity Fund, or APF, to support more than 100 farms in their productivity-enhancing investments. I am happy to share that the APF will be extended till the end of 2020. Beyond this, we will review how we can expand our support for technology test-bedding, adoption and resource efficiency in our farms.

### ***Facilitate the introduction of alternative proteins and ensure safety for consumption***

61. New innovations to produce food more productively and sustainably are also needed. The first research grant call launched by SFA and the A\*STAR last December under the \$144 million Singapore Food Story R&D Programme, will facilitate this.

62. One theme under this research programme is the production of novel foods, like alternative proteins. Traditional meat production methods are often land and water intensive, and generate high levels of emissions. Today, alternative proteins, such as Impossible and Quorn, are poised to become game-changers. I hope Members will enjoy the alternative protein food items from Tee Yih Jia Food and Empress served at today's tea break.

63. Ms Cheng Li Hui asked about food safety of novel foods. We will ensure that only novel foods that are safe for consumption are introduced in Singapore. Last year, SFA implemented a new regulatory framework to require companies to seek its approval and undergo a scientific pre-market assessment before placing novel foods in the market. This framework facilitates the sale of alternative proteins in Singapore, while ensuring their safety. Companies, such as local start-up ShioK Meats, who is looking to produce cell-cultured shrimp, will be able to benefit from this framework.

64. To support its assessment of novel food, SFA will establish an international expert working group to provide scientific advice on food safety.

### **SAFEGUARD FOOD SAFETY**

65. Beyond food supply, we must also not forget our fundamental mission, that is to ensure that the food we eat is safe.

66. SFA takes a serious approach towards upholding high food safety and hygiene standards. Since its formation, SFA has conducted more than 5,200 inspections in 2019, and taken more than 1,600 enforcement actions against errant operators.

67. SFA will be introducing new measures to safeguard food safety. Premises which pose higher food safety risks, such as caterers and central kitchens, will be required to install Closed-Circuit Television Cameras. This enables them to monitor food safety performance and provide evidence in the event of food safety allegations. Enhanced measures will also be targeted at businesses that cater to vulnerable groups. Food businesses catering to preschools, kindergartens and nursing homes will be required to maintain food retention samples, which will facilitate investigations during foodborne outbreaks.

68. From 2021, SFA will also introduce a single, unified framework to license and recognise all food establishments. SFA will award a longer licence duration and a higher recognition to food establishments which uphold high food safety and hygiene standards.

This way, SFA can re-prioritise resources to focus on checks to ensure compliance with food safety requirements.

69. Mr Louis Ng asked about the introduction of a Good Samaritan Food Donation Act. MEWR is currently working on a legislation to enhance our food safety regime. As part of this, we are looking to introduce a legislation to facilitate food donation. Any legislation will need to strike a balance between facilitating food donation and ensuring food safety. We will be happy to work with Mr Louis Ng.

## **DRIVING THE SUSTAINABILITY AGENDA WITH SINGAPOREANS**

### **SINGAPOREANS AS AGENTS OF CHANGE**

70. Let me conclude my speech by touching on the role of all Singaporeans in taking climate action. As the Government, we are providing leadership in tackling climate change. We do this by enhancing our climate pledge under the Paris Agreement and working with the industry to guide their transformation to a low-carbon economy. While the Government can lead on sustainability, the people must champion its cause.

#### ***Support Local Produce***

71. For instance, Singaporeans can make conscious climate-friendly choices in our daily essentials, such as food. Locally-produced food is of high quality, incurs less carbon miles, lasts longer and tastes good! By eating local, Singaporeans are making an environmentally sustainable choice.

72. In the process, we support our farmers by choosing food that is grown in Singapore. Since 2017, SFA has partnered SAFEF to organise Farmers' Markets to raise awareness of local produce. Last month, I unveiled a new logo which Singapore farmers can soon use to help Singaporeans identify local produce.

73. The community can also support local production by participating in community farming projects. For example, nearly 80 per cent of NParks' Community-in-Bloom gardens grow edibles. There is also the potential for companies and the community to engage in commercial urban farming that involves the community. Since the launch of a pilot rooftop farm, Citiponics in Ang Mo Kio, interest from the public towards urban farming in community spaces has grown. We will provide more opportunities for urban rooftop farming. In the coming months, SFA will tender 16 rooftop spaces on HDB Multi-Storey Car Parks across the island, totalling over 30,000 square metres. As we grow our agri-sector, let's get involved in growing food in our own backyards.

#### ***Enable Climate-Friendly Choices***

74. Now, let us talk about electrical appliances. Take refrigerators. They are amongst the top three highest energy-consuming household appliances today. However, many households continue to purchase one to two-ticks refrigerators, partly due to the higher

upfront costs of energy efficient models, without considering the savings from electricity consumption over the long term. Similarly, showering takes up a significant proportion of water consumption, yet many households are choosing the less water-efficient fittings.

75. To help households living in one to three room HDB flats invest in energy and water efficient models, the Government will introduce a \$24.8 million Climate-Friendly Household Package. These households will receive a once-off \$150 voucher to purchase refrigerator models approved by NEA that have three ticks and above. Not only will this help fight climate change, households can also benefit from electricity cost savings of up to \$60 annually. We will also extend the 'Switch and Save – Use LED' programme launched in 2018 to all three-room HDB flats. In addition, we will give all one to three room HDB households a \$50 voucher to offset the cost of changing their shower fittings to more water-efficient three-tick models.

76. If all eligible households make the switch, we can collectively reduce emissions equivalent to taking around 12,600 cars off the road, and save up to 400 million gallons of water annually!

### ***Support Passionate Youths and Citizens***

77. Next, let me focus on the ground-up efforts of our youths and citizens to address climate change. I commend our youths who are channelling their passions into positive change for the environment. During the Year of Climate Action in 2018, more than two climate-related activities per day were conducted, and youths played a big part in them. Recently, a group of 50 youths participated in the Environmental Track of the Youth Action Challenge organised by the Ministry of Culture, Community and Youth, submitting projects ranging from waste reduction to green technologies. We will work together with these youths to deliver some of these ideas into reality.

78. To empower our youths with knowledge and experience on sustainability, my Ministry is working with MOE and the National Youth Council. We want to introduce more sustainability programmes in schools and community facilities. Even OBS@Coney will be designed to be an eco-experience for our youths to learn and enjoy.

79. The Government will work with schools to introduce initiatives which will integrate green infrastructure, sustainability programmes, and curriculum design to inculcate positive environmental values in our youths, like ones done in Mee Toh School.

80. Another group of Singaporeans whose efforts I would like to recognise are those that are willing to share their experiences and ideas on sustainability. Last year, my Ministry convened our first Citizens' Workgroup on recycling, where 48 participants joined us on a month-long journey of co-creation. We will be setting up two more Citizens' Workgroups this year focusing on more issues that Singaporeans care about. One Workgroup will start the conversation on how we can increase demand for local produce. I invite interested members of the public to visit our website at [foodstory.sg](http://foodstory.sg) to find out more about the Workgroup and sign up for it. Another Workgroup on reducing the

excessive use of disposables will also be set up. As we have done with the recycling workgroup, we will carefully consider and work with these workgroups to realise some of their recommendations.

### ***Eco Towns***

81. It is our aspiration for Singapore, as a nation, to practise sustainable development and put sustainability at the centre of the way we live, work and play. At Budget, DPM spoke about the Ministry of National Development's Green Towns Programme, which injects sustainability into the infrastructure of our HDB Towns. Beyond the look and feel of our housing estates, MEWR will introduce initiatives that will encourage Singaporeans to live and breathe sustainability. Let me elaborate.

82. We have come far in the last twenty years, since the development of Punggol as Singapore's first Eco Town. We have a vision to transform all HDB towns into Eco Towns.

83. First, as we rejuvenate neighbourhoods, we will create more sustainable community touchpoints. We will build sustainable hawker centres that strive towards zero waste. Second, we will introduce community-based programmes that foster sustainability initiatives on the ground. Third, we will develop indicators for towns to track their progress and benchmark against national sustainability targets in carbon, energy, water, and recycling. This will drive home the message that the effort of each and every Singaporean counts.

84. I am happy that Tampines, Choa Chu Kang and Nee Soon Towns are coming on board to become Singapore's first Eco Towns. Let me share some initial efforts.

85. In Tampines, we are piloting new sustainability projects which can be replicated in other towns. The first project, 'Sustainability @ Tampines Park', will be Singapore's first community-based circular ecosystem for food production. Residents from 12 HDB blocks will be segregating food waste generated in their homes, to be fed to black soldier fly larvae. The larvae will produce fertiliser for a new vertical vegetable farm, and the larvae will be fed to Tilapias cultivated in the Tampines Park pond. Not only will this project reduce food waste, it will simultaneously strengthen the community's food resilience!

86. The second project in a different part of Tampines is the introduction of 'Eco Boards'. Eco Boards are low-energy digital boards that provide block-level information on water and energy use to residents. Together with Singapore Power and Temasek, we plan to build Eco Boards in several sites across Tampines Town. These Eco Boards will enhance the residents' awareness of their resource usage, and illustrate the impact of green infrastructure such as solar panels.

87. More details on the three Eco Towns will be announced over the coming months. I believe that the success of these Eco Towns will inspire other towns to begin their own journey of transformation towards sustainability.

88. To build our sustainable Singapore together with Singaporeans, DPM announced at Budget the establishment of a Singapore Eco Fund. Mr Mohamed Irshad and Mr Gan Thiam Poh asked for details of this fund. We are happy to announce that the \$50 million SG Eco Fund will be made available later this year to the people, private and public sector, to support the co-creation of a sustainable Singapore. We welcome project proposals which involve the community, and can deliver measurable impacts on our sustainability goals. My Ministry will also set up an SG Eco Office to co-ordinate sustainability projects across Singapore.

## **CONCLUSION**

89. Let me conclude. When we started our journey as a nation, our founding fathers gave us a vision of being the cleanest and greenest city in Southeast Asia. Even for this we were inspired to do it together. Mr Lee Kuan Yew said in 1968 at the launch of the inaugural Keep Singapore Clean Campaign: “For only a people with high social and educational standards can maintain a clean and green city.” And he went on to say: “Only a people proud of their community performance, feeling for the well-being of their fellow citizens, can keep up high personal and public standards of hygiene.” We are now on our journey towards a sustainable and climate friendly Singapore. It is a journey that we can only make, together. Prime Minister at a tree-planting event in 2014 said: “But we also have to do more than just plant trees. We also have to make the whole of the environment sustainable, friendly to people, and also for Singaporeans to be friendly to the environment.” It is for this reason that the Government will place sustainability at the core of everything we do. However, only by living and practising sustainability together can we mitigate the impacts of climate change and secure the resources needed to take Singapore into the future. Let us all play our part and work together, as one people, to ensure that Singapore remains a liveable home for our future generations.

90. Mr Chairman, I will now hand over to Senior Minister of State Dr Amy Khor to address other strategies that will make Singapore a clean, sustainable and liveable home.

Graduands of the 116/19 Officer Cadet Course

Parents

Distinguished Guests

Ladies and Gentlemen

1. A very good evening to all of you. It is my pleasure to join you and your loved ones on this special day to witness and celebrate your commissioning.

2. Over the past nine months, every one of you standing on the parade square has demonstrated great resolve and discipline to meet the exacting training standards in Office Cadet School. Congratulations – you have truly earned the right to be commissioned as an officer of the Singapore Armed Forces. But what comes after today requires even more from you. As a commissioned SAF officer, the expectations on you are high – you have to defend our country’s sovereignty, protect our way of life, and lead your fellow soldiers. This is a solemn duty and a calling of the highest order, which you have chosen to accept today.

### **EVOLVING ROLE OF THE SAF**

3. The role of the SAF has evolved over the years, in response to global developments. It will continue to evolve, to help Singapore tackle future challenges.

4. One of these challenges is climate change. As a low-lying city state, climate change is an existential threat to Singapore. That is why PM Lee mentioned in his 2019 National Day Rally speech that we should treat climate change defences like we treat the SAF – with utter seriousness. Our government has taken early actions to build Singapore’s climate-resilience. We have done this in three ways.

5. First, we have invested to learn more about climate change. We set up the Centre for Climate Research Singapore, or CCRS, in 2013. This has allowed us to better understand the science of climate change and its effects on Singapore and our Southeast Asia region. Last year, CCRS launched a S\$10 million National Sea Level Research Programme to better understand sea levels around Singapore, and develop more robust projections of sea level rise. This year, we are setting up a new Climate Science Research Programme Office to lead, formulate and implement the National Climate Science Research Masterplan.

6. Second, we have put in place a comprehensive suite of measures to reduce our carbon emissions across all sectors. This includes the implementation of a carbon tax – the first in country to do so in Southeast Asia - efforts to improve industrial energy efficiency, and the greening of our transport. We are also harnessing more solar power. By next year, PUB will have deployed floating solar systems at Bedok, Lower Seletar, and Tengeh Reservoirs. With this, Singapore will be one of the few countries in the world to have 100

per cent green waterworks. We are also taking steps to better manage our waste streams, and move towards zero waste and a circular economy approach. On the international front, we continue to push for constructive multilateral agreements on climate action.

7. Third, even as we do our best to mitigate carbon emissions, we are also taking actions to address and adapt to the multi-faceted impacts brought about by climate change. This includes sea level rise, more frequent and intense storms, prolonged dry weather, and the exacerbated threat of vector-borne diseases. From April, PUB will take on the role of the national Coastal Protection Agency, to study both coastal and inland flooding holistically and develop plans to protect Singapore from floods and sea level rise.

8. I am heartened that MINDEF and the SAF are also doing your part to fight climate change through sustainable development. Earlier this month, the SAF unveiled its first net energy-positive building – a new hangar at Changi Air Base that harnesses solar panels and natural ventilation. MINDEF has also commissioned net zero-energy buildings in Kranji and Seletar Camps, and buildings in twelve army camps will be equipped with solar panels by the end of this year. Under a collaboration with the National Environment Agency and Defence Science and Technology Agency, MINDEF has established a waste management system that recycles food waste into biogas to generate energy. MINDEF's efforts are projected to reduce 11,500 tonnes of carbon emissions. This will help Singapore achieve our target of halving our 2030 peak emissions by 2050.

9. The SAF is also an icon which our people identify with and draw strength from, in times of need. Even as I speak, our nation is grappling with COVID-19. I am moved to see so many Singaporeans, especially our frontline healthcare staff, selflessly stepping up to contribute to our nation's efforts to battle COVID-19. The SAF has also responded well to the crisis. 1,500 SAF soldiers worked round the clock to pack more than 5 million surgical masks for public distribution, while many others supported temperature screening efforts at Changi airport and our national contact tracing centres. These efforts underline the important contributions of the SAF in peace time, and its ability to mobilise resources at short notice.

## **DETERRENCE AND NATIONAL DEFENCE REMAINS CORE**

10. No matter what comes our way, one thing will always remain a constant for the SAF — its core mission of defending Singapore and safeguarding our borders.

11. The SAF, like Singapore, may be small in size, but it stands tall and proud to defend our rights and advance our national interests. The source of that strength lies not just in modern and sophisticated weaponry, but the heart and dedication of the people who make up the SAF. Given our country's physical constraint and small population, it is not possible for us to maintain a large, regular army. National Service, or NS, has therefore been integral in building up a strong and deterrent military force. Generations of national servicemen have put in countless hours, sweat and tears so that we can continue to live our Singaporean way of life. And in doing so, many have bonded over shared experiences

and developed life-long friendships, further strengthening the social fabric integral to a cohesive and resilient society.

### **NS IS A COLLECTIVE CONTRIBUTION**

12. Just as Singapore and Singaporeans draw strength from the SAF, the SAF is made up of servicemen and women who in turn draw strength from the support of parents, spouses, employers, and the community at large. To the family members, friends, and loved ones here today, your steadfast support, encouragement, and unwavering love for our graduands over their nine months of training have not gone unnoticed. I sincerely thank you for your support, on their behalf.

### **DEVELOPING LEADERS WITH THE RIGHT VALUES**

13. Let me conclude. To the commissioning class, bear in mind that as an Officer of the SAF, your duty is to rally and nurture fellow Singaporeans who come from different races, religions, and socioeconomic backgrounds. You will have to inspire them to serve with distinction and commit to the common cause of keeping Singapore safe and secure. Remember also the trust placed upon you by their own families and loved ones, and always return these men and women under your command safely to them.

14. The end of today's journey marks the beginning of a new one. As the saying goes, the only easy day was yesterday. The road ahead will be tough, but it will build character and resilience. Be humble, lead with your heart, and serve with purpose. I have every confidence that you will be able to Lead, Excel, and Overcome, as the Officer's Creed implores you to.

15. Congratulations once again to all graduands.

16. Thank you.

Dr Koh Poh Koon  
Adviser to Ang Mo Kio GRC GROs

Ladies and Gentlemen

1 Good afternoon. Thank you for joining us at today's launch of the National Dengue Prevention Campaign 2020.

2 Yesterday, the Ministry of Health announced that two COVID-19 patients had passed away due to complications, despite the best efforts of the medical team. Our thoughts are with their families. I understand many are worried by this news. We have taken this virus very seriously from the start, and will continue to enhance our precautionary measures, including implementing safe distancing measures. Let us all take the necessary measures as advised and support one another through this difficult period.

### **Current Dengue Situation**

3 Indeed, 2020 has been a challenging year for the world and Singapore, as we continue to battle the COVID-19 situation. But this is not the only public health threat that Singaporeans face. Over 4,000 dengue cases have been reported since the start of this year, which is double the number of dengue cases reported in the same period last year.

4 This unusually high number of cases outside the typical peak dengue season is a cause for concern. As we enter the warmer months of the year, there could be more instances of transmission.

5 The surge in dengue cases is due to three key factors. First, the presence of the less common Dengue virus serotype 3, or DENV-3. We have detected more DENV-3 cases over the past four months. As Singapore has not experienced such a DENV-3 outbreak in almost 30 years, our population has lower immunity against DENV-3. It is still too early to determine if there is a switch in the predominant dengue virus serotype, but the National Environment Agency, or NEA, is monitoring the situation closely.

6 The second cause for the surge in dengue cases is the high *Aedes aegypti* mosquito population in some areas. Climate change has led to warmer temperatures and more intense rainfall, which facilitate the faster multiplication of the *Aedes aegypti* mosquito and dengue virus.

7 So first, we have a less common dengue virus serotype emerging and lower immunity against it, and second, we have more *Aedes* mosquitoes carrying the dengue virus. This has resulted in a higher number of dengue cases, which in turn increases the chances of dengue transmission. So that is the third reason for the surge in dengue cases we are seeing.

8 There are currently 300 to 400 cases per week. If the three factors I mentioned persist, this number could rise beyond the historical weekly peak of 891 cases recorded in July 2014, during the peak season.

9 The launch of the National Dengue Prevention campaign is traditionally held in April or May. But we decided to bring it forward this year to raise the alert on the dengue surge and encourage everyone to do their part. It is critical that we act now to reduce the risks of increased transmission.

### **NEA's Dengue Prevention Efforts**

10 NEA has been doing its part by engaging key stakeholders, such as members of the Inter-Agency Dengue Task Force and Town Councils, to remove potential mosquito breeding habitats from public areas and housing estates. From January to February this year, NEA conducted about 161,000 inspections. During the inspections, NEA uncovered about 3,200 instances of mosquito breeding habitats islandwide.

11 In addition, NEA has strengthened our Gravitrap surveillance system. The Gravitrap is designed to attract and trap female *Aedes* adult mosquitoes that are looking for sites to lay their eggs in. It also prevents the emergence of any mosquitoes from eggs that are laid in the trap. A total of 14,000 Gravitraps were deployed to newly completed HDB blocks and landed housing estates in January this year. We now have a more comprehensive vector surveillance capability to aid our vector control efforts. With better surveillance and analytics capabilities, we have observed a 90 per cent increase in the detection rate of *Aedes* larval habitats found in homes for the past three years.

12 We need everyone to take personal responsibility. NEA's efforts alone cannot stem dengue transmission, given the short breeding cycle of seven days for the *Aedes* mosquito. We need everyone to do the Mozzie Wipeout regularly. In some of the large dengue clusters, NEA had detected repeated mosquito breeding in the same homes despite giving multiple alerts to residents. I therefore appeal to residents to do your part to remove potential breeding habitats in your homes, to keep you and our communities safe.

### **Need for Collective Action**

13 Last month, NEA launched the "SG Clean" campaign to galvanise collective community action to keep our public spaces clean. While the campaign addresses the immediate risks from COVID-19, it also sets out to improve public hygiene and cleanliness for the long term. This is critical to safeguarding public health.

14 For instance, we should always dispose our litter properly to prevent them from collecting stagnant water, which are potential mosquito breeding habitats. Over the past three years, more than 3,000 mosquito breeding habitats were linked to containers and receptacles found in public areas. About 65 per cent of these receptacles – such as plastic containers and empty drink cans – had been improperly discarded. At home, it is also important that we remove stagnant water from potential mosquito breeding spots, such as flower pot plates, vases, pails and hardened soil. These simple yet important steps will help to eradicate mosquito breeding habitats and keep our loved ones safe.

15 To facilitate community action, we have published information on areas with relatively higher *Aedes aegypti* mosquito population on the NEA website and myENV app. I encourage everyone to subscribe to this information alert, so that we can take early action to prevent dengue clusters.

16 NEA is also putting up posters at the lift lobbies of HDB blocks to inform residents of upcoming inspections and insecticide spraying for all homes within the dengue cluster areas. I ask for your cooperation to allow NEA officers to carry out the checks and spraying in your homes. We should also inform our family, neighbours and friends about these efforts so that they are aware and lend support.

### **Conclusion**

17 Let me conclude. I thank all our Grassroots Leaders, volunteers and residents who have been supporting Singapore's journey to combat dengue. Let us come together to keep dengue at bay and safeguard the health of our loved ones and community.

Thank you.

Chairperson

Excellencies

Distinguished delegates

1. Allow me to begin by thanking the Kingdom of Saudi Arabia for convening this Extraordinary Virtual G20 Agriculture Ministers Meeting.

2.COVID-19 is the gravest health crisis the world has faced in a century. It has claimed and disrupted daily lives and impacted all our economies. The crisis also reminds us how inter-connected we are as a single global community, and the importance of global cooperation and unity.

3. Of particular concern is the potential impact of the COVID-19 pandemic on global food security. Food supply disruptions and shortages pose an immediate danger to the health and well-being of our populations. All around the world, we have seen worried citizens rush to supermarkets for essential food items, no doubt concerned about the availability of food and essential supplies.

4.This global crisis has reminded us of the importance of strengthening food security and resilience. In Singapore, even before COVID-19 pandemic, we have seen the threat of food supply disruptions arising from climate change and resource scarcity. We have been preparing for it. To make our food supply more resilient, we are pursuing three strategies, also known as our three 'food baskets': 1) Diversify import sources; 2) Grow local; and 3) Grow overseas. As part of this strategy, Singapore has diversified our food imports to source from over 170 countries and regions. We have built stockpiles of essential food supplies. We have also announced our 30-by-30 goal – to meet 30% of Singapore's nutritional needs with food produced locally by 2030.

5.In light of current circumstances, we are putting our 30-by-30 goal on a fast track. We have just announced 30x30 Express, to accelerate food production over the next six to 24 months. We will develop an innovative agri-food sector that is highly productive and sustainable. We are also investing in research and development in urban food solutions and alternative proteins.

6.But to effectively strengthen our individual and collective food resilience, we must all work closely together to ensure global food supply chains continue to flow well. It is in the collective interest of the global community to ensure that trade lines remain open, including via air and sea freight, to facilitate the flow of goods and essential supplies, including food.

7.Singapore is committed to play our part to keep trade flows open. Our critical infrastructure such as air and seaports will remain open to support the viability and integrity of food supply chains. This is why Singapore and eight other countries – Australia, Brunei Darussalam, Canada, Chile, Lao PDR, Myanmar, New Zealand and Uruguay – issued a Joint Ministerial Statement affirming our commitment to ensuring supply chain connectivity amid the COVID-19 situation. We encourage more countries to join us in this endeavour. We also call upon the G20 Agriculture Ministers to affirm the importance of maintaining open and connected supply chains, especially during the global pandemic.

8. In this spirit, I would like to voice Singapore's support for the G20 Ministerial Statement to be adopted at this meeting.

9.I would like to conclude by echoing the statement of Singapore's Prime Minister Lee Hsien Loong at the Extraordinary Virtual G20 Leaders Summit on 26 March 2020. As this crisis continues to shed light on our individual vulnerabilities, countries may seek for more safeguards against the risks of globalisation, and to strengthen national capabilities to reduce dependence on others. But we should resist the urge to turn inwards. This pandemic is proof of our interdependence, not an indictment of globalisation. As we meet under these extraordinary circumstances, the G20 Agriculture Ministers have a rare and important opportunity to show leadership and reaffirm your commitment to lead the global effort to overcome the COVID-19 crisis. At such a disruptive and challenging time, we cannot revert to the laws of the jungle world, where the strongest survive, leaving behind the weak and helpless. Multilateralism and global cooperation must prevail over narrow nationalistic, beggar-thy-neighbour approaches. The G20 must work in close

collaboration with the UN and its agencies notably WHO, FAO, as well as the WTO, the IMF and the World Bank, and lead the collective response to the global pandemic and resolve problems like the flow of supply chains and food. I look forward to working with all of you to reaffirm our commitment, as one global community, to work together to suppress the COVID-19 virus and address its impacts, including ensuring strong global food supply chains and food security for all.

Ladies and Gentlemen,

I am pleased to join you at this first Virtual Conscious Festival organised by Green is the New Black. Ironically, COVID-19 has within months achieved what we have failed to do for years, and that is to transform and digitalise the way we work, do business and conduct meetings.

2 Countries around the world continue to grapple with the unprecedented COVID-19 pandemic and its staggering impact. Lives have been lost, and economies devastated.

3 My Prime Minister, Mr Lee Hsien Loong, has described this pandemic as the most dangerous crisis that humanity has faced in a very long time. But even as we battle this crisis of a generation, we must not forget that climate change, if not tackled decisively, could well become the crisis of many generations. As we rebuild our economies and adjust to a new normal, we should not waste this crisis. We must also take this opportunity to redouble our efforts to fight climate change and move towards a low-carbon and sustainable future.

4 Today, I would like to share my thoughts about some similarities between the COVID-19 pandemic and climate change, and two key lessons learnt as we continue to battle this pandemic — the importance of planning ahead, and the need for not just individual but collective action to overcome both challenges.  
Complex Challenges

5 First, what are the similarities between COVID-19 and climate change, besides the somewhat frivolous fact that both begin with the letter “C”? We have seen how COVID-19 has devastated the lives of people around the world. We have also experienced some of the destructive impact of climate change on lives and livelihoods, such as more intense rainfall leading to severe floods, and prolonged dry spells leading to droughts. Both the virus and climate change are invisible, transcend boundaries and are no respecter of persons or governments. Both challenges are complex, and their consequences are disruptive and catastrophic. Both demand countries and their citizens to respond on multiple fronts, simultaneously, and most important of all, collaboratively.

6 Are there lessons from COVID-19 that we can apply to climate change? *I believe so.* Singapore is better prepared for COVID-19 today than we were for SARS in 2003. That is because we learnt from our SARS experience and planned ahead for potential virus outbreaks. Besides developing a crisis management plan which we continued to refine over the years, we also expanded and upgraded our medical facilities, and trained more doctors and nurses to deal with outbreaks. We also invested in developing research and diagnostic capabilities to study viruses.

7 After Singapore confirmed our first COVID-19 case in January this year, our scientists worked closely with our public health community to develop different diagnostic test kits to detect the virus. These include one that is now in routine use in hospitals and labs, another for testing travellers and returning Singaporeans, and a third that detects virus-specific antibodies that could help in contact tracing and establishing links between infection clusters. Today we have achieved a high number of tests – 71,000 tests per million population – and thankfully, one of the lowest death rates in the world for COVID-19, at below 0.1 per cent. Nonetheless, we are not out of the woods yet. We must continue to learn and adapt as we fight this wily virus in order to win this war and be even better prepared for future pandemics that may, or should I say will, come our way.

8 The COVID-19 outbreak has underscored the importance of planning ahead to avert catastrophes. We must do no less for climate change, which can be equally, if not even more, disastrous.

### **Planning Ahead**

9 Singapore embarked on our journey to understand, mitigate and adapt to climate change early on. In 2007, we established an Inter-Ministerial Committee on Climate Change to coordinate a whole-of-nation response. We set out to ensure that our plans are based on robust science. In 2013, we established the Centre for Climate Research Singapore. It is one of the few dedicated centres in the region that focuses on research on tropical weather and climate. The Centre is cooperating with their counterparts in our neighbouring countries to study how climate change is affecting Southeast Asia. It has launched a S\$10 million National Sea Level Research Programme to strengthen our understanding of sea levels around Singapore, and develop more robust projections of sea level rise. A new Climate Science Research Programme Office will also be set up this year to lead, formulate and implement our National Climate Science Research Masterplan, and to systematically build up our climate science capabilities.

10 We are committed to play our part to mitigate climate change as responsible global citizens. Let me give you some examples. Singapore is an alternative-energy disadvantaged country with limited access to alternative energy sources such as geothermal, wind and hydropower. Due to our small size and dense urban landscape, even the deployment of solar energy, our most viable renewable energy source, is challenging. To overcome our constraints, we are investing in innovative solar technologies, such as floating solar photovoltaic systems on our reservoirs and offshore. The floating solar PV system we are building on the Tengeh Reservoir will be among the world's largest when completed in 2021. It will make Singapore's waterworks one of the few in the world to be 100 per cent green.

11 We have ambitious plans to green our buildings and our transport sector. As of March 2020, we have greened more than 40 per cent of our buildings, by gross floor area. By 2030, we aim for 80 per cent of our buildings to be green. As part of Singapore's Land Transport Master Plan 2040, we aim for nine in 10 peak-period journeys to be made via public transport, active mobility or shared transport, up from 7 in 10 today. By 2040, we also aim to have 100 per cent of our public bus and taxi fleets running on greener and cleaner energy.

12 We are also pursuing circular economy approaches. Last year, Singapore launched our inaugural Zero Waste Masterplan, which outlines our strategies to reuse and recycle resources, turn trash into treasure and produce and consume sustainably. By 2030, we aim to reduce, by 30 per cent, the amount of waste we send each day to our only offshore landfill, which primarily consists of incinerated bottom ash, or IBA. Among the many ways we plan to do this is to turn IBA into construction material which we call NEWSand, just like our recycled water, which we call NEWater. In fact, we are also looking to harness pyrolysis oil from our plastic waste, and we are going to call it NEWOil! We are pursuing the circular economy even at our incineration and waste water treatment plants. We are co-locating a water reclamation plant with an integrated waste management facility to harness synergies between water, energy and waste. To maximise resource efficiency, food waste will be co-digested with used water sludge to triple biogas yield, generating energy to power the entire facility. This is how we are living by the mantra that green is the new black!

### **Collective Action**

13 Let me now talk about the second lesson from COVID-19 — the importance of collective action. COVID-19 has presented an unintended silver lining. The pandemic has brought many activities literally to a standstill, resulting in a reduction in carbon emissions and air pollutants, and the return of clear blue skies and waterways to many cities. Even if the actions were imposed upon us, it shows that individuals and countries can make a positive difference to the environment if we take concerted and collective action. Pollution, like COVID-19, does not respect boundaries.

14 Singapore will continue to do our part. In March this year, we submitted our enhanced Nationally Determined Contribution and Long-Term Low-Emissions Development Strategy document to the United Nations Framework Convention on Climate Change. We have pledged to peak emissions at 65MtCO<sub>2</sub>e around 2030. We aspire to halve our emissions from its peak to 33MtCO<sub>2</sub>e by 2050, with a view to achieving net zero emissions as soon as viable in the second half of the century. Achieving these ambitious targets will require massive and concerted effort across all sectors of our economy and society at large.

15 We are also partnering our citizens to co-create and co-deliver solutions for our environment. Last year, we convened a Citizens' Workgroup to jointly develop solutions with Singaporeans at large to improve household recycling. This year, we will convene similar Workgroups to look at how we can strengthen Singapore's food security, and reduce the excessive consumption of disposables. We have also set up a new SG Eco Office to promote sustainable practices in our communities. The Office will administer a S\$50 million SG Eco Fund to support the co-creation of sustainability initiatives with Singaporeans.

16 Many of the participants in this Virtual Conscious Festival are leading the way in advocating a green lifestyle, through our daily habits and decisions. Your efforts to make sustainability a new way of life is indeed commendable. Every action to reduce our carbon footprint matters. I am glad that Green is the New Black is encouraging the public to make #LittleGreenSteps with the hope to create real change. Do pledge your support for this movement at their website. I hope that the little green steps you take will multiply, and spark a green revolution across all the nations of the world.

## **Conclusion**

17 Let me conclude. Like the COVID-19 pandemic, climate change will bring about unprecedented changes to the world as we know it. But the challenge is not insurmountable. With bold and decisive long-term plans, the political will to sustain them, and the collective efforts of businesses, civil society and individuals, like many of you here, we can avert a crisis of many generations and make this world a better place for ourselves and our children.

Thank you.

Ladies and Gentlemen,

1 Good morning. It is my pleasure to provide the keynote address on the theme – “The Fortitude Approach in Crisis Times”.

2 This conference comes at a time of great disruption. Jobs and skills are foremost issues on the minds of governments and citizens globally, given the unprecedented impact of the COVID-19 pandemic across the world. Allow me to share my views on what we can all do to tide through this trying period, even as we ready ourselves for the next phase of opportunity.

### **Impact of COVID-19**

3 The COVID-19 pandemic will continue to have extensive repercussions across the world. Besides the public health crisis of COVID-19, we also have an economic crisis. According to the International Monetary Fund, the global economy is projected to contract by almost 5% in 2020, worse than the 2008-2009 Great Financial Crisis. This time, unlike during SARs when the impact was mostly felt in Asia, countries across the world have imposed lockdowns and closed their borders, disrupting supply chains and tipping many economies into deep recessions. Corporate bankruptcies are in the news every day, which will lead to retrenchments and a slowdown in hiring. While we see gradual re-opening, the economic recovery will take time.

4 Singapore has also been affected. Indeed, because of our openness and interconnectedness with the global economy, we have felt the effects more sharply. Singapore’s economy is expected to contract by 4 to 7% this year, the worst in our history. Unemployment rates are at a 10-year high, and companies are expected to retrench more workers. In the months to come, we must expect more uncertainty and disruption. Many Singaporeans are rightfully worried about job prospects and livelihoods.

5 I am confident we can overcome this challenge, together. First, as we support each other in the near term and cope with the disruptions brought about by the COVID-19 pandemic. Then, as we work together to build capability, up-skill, and re-skill to seize new growth opportunities in the region and beyond.

### **OUR IMMEDIATE PRIORITY – SAFE RE-OPENING, STRONG RECOVERY**

6 Let me start with our near-term priorities.

7 First, we must ensure a safe re-opening, which will form the base for a strong recovery in the new COVID-safe normal. We are now in Phase Two of re-opening. Social and community activities are resuming, and many of us are experiencing a greater sense of normalcy by visiting our loved ones or having a meal out. Yet, we must not let our guard down. Every individual and business has a role to play to ensure that we keep the transmission of COVID-19 in the community low.

8 Second, to help Singaporeans stay employed during this trying period. I sit on the National Jobs Council chaired by SM Tharman, which has set itself the ambitious goal to identify and develop opportunities for close to 100,000 jobseekers over the next year. The Council will oversee the implementation of the S\$2 billion SGUnited Jobs and Skills package, which will create jobs, traineeships, and skills training opportunities to support workers from different sectors and every skill level. This is a national effort, and with the tripartite partners working in close concert, we will scale up opportunities to a new level, and empower Singaporeans to take full advantage of them.

9 Even as COVID-19 has forced businesses to a halt, the crisis has also brought about new needs, and with it, job opportunities.

10 For example, to implement safe distancing measures. For the Circuit Breaker period, agencies in the taskforce led by my ministry hired 1,300 temporary staff from industries affected by COVID-19, such as aviation and hospitality. They took on the crucial role of Safe Distancing Ambassadors and SG Clean Ambassadors and helped to ensure that individuals and businesses adhere to safe distancing measures. We hope to increase the number of Ambassadors as we resume activities in phases, to sustain efforts to educate the public and promote new norms.

11 There has also been a surge in interest from companies looking to maintain and raise standards of public cleanliness, to safeguard public health. This has long been a priority, but COVID-19 has brought even greater urgency and importance to the issue. As we ramp up our environmental services to strengthen public cleanliness, we will create more new and enhanced jobs. For example, there will be increased demand for cleaners with specialised disinfection knowledge, or assessors for the SG Clean Quality Mark.

12 These are just two of many areas that require manpower during the crisis. There are many others who have taken on new roles, such as in healthcare, as swabbers, operations support staff, and site supervisors.

## **READYING OURSELVES FOR THE NEXT PHASE OF OPPORTUNITY**

13 Beyond the immediate term, we must prepare ourselves for the next phase of opportunity. In that regard, it is not all doom and gloom. Singapore has unique strengths that set us apart. We are also building on our Future Economy which was already well under way before COVID-19.

14 We are seen as trustworthy, connected with the world, and with world-class infrastructure and a skilled workforce. All of us – the Government, workers, and businesses – must come together to seize new opportunities. As announced by DPM Heng, the Emerging Stronger taskforce has set up seven industry-led Singapore Together Alliances for Action.

15 At the same time, many of our ongoing and longer-term plans remain sound, and continue to be promising engines of growth for Singapore. I will speak on three areas in my Ministry's work – sustainability and green growth, resource resilience, and digital transformation.

16 **First**, sustainability and green growth. Climate change has and remains an existential threat to Singapore. We will play our full part to fight climate change, make the shift towards a low-carbon, climate resilient and sustainable Singapore, and seize growth opportunities it presents. We are taking on de-carbonisation efforts to transition Singapore's energy intensive sectors to a low-carbon future. We are also building capabilities in climate science and putting in place island-wide coastal protection measures. Such efforts to strengthen our response to climate change will create specialised jobs in areas such as carbon and sustainability services, climate sciences and coastal protection.

17 Likewise, a circular economy approach to waste management will help us to move beyond efficient waste management, towards a Zero Waste Nation. Last year, we launched our first national Zero Waste Masterplan to set out our strategies to be a zero waste and circular economy. Our efforts to reuse and recycle resources, turn trash into treasure, and produce and consume sustainably will create new jobs in areas such as engineering, science, and environmental management over the next few years.

18 **Second**, resource resilience. Never has a crisis demonstrated the need for resource resilience more than COVID-19. While we can never guard against every risk, we must continue to build resilience in our supply chains and resource lines. Take for example, food supply. Imports will remain our most significant source of food in the foreseeable future, and import source diversification is essential to ensure that Singapore is not reliant on any one source country. The Government will assist the industry in their diversification efforts, such as by accrediting more source countries and farms for importers to buy from. Importers of key food items, starting with eggs, will be required to adopt business continuity plans, so that they are prepared to withstand potential food supply disruptions.

19 Aside from source diversification, we are also building greater self-sufficiency in our food supply. Even before the pandemic, we set an ambitious "30 by 30" goal to meet 30 per cent of our nutritional needs with food produced locally, by 2030.

20 To boost local production of food items, we need innovative, efficient and space-saving methods of farming. In April this year, we launched the \$30 million "30x30 Express" grant call to encourage our local agri-food players to use highly productive farming systems to ramp up local production in eggs, leafy vegetables and fish over the next six to 24 months. SFA also administers the Agriculture Productivity Fund, which has committed \$38 million over the past five years to raise the productivity of over 100 farms. Some examples include highly automated, climate control systems for vegetable farming and purpose-built closed-containment floating aquaculture farms.

21 In bolstering Singapore's food supply resilience, we are also poised to create good jobs in the high-tech agriculture and aquaculture industry, such as plant scientists, agronomists and aquaculture specialists. These jobs will require training. For example, SFA is working with Republic Polytechnic to develop a SkillsFuture e-learning course to provide workers with foundational training in agriculture technology. Later this year, SFA and the Nanyang Technological University will launch a new Food Science & Technology post-grad certificate programme to cover contemporary topics such as urban agri-technology, post-harvest technologies, and novel food innovations.

22 **Third**, digital transformation. COVID-19 has accelerated digitalisation and forced many companies to rethink their business model. We will support our people and businesses to acquire the digital edge to thrive in a post COVID world. The Government has committed over \$500 million to help businesses digitalise. We also formed the SG Digital Office to drive the acceleration of digital adoption in our community, and equip every individual and business with digital tools and skills to participate meaningfully.

23 Take our hawkers as an example. During the Circuit Breaker period, hawkers had to adapt to new ways of doing business, such as leveraging online food delivery services. To support the hawkers, NEA introduced a one-time funding of \$500 for hawkers who adopt food delivery services. As of today, more than 820 hawkers have benefited from the scheme.

24 We are also driving the adoption of e-payment to reduce the handling of cash. This would better protect our hawkers and patrons during this period of COVID-19. Under the "Hawkers Go Digital" programme, the Government has accelerated the roll-out of the Unified e-Payment Solution nationwide in NEA hawker centres, HDB coffee shops, and JTC industrial canteens. Stallholders are provided with financial incentives to use e-payment and will receive bonuses of \$300 per month over 5 months. Digital Ambassadors have also been deployed on the ground to help hawkers adopt e-payment.

25 Another example is our waste, cleaning and pest-management industry. This is an industry that is often viewed as low-skilled and low-tech. However, we are giving this industry a facelift by driving the adoption of technology and digital solutions to increase productivity. Our Environmental Services Industry Digital Plan will be refreshed to better guide companies on digital solutions to adopt at each stage of their growth. More details will be announced in August 2020.

26 In the years ahead, there will be significant opportunities in the environment space. We anticipate that through our efforts to enhance Singapore's climate, resource and economic resilience, over 55,000 individuals will benefit from new and upgraded jobs over the next 10 years.

## **COURAGE FOR THE ROAD AHEAD**

27 Let me sum up. Even though the pandemic has profound impacts on our economy, there are also opportunities to harness. We will work with Singaporeans, companies and unions to ensure that everyone can have the chance to develop themselves and contribute meaningfully to our economy and nation. Our people have always been Singapore's greatest asset, and I believe that together, we can take on these challenges, and emerge stronger.

28 Thank you.

## **Introduction**

Good morning. I would like to thank everyone for spending your Saturday morning with us, and for committing to join us for the next five sessions. We are heartened by your support, and thankful for your understanding of the changes we have had to make to the sessions, such as moving from physical meetings to online meetings, and having to commit to more sessions due to the current COVID-19 situation.

### **'30 by 30' goal and our Singapore Food Story**

2 Ensuring food security is an existential challenge for Singapore. We currently import more than 90 per cent of our food and this leaves us vulnerable to disruptions in the global food system due to climate change, disease outbreaks and volatilities of the global food market. This was underscored during the COVID-19 pandemic, when many countries undertook lockdown measures, and there was adverse impact on global trade and supply chains.

3 Even before the COVID-19 crisis, the Government has been planning and taking action to safeguard Singapore's food supply. To mitigate the risks of disruption to our food imports, Singapore has been diversifying our sources of food imports and building stockpiles of essential food items. Another key strategy that we must seriously pursue is to boost local food production. By 2030, we aim to meet 30 per cent of our nutritional needs with food produced in Singapore — in short, our "30 by 30" goal. Nonetheless, this is an ambitious goal given our inherent constraints. Singapore is a small city state with only around 700 square kilometres of land, and currently less than 1 per cent of it is designated for agricultural use. The challenge is compounded by the need to produce food in a resource-efficient and sustainable manner.

4 Earlier this year, my ministry launched "2020: Singapore Food Story", a year-long campaign to raise awareness of issues surrounding Singapore's food security. As events would have it, and as highlighted earlier, the COVID-19 outbreak escalated quickly, disrupting global supply chains and affecting trade and commerce worldwide. This pandemic has certainly reinforced the need for us to boost our local food production capacities to ensure that we have a resilient and secure supply of food.

### **Accelerating local food production**

5 The Singapore Food Agency, or SFA, has embarked on various strategies to increase local food production. Recently, a tender for the rental of rooftop spaces on nine HDB multi-storey carparks was launched, as part of efforts to open up more spaces for commercial urban farming. We received 88 proposals for the nine rooftop spaces and the tender will be awarded in the coming months. More multi-storey carpark rooftop sites will also be made available later this year.

6 SFA also provides funding support for the local agri-food industry to harness technology to grow more. The Agriculture Productivity Fund, or APF, and the \$144 million of funding under the Singapore Food Story R&D Programme are two examples.

7 In April this year, SFA established a \$30 million "30 x 30 Express" grant to accelerate local production of eggs, leafy vegetables and fish over the next six to 24 months. Once the companies have been awarded the grant, SFA will coordinate with agencies to facilitate the necessary regulatory clearances so that farms can start producing as soon as possible.

### **Government efforts to increase demand for local produce**

8 The increase in local production of food has to be complemented by a growth in demand, for a commercially sustainable and vibrant agri-food ecosystem. Choosing to buy local produce will help to spur our farms to embrace technology and become more productive to meet the increased demand. Otherwise, there may be no incentive for our farmers to increase their supply.

9 In a food perception survey commissioned by MEWR and SFA in January 2020, 94 per cent of respondents indicated that they would be willing to purchase more local produce. However, only 65 per cent could easily identify food that was grown in Singapore when grocery shopping. To create top-of-mind awareness for local produce, SFA has launched a new 'SG Fresh Produce' logo online, and the logo can be

found on local produce in retail shops and supermarkets from August onwards. In addition, we have been working with retailers, such as supermarkets, to carry more produce grown from local farms.

10 We are also helping to bring farmers and their fresh produce closer to consumers. SFA has worked with the Singapore Agro-Food Enterprises Federation, or SAFEF, to roll out the SG Farmers' Market in various housing estates and community clubs. This is to make it more convenient for residents living nearby to purchase home-grown leafy vegetables, eggs and fish.

11 To date, a total of eight SG Farmers' Markets have been organised in various locations across Singapore, including Singapore Turf Club, Bishan Community Club and Our Tampines Hub. In January this year, the SG Farmers' Market expanded online with the launch of e-SG Farmers' Market page on Lazada RedMart. Currently, we have 20 farmers on board and consumers can choose from a range of 100 local produce items, and have them delivered to their doorsteps. Through engaging the community, and encouraging citizens to purchase local produce, we hope to help Singaporeans understand the process behind bringing food from farm to fork, appreciate the hard work put in by our local farmers, and inculcate a sense of pride in Singapore produce.

### **Co-creating and co-delivering solutions**

12 While the Government will continue to ensure a resilient food supply and encourage greater support for local produce, it will take a whole of nation effort to reach our "30 by 30" goal. This is why we have invited citizens and residents to form this Citizens' Workgroup, as part of the SG Together movement.

13 I am heartened by the response we received. Close to 400 members of the public responded to our call, and a diverse group of around 50 members from different ages, ethnicities, professions, and level of support for local produce, have now come together for this endeavour. Today we have with us, in the Workgroup, students, retirees as well as professionals who run food businesses. We also have people who grow their own food at home and some who help out at local farms and NGOs in their free time. We hope to tap on your unique strengths, experiences and ideas, and work with you to co-create and co-deliver solutions to improve demand for local produce, that are adapted to Singapore's context.

14 Over the next three months, my colleagues will provide you with the necessary support and resources as you formulate your proposals. Subject matter experts will also be brought in to guide you along this journey. We are looking forward to the ideas that will arise from this workgroup, which will be presented at the last session on 24 October.

15 Once again, I thank you for your commitment to the Workgroup and look forward to partnering you to write a new chapter of the Singapore Food Story.

Thank you.

## **Introduction**

1 Good afternoon. Thank you for inviting me to speak today. This is my first engagement with students since I took on my new appointment as Minister for Sustainability and the Environment. I look forward to a meaningful conversation with you on climate change issues, and how we can keep Singapore sustainable and liveable not just for now, but for future generations as well.

2 Before we begin our discussion, let me highlight three points on Singapore's response to climate change.

- First, I would like to talk about Singapore's commitment to sustainability;
- Second, Singapore's constraints, and our three-pronged approach to tackling climate change; and
- Third, how individuals like you can play a part.

## **Singapore's commitment to sustainability**

3 Let me start with Singapore's commitment to sustainable development. Some of you have probably been wondering: what will Singapore be like in 10, 20 or 50 years from now? Will our environment be unbearably hot, or will Singapore be flooded? Will we have enough resources to support ourselves, and are we doing enough to mitigate climate change? I assure you that the Government shares your concerns on these issues.

4 In fact, sustainability has always been a cornerstone of Singapore's development. Since our independence, we have sought to balance our environmental considerations with economic development and social inclusion. We believe that they are complementary, and not contradictory.

5 Even in our early years, as our pioneer leaders worked to provide Singaporeans with jobs, affordable housing, clean water and education, they also planted trees around public housing estates, gazetted our nature reserves, cleaned up the heavily polluted Singapore River, and enacted laws against pollution. Today, we enjoy a clean and green environment, with flowing taps, and many parks and nature reserves.

6 The recent renaming of my Ministry to the Ministry of Sustainability and the Environment reflects the Government's emphasis on sustainability, and our plans to press on with major initiatives in carbon mitigation, coastal protection, zero waste and circular economy, as well as food and water security.

## **Singapore's constraints and our Climate Action Plan**

7 Next, let me touch on Singapore's constraints and our climate action plan. We are a small island state with limited natural resources. It was only through hard work, careful planning and deliberate implementation that we have been able to provide our people with reliable supplies of food and water, even though we are one of the most water-stressed countries in the world, and we have little land to grow food.

8 We recognised early on that climate change would make our future even more challenging. In 2007, Mr Lee Kuan Yew called climate change the "ultimate threat to human survival". That year, we established a high-level Inter-Ministerial Committee on Climate Change (IMCCC) chaired by then DPM S Jayakumar to dedicate resources to coordinate climate change policies and a whole-of-nation response.

9 We have taken a three-pronged approach to tackle climate change. First, we want to better understand climate change and its impact. Second, we are mitigating climate change by reducing our emissions across all sectors; and third, we are taking measures to adapt to climate change.

10 To better understand climate change, we set up the Centre for Climate Research Singapore (CCRS) in 2013 to strengthen our capabilities in climate science. Today, CCRS is one of the most advanced climate research centres in the region specialising in tropical climate science. A new Climate Science Research Programme Office will also be launched this year to lead efforts to develop and implement our National Climate Science Research Masterplan.

11 Second, to mitigate climate change, we have put in place a comprehensive suite of measures to reduce emissions across all sectors over the years. These include switching to natural gas as a cleaner fuel for power generation, implementing an economy-wide carbon tax, and greening our transport system and buildings. We will do our full part to mitigate climate change as a responsible global citizen.

12 Because we are small and highly urbanised, with low wind speeds and no geothermal resources, we are disadvantaged in alternative energy. We do not have access to many of the alternative energy options that other countries have. Solar energy is our most promising renewable energy option, but our limited land makes it challenging to deploy solar power on a large scale. But we are developing creative solutions within our constraints. For example, we are installing floating solar panels on our reservoirs, and they will be amongst the world's largest when ready.<sup>13</sup> Third, to adapt to the impact of climate change, we are prepared to spend an estimated S\$100 billion to protect Singapore against rising sea levels in the coming decades. Measures may include pumps, sea walls, reclamation (to a higher level), and polders/dykes. Earlier this year, our national water agency PUB also assumed the role of our Coastal Protection Agency. By combining coastal protection responsibilities with its stormwater

management functions, PUB will be well-positioned to look at inland and coastal flooding holistically.

13 Climate change will also challenge our access to critical resources such as water and food. For instance, extreme weather conditions can pose threats to our water supply, and we will need to ensure that our Four National Taps – imported water, water from local catchment, NEWater and desalinated water – continue to supply sufficient water to meet our needs. In June this year, we opened our fourth desalination plant — the Keppel Marina East Desalination Plant. It can produce about 30 million gallons of fresh drinking water per day, further strengthening our water supply resilience.

14 Rising temperatures and extreme weather conditions can also affect global crop yields. As Singapore currently imports 90 per cent of our food, this makes us vulnerable to disruptions to global supply chains, which the COVID-19 pandemic has underscored. To safeguard Singapore's food supply, we have been pursuing three strategies, also known as our three "food baskets". They are: 1) Further diversifying our import sources; 2) Growing more locally; and 3) Growing more overseas. By 2030, we aim to meet 30 per cent of Singapore's nutritional needs through locally-produced food. We call this our 30-by-30 goal. Of course, besides strengthening supply chains, we can also look to reduce food waste.

### **Individuals play an important part**

15 This brings me to my third point, which is how individuals like you can play a part. I have given you a quick snapshot of some of the Government's efforts in sustainable development, and how we are preparing for climate change. However, the Government cannot drive these efforts alone. Everyone has a role to play in fighting climate change – from businesses and organisations, to individuals like you.

16 Each of us has the potential to be an agent of change. We can make a difference by making climate-friendly choices in our daily lives and encouraging our families and friends to do the same. Think of ways to reduce, reuse and recycle our precious resources. Although climate change cannot be solved by any single person, the sum of our actions can be significant. For example, if all households in Singapore were to change one fluorescent lightbulb to an LED bulb, we could potentially achieve enough energy savings to power 1,000 four-room housing units. And if we all reduce our shower time by two minutes, we can save about 80 million litres of water – equivalent to the daily water usage for over half a million people in Singapore!

### **Conclusion**

17 Let me conclude. As leaders of tomorrow, you have the potential to make a positive impact on the environment by becoming a climate game changer. I am heartened that more youths are talking about sustainability and climate change, and what we can do together. These are important conversations that can help raise public awareness on the importance of collective action for the environment.

18 Thank you for listening, and I look forward to our discussion.

Mr Jens Ruebbert, President of the Singaporean-German Chamber of Industry and Commerce, or SGC

Mr Christoph Hallier, Charge d'affaires of the German Embassy in Singapore

Mr Nikolas Stürchler, Deputy Head of Mission / Counsellor of the Swiss Embassy in Singapore

Members of SGC

1 A very good morning to all of you. It is my pleasure to join you for this conference on sustainability. I would like to thank the SGC for organising this event, and Mr Jens Ruebbert and esteemed members of the SGC for presenting me with a copy of the Grün [*Groon*] Book earlier this morning. I congratulate the SGC, Advantage Austria and the Swiss Embassy on its successful publication.

2 My Ministry – the Ministry of Sustainability and the Environment – and the National Environment Agency were glad to support and contribute to this Book. It covers waste management and recycling practices, and possible collaborations between Singapore and Germany, as well as Austria and Switzerland, such as in closing the plastics loop through innovative plastic recycling technology. These countries are known for their waste management and recycling technologies. I look forward to advancing these discussions between our countries.

### **A Stronger Emphasis on Sustainability amidst Challenges**

3 Since the onset of the COVID-19 pandemic, the way in which we live, work and play has changed dramatically, and some of these changes may well be permanent. As countries continue to battle the outbreak and gradually restore economic activity, we must not waver in our efforts to mitigate and adapt to climate change. Neither should we miss the opportunity to build a cleaner, greener and more sustainable post COVID-19 world.

4 Singapore will play our part to fight climate change, and seize the growth opportunities that stem from these efforts. My Ministry was recently renamed the Ministry of Sustainability and the Environment to reflect an even stronger emphasis on sustainable development in our national agenda. We are developing our capabilities in climate science and implementing island-wide coastal protection measures. We are undertaking a full suite of carbon mitigation measures, and de-carbonisation efforts to help energy-intensive sectors transit to a low-carbon future.

5 As Singapore imports more than 90 per cent of our food, we are vulnerable to disruptions in global supply chains arising from volatilities of the global food market, impacts of climate change, and disease outbreaks. The COVID-19 crisis has underscored the importance of strengthening our resource resilience. To

encourage our local agri-food players to use highly productive farming systems to ramp up local production over the next six to 24 months, we launched a \$30 million “30x30 Express” grant call this year.

6 We will also strengthen our water resilience, and ensure that our Four National Taps – imported water, water from local catchment, NEWater and desalinated water – continue to supply sufficient water to meet the needs of our people into the future. Just like how we recycle our used water to produce NEWater, we are also adopting a circular economy approach to reuse and recycle our resources to turn trash into treasure. Our strategies to make Singapore a Zero Waste Nation are outlined in our Zero Waste Masterplan, which was published last year.

7 Adopting circular economy approaches will generate new opportunities for businesses and people. We already have a vibrant waste management and recycling industry in Singapore. Plans are underway to expand our local recycling capabilities and to close our food waste, e-waste, and plastic waste loops. These initiatives will create new jobs in emerging areas, such as engineering, robotics and automation. They will also put local companies in a position to export these solutions. These developments will strengthen Singapore’s economic resilience.

8 Pursuing sustainability through adopting innovative processes to achieve greater resource efficiency will give businesses a competitive advantage in the future economy. It will also have strong resonance with consumers who are increasingly environmentally-conscious.

### **Collaborating with Global Like-Minded Partners**

9 The EU-Singapore Free Trade Agreement, which came into force last year, commits the EU and Singapore to protecting environmental standards. The SGC has played an active role in furthering partnerships and ideas in the field of sustainability. This includes organising many events, such as the annual Energy Efficiency in Buildings symposium, and the Innovative Solutions for the Water Industry symposium, in close cooperation with PUB, our national water agency. These efforts are a testament to the partnerships between our countries.

10 In particular, we have seen how companies from Germany and Singapore benefitted from these partnerships. For example, German environmental solutions company, Alba Group, recently partnered local waste management company, Wah & Hua, to secure the public waste collection contract for the Jurong region in Singapore. I am heartened by their efforts to introduce innovative solutions into their waste collection systems, to improve sustainability and productivity. This includes electrifying their waste collection trucks and using sensors to monitor refuse level for greater efficiency in waste collection.

11 I believe that Singapore and Germany are well-placed to help address the waste challenges in the South-East Asia region by deploying cutting-edge

technologies and solutions. There is immense potential for greater research and exchanges in recycling which will generate economic opportunities and green jobs. In addition to working with like-minded partners in Europe, we will continue to find common ground with global partners and support international efforts to collectively address climate and sustainability issues.

## **Conclusion**

12 Let me conclude. I am encouraged to know that the SGC is pursuing the theme of 'Sustainable Growth' this year, which builds on their discussions over recent years on topics such as Fish Farming in the 21<sup>st</sup> century, Future of Vertical Farming and Green Financing. We look forward to new opportunities for collaboration with Germany and the SGC to address common environmental challenges and to chart our path towards a sustainable future.

Thank you.

Ms Jessica Cheam, Managing Director, Eco-Business

Mr Wong Kim Yin, Group President and CEO, Sembcorp Industries

Mr Bradley Busetto, Director, UNDP Global Centre on Tech, Innovation and Sustainability

Ladies and Gentlemen,

1 A very good afternoon to all. I thank Eco-Business and Sembcorp Industries for organising today's dialogue in support of Singapore's Climate Action Week, and for inviting me to join you.

### **FIGHT AGAINST CLIMATE CHANGE MUST CONTINUE**

2 Today's dialogue takes place amidst challenging times. The COVID-19 pandemic has resulted in many Singaporeans losing their jobs, and businesses being devastated. But even as we battle this crisis of a generation, my colleagues and I are acutely aware of the urgent need to press on in our other battle against climate change, which will threaten our very existence.

3 Singapore remains committed to making meaningful contributions to build on the global efforts to take collective climate action. In March this year, we submitted our enhanced climate pledge and long-term low-emissions development strategy to the United Nations Framework Convention on Climate Change, or UNFCCC. We hope our early submission will encourage other Parties to do likewise, thereby strengthening the momentum of global climate action at this critical time.

4 Last month, my Ministry was renamed the Ministry of Sustainability and the Environment, or MSE, to reflect the importance of sustainability in our national agenda. While Singapore has always strived to balance economic development with environmental protection and social inclusion, the threats posed by climate change have reinforced our determination to put sustainability at the centre of everything we do. We will rally every Singaporean to join us in this effort.

### **BUILDING UP OUR RESILIENCE**

5 Singapore is tackling climate change on three fronts — understanding climate change, mitigating it, and adapting to it. First, we are collaborating with partners to better understand climate change and its impact, through research and institutions, so that our actions can be based on robust science. For instance, we have committed S\$10 million to a National Sea Level Research Programme to strengthen our understanding of sea levels around Singapore.

This will help us develop more robust sea level rise projections in future, which we hope will also benefit our neighbouring countries.

6 Second, despite our constraints as an alternative-energy disadvantaged country, we are committed to reduce our emissions across all sectors with significant measures. This includes a carbon tax which we are applying with no exemptions. The Government is also moving to evolve our energy sector to be even cleaner and more efficient by further harnessing solar, and exploring ways to tap on regional power grids and emerging low-carbon alternatives.

7 Third, even as we do our full share to mitigate, we are taking early steps to safeguard our future. We are building resilience in three key areas: climate resilience; resource resilience; and economic resilience. Let me give you an example of how the Government is working with businesses to harness innovation and technology to build our **climate resilience**.

8 Those who are familiar with the Singapore Water Story will know how we have enhanced our water sustainability over the years by collecting every drop of water, reusing it endlessly and desalinating seawater. Today, we have “weather-resilient” sources of water from NEWater and desalinated water. But we are not stopping there. We are now working to develop energy sustainability in our water treatment. Singapore is joining the ranks of countries such as China, Japan and South Korea to deploy floating solar farms on our reservoir waters. I am happy to share that PUB and Sembcorp will commence construction of one of the world’s largest single inland floating solar farm at Tengeh Reservoir. Upon completion next year, PUB will be able to reduce its carbon footprint by 7 per cent, and aims to produce clean water from clean energy.

9 We are also building our **resource resilience**, to ensure a safe and secure supply of critical resources. Even before COVID-19 disrupted global supply chains, Singapore has been working to boost our local food production to buffer ourselves against such disruptions. Last year, we set an ambitious goal to meet 30 per cent of our nutritional needs with local food production, by 2030. In the immediate term, we will help local farmers increase their yield and productivity, such as by the introduction of support schemes such as the Agriculture Productivity Fund and the “30 by 30 Express” grant call. In the medium term, we will allocate more land and resources to expand the capacity of our food industry.

10 We are also strengthening our **economic resilience** to help our companies thrive in a future economy that is carbon-light, and to seize new opportunities in the green economy. As an example, we are adopting a circular economy approach to waste and resource management. Preliminary studies have estimated that if Singapore recovers and reuses valuable materials found in e-waste, we can reap a net benefit of S\$40 million. This translates into the creation of new export markets and new jobs. COVID-19 has also provided an

impetus for many companies to adapt and digitalise their businesses. In the environmental context, we are refreshing the Environmental Services Industry Digital Plan, which guides local SMEs in the industry to digitalise their businesses, plug skills gaps, and participate in industry pilot projects. One example is Chye Thiam Maintenance, a cleaning service provider. They have tapped on the Productivity Solutions Grant to adopt various productive cleaning solutions, including digital solutions such as Smart Toilet Monitoring System, and in the process redesigned the jobs to make work easier, safer and smarter for the cleaners who are now known as 'Hygiene Specialists'. More details on the Environmental Services Industry Digital Plan will be announced soon.

## **EMERGING STRONGER TOGETHER**

11 The examples I have mentioned are just some of the ways in which the Government is pursuing sustainability. We will not succeed if we walk alone on this journey. We started a series of dialogues known as the Emerging Stronger Conversations in June for Singaporeans to come collectively together to reflect on our COVID-19 experience, and to share our hopes and dreams for our future Singapore. In the spirit of SG Together, these conversations will guide how we work together – Government with citizens, and citizens with one another – to build our future together.

12 Today's dialogue, to discuss how we can emerge stronger from the COVID-19 crisis, is one such opportunity for collective thoughts and actions. It is being held during Climate Action Week to rally our Ministry's partners to co-deliver activities to sustain the momentum on climate action. I hope that organisations and individuals will participate actively in today's dialogue, and in upcoming conversations, to share your ideas on how we can work together to build a sustainable Singapore for our future generations. Climate action requires us to think about the impact of our individual decisions. It warrants our collective response now.

13 Thank you, and I look forward to our discussion.

Dear NUS staff, students and alumni,

A very good evening to one and all.

2 Let me begin by thanking NUS for your support of Climate Action Week 2020, which is taking place from 15 to 21 August this year. Climate Action Week was initiated by my Ministry in 2019. Through various initiatives and partner events, we aim to raise awareness of the existential threat of climate change, and what individuals and businesses can do to respond to this challenge.

3 I am heartened that more youths today are showing an interest in environmental issues, and more organisations are implementing sustainable practices. NUS, for example, is issuing residential college students with reusable lunch boxes. This will help reduce the use of disposables, and hence our carbon footprint. At the individual level, this might not seem to be much, but multiplied thousands of times, it will go a long way, and hopefully instill life-long habits that gather momentum across future generations.

### **Strengthening our food security**

4 Today, I would like to talk about the importance of food security, and what Singapore is doing to strengthen our resilience on this front. We currently import more than 90 per cent of our food. This leaves us vulnerable to disruptors such as climate change, market volatilities and animal and plant diseases. This is why it is important that we boost our local food production. The COVID-19 pandemic, which caused a brief bout of panic buying at the start of the Circuit Breaker, further underscores the need for Singapore to grow more food locally, to safeguard our food security.

### **Growing Local**

5 Even before the COVID-19 crisis, the Singapore Food Agency, or SFA, had embarked on various strategies to increase local food production. Last year, we announced our goal to meet 30 per cent of our nutritional needs with locally produced food by 2030, with a focus on vegetables, eggs and fish. This is what we call our “30 by 30” goal.

6 In April this year, SFA announced a \$30 million “30 X 30 Express” grant to further accelerate local production of eggs, leafy vegetables and fish over the next six to 24 months. SFA is now coordinating with various agencies to facilitate the necessary regulatory clearances so that farms can start producing these three types of foods as soon as possible.

7 Given our land constraints, we must also explore new and innovative ways of farming. Indeed, many farms are already adopting high-tech solutions to increase their yields exponentially, while maintaining the high quality of their produce.

Since 2019, Citiponics has been operating a farm on the rooftop of a HDB multi-storey car park in Ang Mo Kio. To ensure sustainability and productivity in its operations, Citiponics has developed its own vertical growing technology, the Aqua Organic System (AOS). The AOS can potentially reduce water consumption significantly, as every drop of water is kept in a closed loop.

8 To open up more spaces for urban farming in our community, SFA recently launched a tender for rooftop farms on nine HDB multi-storey carparks. We have been encouraged by the response to the tender. We will make available more multi-storey carpark rooftop sites later this year.

### **Increasing Demand for Local Produce**

9 While we work with the industry to increase local food production, it is also equally important to encourage greater support or demand for local produce. Our local farms need to have sustained demand for their produce to ensure that they remain commercially viable.

10 To make it easier for everyone to identify and purchase local produce, the SFA has been working with our farmers and retailers to label local produce with a new “SG Fresh Produce” logo featuring the SG brand mark. Today, you will be able to find the new logo on packaging of local produce sold at supermarkets and through online retailers such as Redmart. The SFA will also be launching a #fromSGtoSG campaign later this month, aimed at promoting local produce. So do keep a lookout for the campaign videos and updates on social media and other media platforms.

11 Beyond these efforts, we also want to tap on the ideas and experiences of the public on how we can increase demand for local produce. This is why my Ministry recently convened a Citizens’ Workgroup on this topic, to partner citizens to co-create and co-deliver solutions for Singapore’s context. I launched the inaugural meeting for this Citizens’ Workgroup on increasing demand for local produce on 18 July 2020 and since then, the workgroup has met twice. We look forward to sharing the recommendations of the Workgroup in due course.

12 I am heartened that NUS is stepping up its sustainability drive. It is using local ingredients in their first We go Local and Low-carbon Themed Dinner since the COVID-19 pandemic. Choosing to buy local produce has several benefits. First, it will help to spur our farms to embrace technology and become more productive to meet the increased demand. Second, as local produce is grown at home, it is fresher and lasts longer. Third, local produce has a lower carbon footprint, as it does not need to travel far and over a long period of time before reaching us. This also means less spoilage and food waste.

### **Conclusion**

13 To conclude, I am glad that NUS has organised events such as the Sustainable Urban Farming talk featuring Citiponics' co-founder Danielle Chan, who is an NUS alumnus, to raise awareness on the good work of our modern local farmers and the importance of supporting sustainable local produce. The local agriculture industry has evolved to meet the challenges of the future, and the needs of today's consumers. The infusion of technology into farming has altered the shape and character of the industry. It is no longer the back-breaking, labour-intensive industry that some imagine, but an exciting sector with interesting developments, such as transformation of our food sources, and which will offer young graduates a great career. I look forward to the continued growth of the industry, and more recognition and support for local products and offerings.

Thank you.

**Ministry of Sustainability and the Environment**  
**Addendum to the President's Address**  
**Ms Grace Fu**  
**Minister for Sustainability and the Environment**

1. Since independence, Singapore has pursued economic growth in tandem with social inclusion and environmental protection. This is the foundation for the green and liveable city that we enjoy today. However, we cannot take our success for granted. In a global landscape characterised by pandemics, climate change, and resource constraints, sustainability has become increasingly important. Sustainability is the principle that in meeting the needs of current generations, we should not compromise the ability of future generations to meet their needs. It has always been part of Singapore's DNA. But we will push for it to be at the heart of our plans, policies, and processes. This renewed commitment is reflected in our name change to the Ministry of Sustainability and the Environment (MSE). We will continue to work with all segments of society and the economy to realise our vision for a sustainable Singapore, as we ride out COVID-19 and beyond.

**Riding Out the COVID-19 Storm**

2. As an immediate priority, we will shore up Singapore's environmental public health resilience as a first line of defence against the transmission of COVID-19 and dengue. We will strengthen our environmental sanitation controls, upgrade public health infrastructure in hawker centres and coffeeshops, and rally Singaporeans to uplift and sustain cleanliness and public hygiene norms.

3. The disruption of global supply chains amidst COVID-19 is a reminder of why we must take Singapore's food security seriously. While our food supply has remained stable, we have launched the "30x30 Express" grant to support agri-food players to accelerate local food production over the next 6 to 24 months.

4. We will play our part to support those affected by the economic downturn through meaningful jobs. For example, in Phase 2 of re-opening, agencies working with MSE have hired about 1,900 temporary staff from industries such as aviation and hospitality as Safe Distancing Ambassadors and SG Clean Ambassadors, who are helping to educate the public on safe distancing measures and promote positive social norms. We are also hiring more staff for our enhanced dengue management efforts.

**Emerging Stronger Together**

5. As we respond to immediate challenges, we look to the future to ensure that Singapore emerges stronger and more sustainable. In public health, we will further improve the way public health threats are managed. Besides scaling up Project *Wolbachia* as an important complement to our dengue fighting toolkit, we piloted a cutting-edge wastewater-based epidemiology programme that enables the early detection of COVID-19. We will explore how this programme can be scaled and applied to other infectious diseases.

*A Green Recovery: Pushing on in Climate Action and Sustainability*

6. We will keep sight of the longer-term existential threats from climate change. We will push for a green recovery from COVID-19, to support a competitive transition to a low-carbon and climate-resilient future.

7. MSE will drive and coordinate public sector efforts to take the lead in sustainable development, and ensure that sustainability is at the heart of the MSE family of agencies' core functions. For example, we will develop Tuas Nexus to maximise energy and resource recovery by harnessing synergies between solid waste and water treatment processes; PUB will generate sufficient solar energy to power all of its local waterworks by 2021.

8. We will promote green growth, ride on opportunities from decarbonisation, and grow green industries such as carbon services and climate science. We will encourage and support companies to reduce their carbon footprint, and explore new private-public collaborations to make Singapore a leading example of how economic prosperity and environmental sustainability can go hand-in-hand.

9. We will invest heavily in research and development for climate action. The Climate Science Research Programme Office will be set up in end-2020 to drive efforts to formulate Singapore's national climate science research masterplan. We have already launched a S\$10 million National Sea Level Research Programme to develop more robust projections of rising sea levels, and we are setting aside dedicated resources in the Coastal and Flood Protection Fund to protect Singapore against rising sea levels.

#### *Safe, Secure, Sustainable Resources*

10. The challenges of COVID-19 and climate change, together with other trade and environmental pressures, pose a threat to Singapore's supply of critical resources like food and water. We will ensure that Singapore's critical resources remain uncompromised for both present and future generations.

11. To enhance water security, we will continue to build up weather-resilient sources such as by expanding the Changi NEWater Factory. We will invest in technology to stay ahead of the curve in water management and conservation, including the rollout of smart meters in 300,000 premises by 2023. We aim to reduce household water consumption from 141 to 130 litres per capita per day by 2030.

12. To ensure food security, we will intensify efforts to diversify our imports, strengthen our food supply chains, and realise our goal to produce 30 per cent of Singapore's nutritional needs locally by 2030 ('30 by 30' goal). We will continue to unlock more spaces for farming, by encouraging sea-based farming in the deeper southern waters of Singapore, and bring food production closer to communities, such as on the rooftops of HDB multi-storey carparks. We will also masterplan Lim Chu Kang and develop the Agri-Food Innovation Park to create a vibrant and sustainable agri-food ecosystem and provide good job opportunities for the agri-food workforce.

13. In an increasingly resource-constrained world, we will continue to pursue Circular Economy approaches and work towards our vision of a zero-waste nation. Closing our resource loops locally and turning trash into treasure will reduce our vulnerability to global supply shocks and extend the lifespan of Semakau Landfill. We are pushing boundaries in Circular Economy by transforming waste treatment residue into construction materials (or "NEWSand"), and discarded plastics into higher value products like pyrolysis oil (or "NEWOil"). We will also mandate key responsibilities to enable re-using and recycling nation-wide for our priority waste streams of food, e-waste, and packaging, and support the localisation of our recycling capabilities.

#### *Creating Good Jobs: Training a Future-Ready Workforce*

14. As we pursue sustainable development, the MSE family expects to create 4,000 new and upgraded jobs in the next year, and 55,000 over the next 10 years. As we strengthen food security, we will create skilled jobs in the high-tech agriculture and aquaculture industry. We will also continue to promote joint responsibility for food safety assurance with the industry by training more Food Hygiene Officers (FHOs) and Advanced FHOs, who will serve as food safety guardians at food establishments. As we raise environmental sanitation and waste management standards, this will create new good jobs for Singaporeans. We will review the Environmental Control Officer (ECO) scheme to broaden the work areas for ECOs beyond construction sites to more premises, which will create new opportunities for individuals like operations or facilities managers looking to establish high environmental standards in the premises they oversee. We will also help cleaning and waste management professionals enhance their skillset and take on more specialised roles in disinfection, recycling, or waste treatment.

15. We will develop a pipeline of talent to support sustainability in Singapore. MSE will offer scholarships for people passionate about our mission, in areas such as climate adaptation and climate science, and train a workforce that is ready for the sustainability challenges and opportunities of the future.

**Working with all Singaporeans for a Sustainable Singapore**

16. We are committed to achieving our long-term environmental goals by working together with partners in the People, Private and Public (3P) sectors. We will tap on their energy, experiences and ideas to co-create and co-deliver solutions for Singapore through consultations, collaborations, and initiatives such as Citizens' Workgroups and SG Eco Towns. As part of SG Together, we are launching the \$50 million SG Eco Fund to support projects on environmental sustainability. Available to the 3P sectors, this fund will enable every Singaporean to contribute to environmental sustainability.

17. MSE will do its part to keep Singapore at the forefront of public health, climate action, and resource security, with sustainability at the core. We ask all Singaporeans to work with us to make Singapore a green and liveable home and a global champion for sustainability.

Associate Professor Ho Peng Kee, Patron of RHT Rajan Menon Foundation

Distinguished Guests

Ladies and Gentlemen

Good afternoon, everyone. I would like to thank the RHT Rajan Menon Foundation, which is supported by RHT Law Asia and the RHT Group of Companies, for inviting me to today's forum and organising this meaningful event.

### **Why pursue sustainability**

2 This year's forum takes place amidst a global crisis that has upended life as we know it. Yet, even as we address the immediate challenges posed by the COVID-19 pandemic, we must not lose sight of the need to continue to keep sustainability front and centre of everything we do. This is the only way we can hope to mitigate the impact of the even bigger climate crisis confronting us. As we chart our way towards recovery, sustainable development will be an important driver for economic growth, and the transformation of conventional business models. From office design to procurement there are myriad opportunities for us to integrate sustainability as we adapt to a "new normal".

3 Flexible work arrangements like working from home, staggered working hours and split team arrangements have become the norm and will likely continue post-COVID. Office and building designs will also have to be reviewed to ensure a clean and safe workplace, for instance improving ventilation and air filtering inside buildings, installing contactless features such as sensors and automatic doors. As companies start to rethink the office space, there is an opportunity to incorporate sustainability in the planning and restructuring.

4 One way in which businesses can do this is to include environmental considerations during the procurement process. We in the public sector are taking concrete steps to adopt sustainable practices and initiatives. This is coordinated through the Public Sector Taking the Lead in Environmental Sustainability (PSTLES) initiative, which was introduced in 2006 and updated in 2017. Under the PSTLES initiative, the Government has set green procurement requirements such as procuring green electronics and paper products, and holding events and functions in venues with at least a Green Mark certified rating. Through such policies, the government hopes to encourage corporations to adopt environmentally sustainable practices in their operations.

5 Companies are increasingly realising the benefits of sustainable practices, and that environmental sustainability is complementary to business growth. Resource and operational efficiency reduces wastage, which results in lower spending on transportation, materials and waste disposal. Investment in renewable energy such as solar energy not only reduces carbon emissions, it can ultimately result in lower energy expenditure in the longer term.

6 Other than significant cost savings, going green is also aligned with evolving consumer demand. According to a 2019 study by the IBM Institute for Business Value, nearly six in 10 consumers surveyed indicated that they were willing to change their shopping habits to reduce environmental impact. Encouragingly, nearly eight in 10 respondents indicated that sustainability was important for them. And for those who ranked it high in importance, more than 70 per cent were willing to pay a premium of 35 per cent, on average, for brands that are sustainable and environmentally responsible. Whether a company is environmentally-friendly is now part of the rubric of consumer decision-making in procuring goods and services, and have a bearing on branding and competitiveness.

7 It is important that businesses make the transition towards sustainability to reap these multi-faceted benefits, and mitigate the mounting challenges from climate change and other environmental issues.

## **How to pursue sustainability**

8 Let me share three ways in which companies can pursue sustainable growth. First, businesses can adopt a circular economy approach to resource management. A circular economy approach harnesses waste as a resource that can be used again and again for as long as possible. The by product from a process is used as a raw material for another. Not only will this enhance resource and operational efficiency, and reduce wastage, it will lead to greater cost savings. For instance, local waste management company 800 Super opened its integrated energy and resources recovery facility in Tuas South last year. The facility houses a biomass energy plant, a sludge treatment plant and an industrial laundry. The biomass energy plant generates 2 million kilowatt-hours of electricity monthly, or enough energy to power 5,000 HDB flats a month. Part of this is channeled to power the sludge treatment plant, and the steam from the sludge incinerators will be used to manufacture animal feed. Another example is Grand Hyatt, which recycles food waste through a generator that converts it into pathogen-free organic fertilisers.

9 Second, businesses can enhance their energy efficiency. By improving energy efficiency, energy expenditure will be lowered, which will benefit the company's bottom line. This is also an opportunity to invest in renewable energy sources such as solar energy, as it will reduce your carbon footprint concurrently. For instance, DBS has committed to using 100 per cent renewable energy for its Singapore operations by 2030. To meet this target, DBS is engaged in operating its own solar energy installation, procuring renewable energy, and driving energy efficiencies across the organisation.

10 Third, businesses can find synergies within and across industries and partner with one another towards sustainable development. For instance, the waste product of one company could be a resource for another, or companies could reap economies of scale by embarking on collective efforts to treat waste. The partnerships forged can also facilitate knowledge sharing and spark new innovations that could improve operations and processes. I am heartened that the F&B Sustainability Council was recently formed to address environmental issues in the industry. The Council held its first meeting earlier this year, where local F&B operators discussed green solutions, including the idea of pooling food waste across different F&B premises for treatment in a central digester.

## **Help available**

11 We understand that some businesses might find it challenging to implement environmental solutions to their operations, or need help to make the transition due to the initial costs. The government is ready to partner businesses in their sustainability journey. There are many grants and schemes that companies can tap on to help organisations adopt greener systems.

12 For example, NEA supports companies through its 3R Fund, to implement projects to increase the quantity of waste recycled, or reduce the quantity of waste generated. Projects could include the redesigning of processes to reduce waste at the production stage, or the installation of innovative waste sorting or recycling systems.

13 Another fund that companies can tap on is the Energy Efficiency Fund. The fund supports the efforts of businesses with industrial facilities to increase energy efficiency. Under the fund, the government will provide co-funding support for resource efficient design, energy audits as well as investments in energy efficient equipment and technologies.

## **Conclusion**

14 I would like to encourage businesses to step up and leverage opportunities for sustainable development as we transit towards new norms, and adapt how we produce and consume. Environmental sustainability will be an inherent part of building a future-ready business model. Given the transnational nature of businesses, you have the potential to drive the sustainability agenda and make a positive impact on our environment.

15 I am therefore glad that you are gathered here today to participate in this conversation towards sustainable development. I hope the discussions, exchange of ideas, and sharing of successful case studies will inspire all of you to pursue broader economic opportunities while making positive contributions to the sustainability agenda.

16 Thank you.

Professor Yong Kwet Yew, Senior Vice President, Campus Infrastructure

Dr Peck Thian Guan, Director, Office of Safety, Health and Environment and Chairman of NUS Waste Minimisation and Recycling Taskforce

Ladies and Gentlemen,

1 Good morning everyone. Thank you for inviting me to the launch of the 'Towards a Zero Waste NUS' 2030 Action Plan today.

2 I graduated from NUS close to four decades ago, and I am heartened to see the progress the University has since made in championing research and development in sustainable solutions and equipping our next generation of leaders with the knowledge and skills to pursue this frontier. Such efforts are a step in the right direction.

### **Importance of Sustainable Development**

3 As Professor Yong rightly pointed out, my Ministry was renamed as the Ministry of Sustainability and the Environment to reflect the growing importance of sustainability in our national agenda.

4 Sustainability is not a new concept to Singapore. We have in fact always strived to balance economic development with environmental protection and social inclusion since our independence. But the environmental challenges we face today require us to put sustainability at the centre of everything we do.

5 Many of you will be aware that climate change is an existential threat to Singapore. As a low-lying island city state, we are extremely vulnerable to sea level rise. Extreme weather conditions arising from climate change will also affect our access to essential resources such as food and water.

### **Building up Three Types of Resilience**

6 We are taking a three-pronged approach to fight climate change and build a more sustainable Singapore. First, we are strengthening our **climate resilience**. We are implementing measures to protect our people from impacts such as sea-level rise and extreme weather conditions. Key upcoming infrastructure such as Changi Airport Terminal 5 will be built on higher platform levels. We are also investing \$10 million into a National Sea Level Research Programme to strengthen our understanding of sea levels around Singapore. This will enable us to develop more robust sea level rise projections, which we hope will also benefit our neighbouring countries.

7 As part of studying the impact of rising sea levels, the Coastal Protection Agency recently called a tender to look into adaptation measures along our

coastlines which are vulnerable to rising sea levels. The study will also look into possible engineering solutions such as reclaiming a series of offshore islands to create freshwater reservoirs.

8 Recently, national water agency PUB and Sembcorp also commenced on the construction of a 60 MWp floating solar photovoltaic system on Tengeh Reservoir. Once ready, the project will be one of the world's largest inland floating solar PV systems. It will offset 7 per cent of PUB's annual energy needs — a significant reduction in our carbon emissions.

9 Second, we are building up our **resource resilience**. As I have mentioned, climate change will put pressure on essential resources, and we must plan ahead to effectively address these challenges. One example is how we are working to provide Singaporeans with a robust and sustainable water supply. With our water use projected to double by 2060, we are harnessing innovative solutions and investing in weather-resilient water sources to meet our population's long-term water needs.

10 Last week, I also spoke to NUS college residential students on the importance of food security, and what Singapore is doing to increase local food production, amidst the challenges of climate change and the current COVID-19 pandemic.

11 Even before the pandemic, the Singapore Food Agency had embarked on various strategies to increase local food production. Last year, we announced our goal to meet 30 per cent of our nutritional needs with locally produced food by 2030, with a focus on vegetables, eggs and fish. This is what we call our "30 by 30" goal. In April this year, SFA announced a \$30 million "30 X 30 Express" grant to further accelerate local production of eggs, leafy vegetables and fish over the next six to 24 months. SFA is now coordinating with various agencies to facilitate the necessary regulatory clearances so that farms can start producing these three types of foods as soon as possible.

12 The third resilience we are building up is **economic resilience**. We are helping our businesses, through grants and support schemes, to reduce carbon footprint, adopt circular economy strategies and become more energy-efficient. This will ensure that they are able to adapt and thrive in a future economy that is resource and carbon constrained.

13 One example is Systems on Silicon Manufacturing Co. Pte Ltd (SSMC), a semiconductor fabrication company. Tapping on NEA's Energy Efficiency fund, SSMC carried out an energy assessment of their existing facilities and determined an optimal level of refrigerant charging for chiller efficiency. They also implemented a controller to maintain optimal performance of the chillers under different conditions, resulting in annual cost savings of \$319,000.

## **The Need for Collective Action**

14 These are some examples of what the Government is doing in the pursuit of sustainability. But our efforts alone will not be enough. We need every individual, business and organisation in this country to join us on this national agenda and make sustainability a part of their everyday lives.

15 I am happy to note that NUS is doing its part to reduce carbon footprint. Sustainability has always been a part of NUS' DNA. Following the launch of its Sustainability Strategic Plan in 2017, NUS has achieved further progress in the areas of carbon emissions and energy use intensity reduction, as well as implemented increased recycling initiatives, particularly for food waste, horticultural waste, and e-waste. Your goal to attain carbon neutrality on campus by 2030 is highly commendable. I hope this will inspire other organisations to follow suit.

### **Benefits of a Circular Economy**

16 The launch of the 'Towards a Zero Waste NUS' 2030 Action Plan today is another milestone in your institution's journey towards sustainability. In fact, what the plan has set out to achieve is very much aligned with the strategies in Singapore's inaugural Zero Waste Masterplan, which was launched by my Ministry last year.

17 To achieve Singapore's vision of becoming a Zero Waste Nation, we must move towards more sustainable consumption and production, and adopt a circular economy approach to reuse our resources for as long as possible.

18 The possibilities of a circular economy are endless. For example, my Ministry and the National Environment Agency are studying how to turn Incineration Bottom Ash into NEWSand, which may potentially be used in roads and non-structural concrete. This will help to extend the lifespan of Semakau Landfill beyond 2035. We will also look to develop chemical recycling solutions, and convert plastic waste into NEWOil. Just like how we have closed the water loop by recycling used water into NEWater, we can potentially close the waste loop with NEWSand and NEWOil.

19 A circular economy approach has immense potential to create new markets, products and services. The shift towards more recycling, reusing, repairing, and remanufacturing of products will generate new supply and demand streams, creating new jobs and business opportunities for our companies locally and abroad. Take e-waste for example. Last October, TES Singapore announced a \$25 million investment to develop two facilities – one locally and another in France – to recycle lithium-ion batteries using proprietary technology. So apart from creating economic value for Singapore and solutions that we can export to the rest of the world, we are also creating higher-value jobs.

## **Conclusion**

20 Let me conclude. The threat of climate change is real. Even as we fight Covid-19, the crisis of a generation, we must continue to fight climate change, which is a crisis that not only this but future generations will increasingly face. The journey towards sustainability is arduous and challenging. But if we come together as one, and take collective action for the environment, we will be able to make Singapore a role model city for sustainability, and a green, liveable home for our future generations.

21 Thank you. I look forward to hearing from the other speakers, and our discussion later.

Thank you, Japan, for this timely initiative. I am pleased to be participating in a meeting on climate change, convened by a close friend of Singapore. Let me make three brief points on how we can rebuild post-COVID in a sustainable and inclusive manner, in line with the Paris goals.

2 First, we need to show commitment by submitting enhanced Nationally Determined Contributions (NDCs) and Long-Term Low-Emissions Development Strategies (LEDS). Setting long-term decarbonisation plans will demonstrate our commitment to address climate change. It can also support our recovery by unlocking new economic opportunities and jobs. This was why Singapore submitted our NDC and LEDS in March and we encourage other Parties to do likewise, thereby strengthening the momentum of global climate action at this critical time.

3 Second, let us redesign our cities for greater sustainability, resilience, resource-efficiency, with smaller carbon footprints. Notwithstanding COVID-19, we are pressing on to make our towns greener. Our Green Towns Programme aims to reduce energy consumption by 15% by 2030. Our latest housing project will feature smart lighting, solar panels, centralised cooling systems, and car-lite features, aimed at reducing emissions.

4 We will ramp up deployment of solar energy. We have an ambitious solar target of at least 2 gigawatt-peak by 2030 despite our size limitation. This requires innovative use of space, including deploying a 60 megawatt-peak floating solar photovoltaic (PV) on one of our reservoirs, which will be one of the world's largest when completed.

5 We will harness new synergies across sectors to enhance our resource resilience and energy efficiency. Tuas Nexus, an integrated development that will co-locate a waste management facility with a water reclamation plant, will harness synergies from the water-energy-waste nexus and allow us to save more than 200,000 tonnes of CO<sub>2</sub> emissions annually.

6 We will transform Singapore into a “City in Nature” by expanding our green spaces. We aim to plant a million trees across Singapore by 2030. We also aim to phase out private vehicles with internal combustion engines by 2040.

7 Third, we need to invest in needle-moving low-emissions solutions to support the transition to a low-carbon future. Singapore is investing and pursuing partnerships in emerging technologies, such as Carbon Capture, Utilisation and Storage (CCUS) and hydrogen. The government has earmarked S\$20 billion to support research in high impact areas such as climate change and health and biomedical sciences, to study interlinkages and pioneer solutions.

8 In a subject as complex as climate change, there is much to discover, to understand, and to learn from each other. This Online Platform will be a rich

resource to draw inspiration and pursue collaborative partnerships. I look forward to working with colleagues to advance global climate action and achieve a successful COP-26 next year.

# DEBATE ON THE MOTION OF THANKS FOR THE PRESIDENT'S ADDRESS

## MINISTER OF STATE DESMOND TAN

03 SEP 2020

1. Mr Speaker, I rise in support of the Motion.

### **A. FINDING THE SILVER LINING IN THE COVID-19 CRISIS**

2. Much has been said about how the COVID-19 pandemic has severely disrupted our lives and forced massive changes to the way we work, live and play. It is no exaggeration to say that this is indeed the crisis to test our generation. But it has also not been without some silver linings. Let me highlight three.

#### Looking out for one another

3. First, people are looking out for one another. We can take pride and draw strength from this. Many Singaporeans have gone out of their way to help others – giving free masks to strangers, delivering groceries to those in quarantine, hawkers cooking for the hungry, customers rallying support for hawkers on social media. These are just a few examples of the great many heart-warming acts we see all around us.

#### Finding Opportunity in Crisis

4. Second, our businesses and workforce are seizing opportunities and trying new things in response to the crisis. Traditional businesses have innovated and accelerated their adoption of tech solutions. Our wet market stallholders are hawking their fresh produce over livestream on Facebook. Many Members may also recognise *getai* veteran, Wang Lei, who has sold seafood, durians and even cars online. In his words, he turned the crisis into a business opportunity, in Chinese, 把危机转成商机.

#### Allowing Nature to Recover

5. Third, the enforced time-out has allowed nature and the environment to recover. The air is cleaner, and humanity's carbon footprint has shrunk with the reduction of transportation and industrial activities. At the peak of the lockdowns around the world in early April, global daily carbon emissions were slashed by 17%, dropping to levels last observed in 2006. It was My nine-year-old daughter

who noticed the butterflies and wildflowers in my estate during our evening walks.

6. These silver linings give us confidence that we shall prevail. And we will continue to grow stronger as a nation.

## **B. A CRUCIAL JUNCTURE TO ENVISION THE FUTURE OF SINGAPORE SOCIETY**

7. Madam President has said that “domestically, Singapore is at an inflection point of our history.” This is indeed the time to chart the future we want for Singapore and Singaporeans. And our youth will be key in shaping our collective future, for they are the leaders not only of tomorrow, but also of today. Our youth, with their ideals and ideas, can play a critical role in building the kind of society we would like to have, to see in Singapore.

### *A Society of Opportunities for All*

8. What would such a society be like? First, I would like to see a society of opportunities for all. Second, I would like us to build a liveable and sustainable environment and third, I hope Singapore will be a society built on trust.

9. First, on a society of opportunities. The economic impact of COVID-19 has not been borne evenly. Lower-income households are hit much harder. We have a family in Punggol in which both parents lost their jobs and finding new ones was not easy, partly because they were past offenders. They got by with Comcare and COVID support grants. But what weighs most heavily on them is their worry about the future of their four children, who are all in school. There are families out there who need help. I am most concerned about young children and the opportunities they may lose, if nothing is done.

10. While there are various Government schemes to support individuals and families along their life journeys, there is an important role for the community and individuals to reach out to fellow Singaporeans, like what we have done during this pandemic.

11. Two years ago, I worked with some colleagues in the public service to initiate a social programme where volunteers befriend children from the rental blocks at Casa Clementi and give tuition to them after school. 24-year-old grassroots leader Hameed played an active role in setting up and sustaining the centre, together with youth volunteers from the NUS and ACS Independent, and even MINDEF and SAF regulars.

12. Besides tutoring, Hameed and his team organised activities and holiday programmes for them, such as coding classes, football sessions, and trips to the Zoo and *the Wild Wild Wet*. During the Circuit Breaker, they delivered special care packs to each of the children's homes on top of the regular Zoom sessions, just to remind them that they were not alone. It was heartening to see the students improve in their learning attitudes and in their results. Two of them even received the Edusave Bursary Award recently.

13. I asked Hameed recently what kept him going. His answer was simple - seeing the excitement in the children when they turn up, watching them develop and grow, and simply wanting to make a difference to the community he lives in. I am sure we have many Hameeds in every community to bring all Singaporeans on board the moving escalator, to give each generation a better future. I urge members of this house, many of whom have spoken passionately about this topic, to rally our community to step up and do something for our children who may not have a good start, to ensure they receive a good education. Together, let us ensure that there will always be social mobility in our society and that this remains deeply anchored in our value system.

#### *A Liveable and Sustainable Environment*

14. Second, I hope that we can together build and nurture a liveable and sustainable environment for all Singaporeans. Climate change will remain an existential threat for many, many generations to come and we must never stop pushing for sustainability as a key consideration in all our decisions.

15. Sustainability is about meeting the needs of the current generation, without compromising that of the future generations. This has become more pressing than ever with the gathering pace of climate change and its impacts. As a low-lying island with limited natural resources, Singapore is especially vulnerable to rising sea-levels and disruptions in global supply chains of critical resources like food and water. So it augurs well for the future of our common home that sustainability is a high priority for many of our youth, as studies commissioned by the National Youth Council have shown. Many of them are also stepping forward to make their voices and their actions count, and some are working together to make a bigger impact with their efforts on sustainability.

16. In Pasir Ris, we have residents who are keen to turn seaweed and mussels into bio-plastics and then to turn into alternative fuel. We have youths who want to champion roof-top farming, clean up beaches and estates, promote car-lite by improving cycling path networks, and so on. There is no lack of ideas and energy from all our residents. We now have a Pasir Ris Sustainability Action Group with over 20 volunteers and growing, from both young and old.

17. I am excited now to be in the Ministry of Sustainability and the Environment, which has committed to plans for a green recovery from COVID-19,

one that supports a transition to a low-carbon and climate-resilient future. MSE will galvanise sustainability efforts across Government, promote green growth, ensure resource resilience and pursue circular economy. We will create jobs in the green sector and develop a pipeline of talent to support sustainability in Singapore.

18. Sustainability requires a whole-of-nation effort. Besides working with businesses and other partners, we must actively engage and create opportunities for youth to play a bigger role in co-creating and co-delivering solutions. We must take our youth's efforts seriously. They are not an interest group. They are taking ownership to lead in fighting climate change, to make Singapore a more liveable and sustainable city. I will certainly do my best to support their efforts.

### *A Society Built on Trust*

19. Finally, and most importantly, I hope that we can build a society based on trust. This is more relevant and important now than ever.

20. How does a society built on trust look like? I believe that such a society is characterised by a sense of togetherness. Where individuals and groups are willing to sacrifice their own interests for the larger good of the society. A good example in our history is our Land Acquisition Act of 1967. As a young growing nation, our kampongs and squatter huts had to make way for high-rise housing and industrial development. Our Pioneer and Merdeka Generations understood that and they reluctantly moved from places they were familiar with to the HDB flats. There was trust that this was indeed necessary for the greater good of our nation. Today, our world class housing bears great testament to what we can achieve when there is trust between the Government and the people. As our founding Prime Minister Mr Lee Kuan Yew once said, "Our greatest asset was the trust and confidence of the people."

21. COVID-19 has shown this trust still exists today. We saw this when workers accepted wage cuts so that more of their co-workers could remain employed, and when we all responded and stayed home to break the infection cycle and preserve our healthcare system for those who needed them most. I hope that we can continue to build and nurture this trust.

22. The question remains, "How do we build this trust between Government and people and amongst people?" We often hear the phrase that "trust has to be earned". Over my career in the Army and public service, I found this adage, while may be true, may be counter-productive sometimes. Until someone earns it, we hold back trust to protect ourselves, build policies on the premise that a small minority may abuse the trust, and sometimes we micro-manage down to the dot. Instead, I believe that when we are in a position of leadership, trust has to be given. I learnt this as a young father. When my firstborn was in Primary school, I was called up by the school for an accident that he was involved in. Without even

verifying with him, I chided him in the car on the way home for getting himself into trouble. He remained quiet for some time and then he turned to me and asked, “Dad, why don’t you trust me when I said I didn’t do it?” Like all fathers, I wanted to earn his trust. That day, I learned that I have to give him my trust first.

23. I hope we can build a culture of openness and trust. One in which the Government listens, consults and engages regularly with citizens. This may mean being more transparent about our considerations and trade-offs when developing policies. For example, since the start of COVID-19, our Prime Minister and the Ministers have been sharing very openly and regularly with Singaporeans about the pandemic, trusting us to rally together to do the right thing.

24. Beyond sharing information, our policies also need to reflect trust in our people in their delivery. In some areas, the Government can trust citizen groups to lead and execute policies and projects. One initiative that comes to mind is the youth-led Somerset Belt Masterplan which is a product of the ideas and aspirations of over 40,000 youths on what they wish to see in Somerset, and how they can achieve that. It is a good example of how innovative concepts and plans can develop when we give autonomy and trust to our youth who can take ownership of projects they feel strongly for.

25. On the other hand, an engaged citizenry must be prepared to listen and understand the various perspectives, considerations and trade-offs. We must create a discourse that is based on data, science and facts. Not one based on rhetoric and ideology. I hope to be part of this constructive engagement process.

26. Trust is ultimately a two-way street. It is only when we give trust, that we gain trust and achieve great things together.

### **C. CONCLUSION**

27. Mr Speaker, let me conclude. I urge all of us Singaporeans to come together to build a society with opportunities for all, that is liveable and sustainable, and founded on mutual trust. Let us learn to listen well to one another, and communicate with more empathy. Consulting my two boys on the use of social media so that I can relate to the younger generation, I learnt that if I want them to understand me, I need to first connect with them in their channels, sometimes using their language. I hope to see better engagement, especially with our youth. Together, let us build on the solid foundation that the Pioneer and Merdeka Generations developed for us, and create a society that we will be proud to pass on to the generations to come. With all Singaporeans on board, we will surely get there, and grow stronger in the process.

28. Mr Speaker, in Mandarin please.

29. 议长先生，我想在这里和大家分享一首新谣歌曲《新加坡派》的几句歌词：“爸爸说我出世在六十年代、一岁多国家才诞生出来、那时候没人相信新加坡牌、还有人移民海外；渐渐地我们进入七十年代、裕廊镇烟窗个个有气派；当我们不觉来到八十年代、地铁将这个传奇讲得更快、朋友说我越活越不赖、像岛国一样实在；一晃眼已经来到九十年代、现在是别人纷纷移民前来、谁不爱新加坡牌”。

30.

因为时间的关系，我就不把整首歌念出来了，大家有兴趣的话，可以到网上聆听。我今天特别提起这首歌呢，是因为它诉说新加坡成功的传奇故事。在建国初期，没有人相信新加坡会成功，还有人甚至移民海外。后来在国人和政府协力配合下，我们的建国一代和立国一代响应政府的号召，把国家治理得井井有条，原本移民海外的，也都纷纷回来了。这就是新加坡的成功。

31. 歌曲的最后两句是：“我们的故事我们自己记载、未来就看下一代。”我们这一代和下一代要建立的，是一个怎样的新加坡？我想我们大家必须扪心自问。我们要的，是一个相互猜疑，还是一个相互信任的新加坡？是一个相互指责，还是相互想办法解决问题的新加坡？是一个争先恐后的问“我能得到什么”，还是一个热心关怀的问：“我能付出什么”的新加坡。

32.

议长先生，我只想说，当有一天我老了，我希望交给子孙的，是一个下一代都会感到骄傲的新加坡。谢谢。

Chairperson

Excellencies

Distinguished delegates

1. I would like to thank the Kingdom of Saudi Arabia as the G20 Presidency for hosting the G20 Agriculture and Water Ministers Meeting. This has been a particularly difficult period given the hardship that the COVID-19 global pandemic has presented us. In this light, I wish to particularly highlight the great leadership and fortitude that Saudi Arabia has demonstrated in galvanising the G20 community and ensuring that countries are still able to participate in the discussions and drafting sessions despite such challenges.

2. Singapore commends the work of the G20 on food security and nutrition, and integrated water resource management. Sustainability is an important theme for the Ministers Communique whether it relates to Responsible Investment in Agriculture and Food Systems, Food Loss and Waste Reduction Initiatives or Fostering Sustainable and Resilient Water Management. Singapore strongly supports this call to build a future where the supply of food and water is sustainable and secure. The theme resonates strongly with Singapore, especially with the recent renaming of my Ministry to the 'Ministry of Sustainability and the Environment' reflecting the strong commitment that Singapore places on sustainability amidst long-term challenges stemming from climate change and global resource constraints, and hopefully a short-term disorder to lives and livelihoods caused by the COVID-19 pandemic.

3 Since the start of 2020, the world has changed in ways that none of us could have imagined. The COVID-19 crisis has claimed lives, fundamentally altered how we live, work and connect, and impacted all our economies. Its lasting impacts will be felt long after the health crisis is over.

4. Against this backdrop, we continue to face challenges in food and water sustainability. Based on United Nation's estimates, the global population is expected to grow by 32% to 9.7 billion in 2050. By then, global food demand is projected to rise by 50% from 2013. In Asia alone, we expect an additional 250 million mouths to feed by 2030. As climate change and environmental degradation intensify, changes in weather patterns can also lead to disruptions in water supply and water management, while the amount of arable land could fall by 5%. Together with the impact from the COVID-19 global pandemic, these challenges will bring rapid and drastic changes to the agri-food and water landscape in the coming years. We must strive to prepare for these challenges and take steps to ensure that our food and water systems are resilient.

**A Circular Economy Approach for a Sustainable Singapore**

5. In Singapore, the principle of sustainability and a circular economy approach have helped us build resilience in our systems over the decades. Since independence, we understood that, for a small nation without natural resources to survive and thrive, we must develop sustainably so as not to waste scarce resources and extend the shelf-life of these limited resources by keeping them in use for as long as possible through a circular economy approach. This has allowed us to tackle issues such as water, energy, food, and waste, which are fundamentally interconnected, in a systematic way. We identified synergies within and across resource loops, which allowed us to maximise resource use, minimise waste, and create economic opportunities.

6. An example of this is a facility we have started building called the Tuas Nexus, where our Tuas Water Reclamation Plant (Tuas WRP) will be co-located with our Integrated Waste Management Facility (IWMF). At Tuas Nexus, food waste will be mixed with used water sludge and co-digested. This process increases biogas production by 40%, compared to the yield from treatment of used water sludge alone. The biogas produced will enhance the overall thermal efficiency of IWMF, generating more than enough energy to power Tuas Nexus. The enhanced processes of Tuas Nexus such as increased biogas production and thermal hydrolysis will contribute to the reduction of an estimated 200,000 tonnes of carbon emissions a year, equivalent to taking 42,500 cars off the road. Treated used water from the water reclamation plant will also be piped to the waste management facility to be used for cooling and cleaning purposes. By harnessing synergies in the food-water-waste-energy nexus, we can do more with less: improving energy and resource recovery from waste with a smaller environmental and land footprint.

### **Produce Food Sustainably**

7. In Singapore, over 90% of our food is sourced from over 170 countries and regions. In this regard, it is important to effectively strengthen our individual and collective food security. We also reaffirm the commitment made at the G20 Extraordinary Agriculture Ministers Meeting this year to ensure the continued flow of food, products, and inputs essential for agricultural and food production across borders. To do this, countries would also need to ensure that critical infrastructure such as air and seaports remain open. Nonetheless, given the risks posed by COVID-19, climate change and disruptions in supply chains, we are implementing plans to produce more food locally and sustainably. In fact, we have a goal to produce 30% of Singapore's nutritional needs locally by 2030, from the less than 10% today. This "30 by 30" goal is a stretched one, given that less than 1% of our land is used for agriculture.

8. To achieve our "30 by 30" goal, we have put in place plans to build an innovative agri-food sector that is highly productive and that is able to meet the challenges of an increasingly resource-constrained world. We have an \$63 million Agriculture Productivity Fund to incentivise our farms to adopt automation

and productivity-enhancing technologies. Many of our vegetable farms have tapped on this fund to adopt climate-control technologies that mitigate adverse weather conditions, thereby raising their production capacity. We will continue to do more to optimise the use of farmland to raise food production.

9. Increasing food production should be done in a sustainable manner. We encourage our farms to embrace sustainability by employing circular economy principles. One example is a local egg farm called N&N Agriculture. The farm converts its poultry waste to biogas using an anaerobic digester. The biogas is then used to generate electricity to power the farm. The solid by-product of anaerobic digestion is also used as compost for growing vegetables. As a result, the farm requires low energy input and generates little waste that needs to be incinerated. Farms are recognising the economic opportunities and environmental benefits of designing circularity into their processes. These interventions allow companies to gain a competitive advantage in an increasingly resource constraint world.

10. We strongly believe in leveraging R&D to fill the gaps where existing technologies cannot address. Last year, we had set aside S\$144 million for the Singapore Food Story Research & Development programme to support sustainable urban food production to contribute to the “30 by 30” vision. One of the themes under the research programme is the production of novel foods like alternative proteins. Traditional meat production methods are often land- and water-intensive, and generate high levels of emissions.

11. Alternative proteins, including novel food, are also poised to be game changers for high-yield food production. With alternative proteins, Singapore can “produce meat” in a much more sustainable way than traditional animal farming. To ensure that novel food is safe for consumption, we have introduced a new regulatory framework that requires companies to seek approval and undergo a scientific pre-market assessment before novel foods goes to market. It is our hope that our R&D support and strengthened regulatory framework will allow Singapore and other nations to continue to secure a safe and sustainable supply of food for generations to come.

### **Closing the Water Loop**

12. The circular economy approach that can be found in our food management has also been integral to our water story. Since independence, we have strived to overcome our lack of natural water resource by building a robust and diversified water supply from four water sources known as the Four National Taps. The Four National Taps refer to water from local catchment, imported water, high-grade reclaimed water known as NEWater, and desalinated water.

13. I would like to take this opportunity to share more about NEWater. Introduced in 2003, NEWater was a major breakthrough that allowed Singapore to close the

water loop and strengthen our water security. While we had experimented with used water recycling as early as the 1970s, and it was three decades later that our efforts paid off when membrane technology's cost and performance improved sufficiently for reclaimed water to be priced reasonably. Perhaps what is less talked about is the mindset and long-term investments that allowed NEWater to happen. From the very beginning, we were convinced that every drop of water, every H<sub>2</sub>O molecule, can be reclaimed and re-treated for drinking. This circular mindset, which helped us to close the water loop, is the very same approach that Singapore applies today in how we treat our waste, plastics, energy, and food.

14. NEWater would also not be possible without our long-term investments in our sewerage network. The Deep Tunnel Sewerage System, or DTSS, is a used water superhighway that spans our island-state and ensures that every drop of used water does not go to waste. This DTSS project was conceptualised in 1990s and is expected to be completed in 2025. The NEWater story shows that leveraging technology is only part of the sustainability story. We also need a vision to believe in and a determination to make it happen. We are working towards reducing the energy needs of water reclamation and desalination.

15. Another important aspect of our integrated approach to water management is our emphasis not just on managing water supply, but also on managing water demand. We recognise that water is a treasured resource, and that we need consumers to use water wisely so that water demand does not rise at an unsustainable rate. We have implemented a range of water conservation measures for the domestic and non-domestic sectors, such as the Mandatory Water Efficiency Labelling Scheme and minimum water efficiency standards for water fittings and appliances, and requiring large water users to prepare and submit mandatory water efficiency management plans and to appoint water efficiency managers. We price water fully to reflect its true scarcity value and send the right price signal to consumers for its sustainable consumption. These measures, coupled with public education efforts, have helped reduce per capita household water consumption from 165 litres per day in 2003 to 141 litres per day in 2019. We are targeting to lower this further to 130 litres per day by 2030. To further promote water conservation, Singapore is deploying smart water meters to residential and commercial premises from 2021, and some 300,000 smart water meters will be installed by 2023. These smart water meters will provide consumers with accurate and timely water usage data to encourage them to conserve water, to maximise its use and minimise its waste.

## **Conclusion**

16. The circular economy approach to resource management is a concept that has roots originating from nature. Systems are interconnected, resources are kept in closed loops, and waste of one process is the input to another. From our experience, we believe this approach to sustainable development is important and will allow us to develop climate, resource, and economic resilience in a low-

carbon and resource-constrained future and strengthen food security and nutrition, and integrated water resource management.

17. I understand that the Presidency is working hard to find consensus and finalise the G20 Agriculture and Water Ministerial Communique. Singapore supports the Presidency in its efforts, and we look forward to seeing consensus on this document which we stand prepared to support. We also welcome the Dialogue on Water, and Roadmaps on Water Best Practices and Water Coordination. We thank the G20 Presidency for giving Singapore the opportunity in joining other delegations in the G20 community to contribute meaningfully to the process.

18. Thank you.

Chairperson

Excellencies

Distinguished delegates

1. I thank the Kingdom of Saudi Arabia as the G20 Presidency for hosting the G20 Environment Ministers Meeting. The Presidency has demonstrated great leadership in bringing countries together, especially during this difficult time amidst a global pandemic, to ensure that we are all still able to engage in discussions. Singapore is honoured to contribute to this important endeavour.

2. Singapore commends the impressive work of the G20 on Combatting Land Degradation and Habitat Loss and Improving Coral Reef Resilience and Conservation. As an international community, it is important that we work together to identify sustainable solutions to address these issues, particularly in light of the challenges brought upon by climate change, in order to prepare for a carbon and resource-constrained future. Singapore identifies strongly with the principles of sustainability—as reflected in the recent renaming of our Ministry to the Ministry of Sustainability and the Environment.

### **Combating Habitat Loss**

3. Singapore is a small, littoral and highly densely populated city-state, and our natural inheritance, both land and sea, is therefore very important to us. Since the 1990s, Singapore has been undertaking habitat enhancement measures to mitigate habitat loss and maximise green spaces.

4. Through our Nature Conservation Masterplan, in accordance with accepted science-based methods, we strive to restore habitats that have been lost and enhance existing habitats.

5. To increase the viability of habitats, we are creating a pervasive network of greenery, such as roadside green corridors known as Nature Ways to connect areas of high biodiversity. Trees, shrubs and ground cover are planted to mimic the emergent, mid-canopy and undergrowth layers of a natural forest in these Nature Ways to link fragmented natural habitats and enhance biodiversity in our urban environment. We even have colonies of smooth-coated otters as residents in our waterways! We hope that our efforts to make Singapore a City in Nature will contribute to the long-term sustainability of our existing habitats.

### **Enhancing Our Coastal and Marine Environments**

6. Singapore's biodiversity is a significant part of our natural heritage, and this conviction extends to our coastal and marine environments that we strive to conserve and protect. The sustainability of our coastal and marine areas is also

vital in supporting the biodiversity, habitat protection, liveability and development of our country. Despite our growing urbanisation and small size, our coastal and marine environment is home to over 250 hard coral species, 12 seagrass species, 100 marine fish species, and countless others. We have various initiatives and safeguards in place to ensure that our coastal and marine environments are conserved in a sustainable manner. For example, we have developed the Marine Conservation Action Plan (MCAP) which details our efforts on conserving our marine biodiversity through, among other approaches, species recovery and habitat enhancement.

7. In addition, visitors to our coastal and marine environments are given a unique recreational experience as a means to educate them about our marine natural heritage. We also work closely with the academia and volunteer groups to test-bed research projects in habitat rehabilitation, restoration and enhancement technologies.

8. Through this integrated, multi-stakeholder approach of conserving our coastal and marine environments, we have been able to balance the competing demands within these areas in such a way that has brought boundless benefits to a multitude of species, including the marine turtles, giant clams, Neptune's cup sponge, rare hard and soft local coral species, across a wide range of marine habitats, including coral reefs, sandy shores, and seagrass beds.

9. Specific to the topic of coral reef resilience, Singapore would like to share one of our most recent marine enhancement projects called "Grow-a-Reef Garden" project. This project has been our largest artificial reef installation project to date, where eight reef structures were installed on bare sea-beds to facilitate the growth of new coral reefs at the Sisters' Islands Marine Park. Each structure, termed a "terrace house" for corals, was specially designed to maximise coral settlement and the growth of encrusting species, and to provide shelter to fishes and other mobile organisms.

### **Addressing Marine Litter and Microplastics**

10. Singapore also wishes to express our commitment to addressing the global issue of marine litter that needs to be collectively and urgently addressed.

11. Singapore not only has in place stringent legislation and regulations on pollution control and waste management, we aim to minimise waste at source through our comprehensive and integrated solid waste management and collection system. Litter that enters our waterways is trapped by litter traps installed at appropriate locations and expediently removed by flotsam removal craft. This further reduces the possibility of any marine litter, including plastic debris, from ending up in waterways and the ocean. At the same time, we are actively pursuing circular economy approaches under our Zero Waste Masterplan, so as to turn more of our trash into treasure.

12. We also actively contribute to the continued work on the 2019 G20 Implementation Framework for Actions on Marine Plastic Litter, and we are heartened by the efforts of the G20 Saudi Presidency to ensure the sustainability and continuity of the work done on marine litter and microplastics under the 2019 Japan Presidency.

## **Conclusion**

13. It is imperative that we ensure the sustainability of our terrestrial and marine environments, as these are pathways that are critical in helping us to stay resilient in a low-carbon and resource-constrained world.

14. This year, the G20 Presidency's endeavours to bring focus on the health of coral reefs and land degradation are timely, in the light of the recently launched Global Biodiversity Outlook 5 that highlighted the world's failure to achieve the Aichi Biodiversity Targets that were set in 2010, as well as the Living Planet Report 2020 by WWF that highlights the continuing decline of the Earth's biodiversity. These reports demonstrate that these issues must not be ignored even in this tumultuous period of the COVID-19 pandemic. I understand that discussions are ongoing with the Deputies to finalise the draft G20 Environment Ministerial Communique.

15. Singapore looks forward to seeing a consensus of this hard-fought document which we stand prepared to fully support at today's meeting. We also welcome the Executive Summary for a Global Initiative on Reducing Land Degradation and Enhancing Conservation of Terrestrial Habitats and the Global Coral Reef R&D Accelerator Platform.

16. It is through our collaborative efforts as a global community to address these challenges and co-create innovative solutions, that we can build a more sustainable and resilient future. We would like to thank the G20 Presidency for giving Singapore the opportunity in joining other delegations in the G20 community to contribute meaningfully to the process.

17. Thank you.

1 Good morning. I thank the Public Hygiene Council for organising and having me launch this year's "Keep Clean, Singapore" campaign.

2 This annual campaign is an important initiative to encourage Singaporeans to take ownership of the cleanliness of our shared public spaces. Against the backdrop of the current COVID-19 pandemic, this has become even more relevant.

### **Cleanliness is a shared responsibility**

3 In the new term of Parliament, my immediate priority is to strengthen our environmental public health resilience against the current pandemic and dengue outbreak, and future public health threats. We are doing this in a few ways. Let me share with you two key initiatives.

4 First, I have tabled amendments to the Environmental Public Health Act and I expect to get this through Parliament in October. We intend to implement mandatory cleaning standards, including a regime that specifies frequency for routine cleaning and deep cleaning for disinfection. We will strengthen our environmental sanitation controls and require accountability by owners of premises. NEA will work with industry sector leads to implement these requirements from 2021, progressively, starting with higher-risk sectors with high footfall, and immuno-vulnerable occupants such as childcare centres.

5 Second, we launched an SG Clean campaign, with an SG Clean quality mark. The SG Clean Mark is awarded to premises which have met NEA's sanitation and hygiene standards. This mark will be important to businesses, such as hotels and restaurants, who want to get their customers back by assuring them of the measures taken to safeguard their health. I am happy to share that as of the end of August, more than 22,000 premises across Singapore have come forward and gotten the SG Clean Mark.

6 Ensuring the cleanliness of our public spaces is our shared responsibility. Beyond what the Government and owners of premises can do, members of the public - that's us - must help keep Singapore clean. According to the Public Cleanliness Satisfaction Survey, majority of Singaporeans take pride in keeping Singapore clean. Yet, most recognise that our public spaces are clean because of efficient cleaning services. About a fifth still think that it is acceptable to leave rubbish around if they see that there is already litter in the area. And while most thought that it is easy to return trays, a third believe it is the cleaner's responsibility to do so.

### **We can do better**

7 As a caring people, who proudly call Singapore a clean city, can we do better in keeping Singapore clean? As individuals, do we not have the power and

responsibility to protect ourselves and our community from public health threats? Is it right to expose our cleaners, fellow diners and neighbours to germs when we leave our used tissue or masks behind on the table, on the floor? Is it that difficult to dispose our litter properly in bins?

8 And here I would like to bring your attention to the work of the Public Hygiene Council in building a Zero Litter Nation, by raising public awareness of the health hazards of littering, and working with establishments such as coffee shops, hotels and retailers to raise the standards of public hygiene and cleanliness.

9 The Council has also launched a series of videos to demonstrate how litter can spread diseases, and to encourage families to talk about cleanliness and good personal hygiene habits, at home and in public places. We will be showcasing these videos later on. Do share these videos with your family and friends.

### **Recognising Cleaners as Our Frontline Heroes**

10 Another part of the Council's campaign is to recognise our cleaners. They are our essential workers and frontline heroes. They have worked hard, particularly during this pandemic, to keep our public spaces clean, sanitised and litter-free. Let us all extend our appreciation to them and help keep them safe!

11 The COVID-19 situation has provided the environmental services industry with an opportunity to transform and emerge stronger. For example, to upskill the cleaning workforce, the NEA and Workforce Singapore have partnered the Environmental Management Association of Singapore to launch a new Place-and-Train Programme for Cleaning Specialists providing disinfection services. This will enhance the career prospects of workers through a structured training framework. A multi-skilled cleaner can expect to earn higher wages through the Progressive Wage Model for Cleaners.

12 NEA also worked with Institutes of Higher Learning on new training courses to upskill cleaners in disinfection works and to ensure that they are trained to protect themselves against COVID-19 and other public health threats while at work. NEA is working with partner agencies and the trade associations to identify gaps and emerging trends in skills and competencies to continue upgrading our workforce.

13 In appreciation of our cleaners, the Council will be unveiling new uniform designs for cleaners today. This is a collaboration with students from Temasek Polytechnic's School of Design. Four cleaners will be joining us to model the new uniforms. These new uniforms aim to instil a greater sense of professionalism, pride and purpose in our cleaners as they continue their important work of ensuring a clean and safe Singapore.

### **Conclusion**

14 In conclusion, each one of us is an integral part of our collective defence against public health threats. Our level of public hygiene reflects who we are as a people. Our daily choices define the cleanliness of our environment, and the safety of our community. By taking proactive action, and making meaningful adjustment in our daily lives, we can make a difference. With the Government, industries and community working together, I am confident that we can Keep Singapore Clean and become a Zero Litter Nation. Thank you.

Distinguished Guests

Scholarship Recipients

Parents

A very good morning to all.

2 Thank you for joining us at the Singapore Sustainability Scholarship Award Ceremony. We would normally hold this ceremony at the Environment Building where our office is located but because of COVID, we are conducting it virtually. I'm delighted that we are still able to come together to celebrate this meaningful event.

3 In July, our Ministry was renamed the Ministry of Sustainability and the Environment (or MSE), to better reflect the Government's commitment to put sustainability at the core of everything we do. It's not just in MSE, but all Government agencies. We will press on with major initiatives in carbon mitigation, coastal protection, zero waste and circular economy, as well as food and water security.

4 In line with our Ministry's name change, the National Environment and Water, or NEW scholarships have also been renamed as the Singapore Sustainability Scholarships. This year, we are awarding scholarships to 22 young persons who want to pursue a career to strengthen environmental resilience and sustainability for Singapore. Congratulations to our newest scholarship recipients and a warm welcome to our MSE family.

### **Towards a Green Recovery from COVID-19: A Leaner, Stronger and Kinder Singapore**

5 The COVID-19 pandemic has severely disrupted global economic activity, and devastated lives and livelihoods. Many Singaporeans feel uncertain about their future. But the pandemic also presents new opportunities to build back stronger and secure a greener future. A sustainable nation is a resilient one, and our recovery from COVID-19 will need to be built on sustainable principles.

6 MSE's immediate priority is to work towards a cleaner and safer Singapore, as a first line of defence against the transmission of COVID-19 and public health threats like dengue. We will strengthen our environmental sanitation controls, upgrade public health infrastructure in hawker centres and coffeeshops, and rally Singaporeans to uplift and sustain cleanliness and public hygiene norms.

7 We also want to help build a leaner, a stronger and a kinder Singapore.

8 A Leaner Singapore is one which is closer to zero waste, and more efficient in our use of resources. MSE is working with the industry and community to pursue circular

economy approaches in production and consumption. We will be able to extend the lifespan of Semakau Landfill and move towards becoming a Zero Waste Nation.

9 COVID-19 has underscored the need for Singapore to safeguard our supply of critical resources, while the existential threat of climate change will further aggravate this challenge. We must therefore build a Stronger Singapore with increased resilience in our food and water supplies, a more climate-resilient green economy and future-ready infrastructure. This will ensure that Singapore's critical resources remain uncompromised for both present and future generations.

10 To enhance water security, we will continue to build up weather-resilient sources. To strengthen food security, we have been diversifying our imports, and working to ramp up local production. By 2030, we aim to meet 30 per cent of Singapore's nutritional needs with local produce. We call this our "30 by 30" goal.

11 Last, we are working to build a Kinder Singapore — where citizens show care for one another and for the environment we share. By picking up after ourselves and not littering, we not only keep our public spaces clean, but also help to alleviate the workload of our cleaners.

### **How MSE Family officers can make a difference**

12 Through the Singapore Sustainability Scholarship, we hope to develop a pipeline of talent to support sustainable development in Singapore. As a new member of the MSE family, you have an important role to play in achieving this goal. Let me give you a few examples of how some of our scholars have contributed.

13 Mr Pang Hao Yang works at the Eastern Regional Office under NEA's Environmental Public Health Operations Group. Hao Yang manages vector control operations, including dengue. Since COVID-19 hit us, Hao Yang has also taken up additional duties as a Safe Distancing Enforcement Officer in wet markets and hawker centres.

14 Like Hao Yang, Mr Alex Ng is part of the team at SFA's Northwest Regional Office, which carries out inspection and enforcement activities on food establishments. Alex, together with his colleagues, makes regular checks on food establishments to ensure that food is prepared in a safe manner.

15 Ms Vernice Toh is an electrical engineer from PUB's Water Supply (Plants) Department. She is responsible for the maintenance, replacement and improvement of electrical equipment at Chestnut Avenue Waterworks. She is also part of the team looking into the deployment of floating solar panels at Upper Peirce Reservoir.

16 This experience of interacting with hawkers, stall holders and technicians and at times dealing with difficult people while enforcing will no doubt enrich Hao Yang, Alex and Vernice's life skills. It will also enable them to gain an appreciation of the difficulties of

our officers on the ground. There is no better way for our scholars to start their career – and that is with solid ground experience! And my word of advice here – with humility, we can all learn a lot from our hawkers and our colleagues who may not be very educated but have much wisdom that life has given them.

### **Conclusion**

17 Let me conclude by congratulating all our scholars and your parents. To our scholars, you would not be where you are today without the support of your families and teachers. Take some time to thank your parents, teachers and family members for their support.

18 The journey ahead will be challenging and exciting. I look forward to your contributions in the coming years, to help build a sustainable Singapore.

Thank you, and congratulations.

**ADDRESS BY DR AMY KHOR, SENIOR MINISTER OF STATE FOR  
SUSTAINABILITY AND THE ENVIRONMENT, AT THE FIRST SESSION OF  
THE CITIZENS' WORKGROUP ON REDUCING THE EXCESSIVE  
CONSUMPTION OF DISPOSABLES ON 26 SEPTEMBER 2020**

Minister Grace Fu

MOS Desmond Tan

Invited Guests

Participants

Good morning and welcome to the first session of the Citizens' Workgroup on Reducing Excessive Consumption of Disposables. Thank you for being here with us!

2 Earlier this year, we put out a call for Singaporeans to sign up for this Citizens' Workgroup, which will span eight sessions over the next five months, till end February 2021. The response was very encouraging. More than 300 citizens responded to our call and we selected a diverse group of 55 to join the Workgroup. Among you are students, freelancers, business owners, architects, avid volunteers, and founders of social enterprises.

3 Our aim of having a diverse group of Workgroup members with different backgrounds, professions and demography is to enable members to have a deeper and better understanding of the varied perspectives, needs and concerns of different segments of the population regarding the use of disposables. The Workgroup will then be well-placed to come up with solutions that are viable, address daily realities and mobilise community support.

4 This is the third Citizens' Workgroup that the Ministry is convening. And for the first time, we will facilitate more members of the public to access and

participate in some of the sessions. For instance, we are now on Facebook Live, where anyone interested can tune in. Additionally, we are opening the second segment of today's session beyond the 55 participants, to include members of the public who are interested to join in, listen to the presentations and participate by asking questions or sharing their views. We will be opening up 120 such slots for interested individuals to attend our future sessions. We encourage you to join in the discussion and add to the diversity of ideas and conversation. More details can be found on our Clean and Green Singapore Facebook Page. We hope that this will help raise awareness about the issue of excessive consumption of disposables among more Singaporeans, and also allow the Workgroup to garner more views for consideration.

### **Excessive consumption of disposables**

5 Disposables have become a global concern, not just because of unsustainable consumption rates, but also because of their contribution to marine litter. Marine litter is a serious issue that needs to be collectively and urgently addressed by all countries, due to their impacts on marine life. In Singapore, we have put in place a comprehensive solid waste management system and stringent anti-pollution and littering measures to prevent marine pollution from land-based sources. Any litter that enters our waterways is removed using litter traps and flotsam removal craft before it reaches the sea.

6 The excessive consumption of disposables has a significant impact on our environment in several ways. First, disposables have a short usage lifespan, and producing them hasten the depletion of our finite resources. Second, each stage in the life cycle of the disposables, from extracting the raw materials for production to treating them after disposal, leaves a carbon footprint that contributes to climate change. Third, excessive consumption of disposables exacerbates the generation of waste. While the waste is incinerated before it is sent to Semakau Landfill, the landfill has a limited lifespan.

7 In 2019 alone, we threw away about 200,000 tonnes of disposables such as carrier bags, takeaway food packaging, tableware and cutlery. This was equivalent to more than 10 per cent of the domestic waste we disposed of! This staggering amount is enough to fill about 400 Olympic-size swimming pools. In recent months, we have also seen a shift in consumption patterns due to COVID-19, towards more online shopping, food delivery and takeaway. About 3 per cent more waste was collected by the Public Waste Collectors from domestic and trade premises during the Circuit Breaker period from 7 April 2020 to 1 June 2020, compared to the daily average in the month of March 2020.

8 According to a 2018 study by the Singapore Environment Council, we take, on average, two to four plastic bags per trip when we visit the supermarket. The study estimated that 820 million plastic bags are taken from supermarkets each year. This amount can fill the land area of Gardens By The Bay 126 times. Even though plastic bags are useful for bagging our refuse to minimise the issue of pests, the number of single-use plastic bags we consume is still excessive.

9 Waste is both a noun and a verb, and the verb is what generates the noun. We need to stop wasting in the first place, so that waste is not generated. This is why, in our waste management process, reduction at source is a fundamental priority.

### **Government Efforts to reduce waste**

10 To reduce the excessive consumption of disposables, my ministry and the National Environment Agency (NEA) have been progressively rolling out various policies and initiatives. Let me briefly highlight some.

11 We recently introduced regulations to mandate that producers of packaged products and retailers have to collect and report data to NEA on the types and amounts of packaging they place on the market. This applies to brand owners, manufacturers, importers of packaged goods, as well as retailers such as large supermarkets. We are also requiring these businesses to develop plans to reduce, reuse and recycle packaging, including disposable packaging. This is a significant step towards increasing companies' awareness of the potential for packaging reduction in their business operations.

12 The mandatory packaging reporting will pave the way for the Extended Producer Responsibility framework (or EPR) for managing packaging waste that we plan to roll out no later than 2025. Under the EPR framework, producers will be responsible for the collection and end-of-life management of their packaging. This will further encourage them to reduce the amount of packaging that they put out. As part of the first phase of the EPR, a Deposit Refund Scheme (or DRS) will be introduced for beverage containers. In a typical DRS, consumers pay a deposit for beverages and get a refund when they return the empty beverage container at designated return points.

13 We also recently launched the second run of the nationwide “Say 'YES' to Waste Less” campaign. This is to raise awareness of the need to reduce our disposables and food waste, and to encourage individuals and businesses to act. NEA is working with close to 100 commercial partners covering more than 2,100 premises to encourage consumers to take simple positive actions, such as bringing reusables for takeaways and opting out of disposables for online food orders.

14 I am heartened that many Singaporeans, young and old, recognise the need to take climate action through the reduction of waste. We have seen individuals and businesses channelling this energy into driving change from ground up. These are all steps in the right direction, and we are prepared to do more.

### **Need for the Citizens’ Workgroup**

15 How can we engender a change in mindsets and behaviours of businesses, the community and individuals to reduce their consumption of disposables – not just single-use plastic bags but all types of disposables? We have heard impassioned calls from our youth and environmental groups to take stronger steps, particularly last year, when we launched our Year Towards Zero Waste. Suggestions such as banning or charging for plastic disposables have sparked much debate.

16 This is why, in the spirit of Singapore Together, we want to work hand-in-hand with Singaporeans through this Citizens’ Workgroup. We want to harness

your collective energy, diverse experiences and perspectives to come up with potential solutions that work for Singapore, and build a better, and more sustainable Singapore for future generations.

17 Let us work together to ensure that the solutions we come up with are holistic, inclusive and practicable for Singapore. This means taking into consideration potential implications, such as the substitution of one disposable material for another, and the use of plastic bags to dispose of our waste hygienically. We must also be sensitive to the costs that are placed on the more vulnerable groups in society.

18 No doubt the journey will be challenging, but I hope it will be fruitful and fulfilling. You will be given the opportunity to consult experts to understand the pros and cons of various solutions. As you develop your recommendations, you will also be asked to walk in the shoes of various groups in our society to understand their concerns and demands. Lastly, you will be asked to prioritise solutions that you think will work best for Singapore and garner the most support. My colleagues will provide you with the necessary support and resources over the course of this Workgroup. Many organisations have also volunteered to share their viewpoints and experiences with you.

19 We will study each recommendation carefully and explore implementing the solutions, just as we have done with the #RecycleRight Workgroup organised last year. This could be through policy changes or by working with citizens, interested members of public as well as organisations to run pilots or trials. We hope to pilot or trial at least three projects out of your recommendations.

### **Conclusion**

20 Thank you for coming on board this journey with us. I look forward to our discussions, and to hearing the recommendations of this Citizens' Workgroup early next year. Together, we can bring Singapore closer towards becoming a Zero Waste Nation.

1 Mr Speaker, protecting Singaporeans against secondhand tobacco smoke has always been our priority. I thank Mr Louis Ng for his proposal to curb secondhand smoke. Many Members, including myself, have received similar suggestions.

2 Let me assure everyone that my Ministry is equally concerned about secondhand smoke. I empathise with all who have suffered from this.

3 We have always recognised the serious health risk from secondhand smoke. We first introduced smoking prohibition in omnibuses, cinemas and theatres in 1970 and have progressively expanded this to more public places. We were among the first globally to impose a nation-wide smoking ban in the covered common areas of residential estates.

4 Currently, smoking is prohibited in more than 32,000 places and we will do more.

5 Singapore has introduced robust policies to discourage smoking such as raising the minimum legal age of smoking and introducing standardised packaging for tobacco products. Through public education and nudges, we urge smokers to quit their habit.

6 Consequently, the daily smoking prevalence has decreased from 18.3% in 1992 to 13.9% in 2010 and 10.6% in 2019. We continue to work on driving down smoking prevalence, which will also reduce the incidence of secondhand smoke.

### **Secondhand Smoke Problem within Residential Areas**

7 Let me turn to the issue of secondhand smoke experienced in homes.

8 Of the 11,400 smoking complaints received in the first 4 months of 2020, 58% or 6,630 complaints were in residential estates. As more residents work from home during the COVID-19 pandemic, there has been an uptick in smoking complaints in residential estates. 95% or 6,310 of these complaints were related to smoking in common corridors, staircases and void decks. The remaining 5% or 320 involved smoking in homes.

9 NEA has prioritised surveillance at common areas, in particular, common corridors, staircases and void decks at residential estates. Thermal cameras are also deployed at smoking hotspots. In the first half of 2020, NEA took 2,400

enforcement actions at these areas, a 37% increase from the same time period last year.

10 For complaints of smoking in homes, NEA, Town Councils and grassroots leaders take an educational approach, and advise smokers to be considerate and not smoke near windows and balconies. Most smokers take heed, except for a small group of recalcitrant smokers.

11 For such cases, grassroots leaders, NEA and relevant agencies help to mediate between neighbours and discuss adjustments to be made. Affected residents can turn to the Community Mediation Centre. They can also raise the matter to the Community Disputes Resolution Tribunal (CDRT) as a last resort. Between January 2019 and July 2020, 25 claims relating to excessive smoke, caused by cigarettes or incense, were filed with the CDRT. Quite a number of claimants were able to resolve issues amicably without proceeding to the Tribunal.

### **Smoking Ban at Balconies and Windows**

12 Mr Louis Ng and GPC Members have proposed that we ban smoking at balconies and windows of homes. We are just as keen to resolve this issue and have carefully studied these suggestions.

13 Unfortunately, besides the fact that such legislation could be highly intrusive, there are significant practical challenges in enforcement that limit effectiveness.

14 First, enforcement will be challenging as capturing evidence of the smoking offence is not straightforward. Smelling the tobacco smoke is not sufficient as cameras must capture the smoker smoking or holding a lighted cigarette, as evidence for enforcement. However, a smoker can easily hide behind a pillar, frosted glass windows, or curtains to avoid detection by the camera. Overall, this may entail deployment of significant resources without achieving effective outcomes.

15 Second, to capture the smoking act, the camera must be placed at suitable vantage points to probe into the window or balcony. For towering flats, finding the right vantage point in common areas to deploy the camera is not always possible. Directly aiming cameras into homes is highly intrusive, unlike surveillance for high rise littering where the camera is trained at the building façade and can be placed at ground level some distance away.

16 Finally, this will exacerbate existing concerns about privacy and infringing the owner's rights to his or her private space. Meadows@Peirce is a case in point. A dispute had ensued in 2017 between the condominium management committee and its residents when a circular directed residents to refrain from smoking at balconies and windows. Some residents argued that the management committee should not dictate actions in private spaces.

17 We have studied overseas practices too, some of which were cited by the Member. Globally, there are few instances of bans on smoking in homes. In the US, the smoking ban in homes is limited to public rental housing which accounts for a tiny fraction, in fact 1 per cent, of the total housing stock.

18 In Australia, some states ban smoking in common areas of multi-unit housing, and exempt private spaces, although owner corporations can adopt their own by-laws to cover private living areas.

19 This is similar to what we have in Singapore. Smoking is already banned in many common areas of residential estates. MCSTs can opt to adopt by-laws to expand the ban in their estates, with support from residents.

20 In US the ban is enforced by Public Housing Authorities, whilst in Australia, the owner-corporations have to enforce the ban.

21 Even in countries where there are bans, effectiveness has been mixed and uncertain at best. In US public housing, there was difficulty in securing evidence for enforcement and smokers also saw this as a violation of privacy.

22 The difficulties in enforcing against smoking in homes and privacy concerns can lead to greater frustration, exacerbate disputes and increase social tensions. This was the case at Meadows@Peirce. The overseas examples show that enforcement is challenging.

### **Changing Social Norms; Facilitating Conversations; Resolving Disputes Amicably**

23 We must work hard to address the difficult issue of secondhand smoke from homes but legislation against smoking at windows or balconies may not be that silver bullet.

24 Instead, we will pursue a three-pronged approach.

25 First, we will work harder to engender greater social responsibility. This means instilling consideration for the health and well-being of those around us, not just family members but also our neighbours. We must entrench new social norms of what constitutes acceptable behaviour. For example, stop smoking in

homes, including at windows and balconies, and do so only in non-prohibited areas away from others.

26 NEA will work with other agencies such as MOH, HPB, MND and MSO to explore effective ways of doing this. For example, by developing targeted messages on exercising social responsibility, as well as acceptable social norms. These can then be communicated pervasively across key platforms, including social media channels. We will also partner the community to amplify these messages.

27 Changing norms will take time but we must work doubly hard as it gets to the very heart of the problem that legislation and enforcement, at least with today's level of technology, cannot fix.

28 Second, we will examine more ways to facilitate productive conversations between neighbours to deal with difficult situations, before they escalate into intractable disputes. For example, we could develop simple messages for neighbours to communicate concerns with one another or share best practices from successful efforts to resolve neighbourly disputes. We will also look at how to leverage community networks and links, including grassroots, to bring neighbours together in conversations.

29 Third, we will work with agencies to study how these disputes can be better addressed by the inter-agency Community Dispute Management Framework. For example, we will work with agencies to review the Community Mediation Process and the Community Disputes Resolution Tribunal, to enhance their effectiveness when residents have to resort to these channels. Nonetheless, we hope that most cases will not have to end up in community mediation or with the Tribunal.

30 The best way to protect against secondhand smoke is for family members and neighbours to help smokers cut down and quit smoking. And if they have to smoke, not to light up at home and instead smoke at non-prohibited areas.

## **Conclusion**

31 Sir, I fully appreciate the frustration and distress of those who suffer from secondhand smoke at home. We are determined to address this and will work hard with government agencies and the community on the strategies that I laid out. At the same time, we will continue to monitor best practices globally and improvements in technology. We will stay open to innovative and practicable solutions as they emerge.

32 Ultimately, mitigating the impact of secondhand smoke requires everyone to play their part. Smokers must exercise consideration for the health of their family and neighbours. As a community, we must help one another build the right social norms for a healthy and gracious society.



1 Mr Deputy Speaker, I thank Members for their broad support of the Bill. Your thoughtful comments and suggestions reflect the importance that we collectively place on preserving a clean and healthy environment for Singaporeans.

2 Members have raised pertinent points which can be broadly summarised as follows:

a. First, while the environmental sanitation regime focuses on premises managers taking responsibility for the cleanliness of their premises, we must also instil greater social responsibility for public hygiene, especially on the part of end-users.

b. Second, even as we lean on premises managers to take concrete steps to improve cleanliness, we must help them manage compliance costs.

c. Third, we must build on the capabilities of all key parties within the cleaning ecosystem, including the cleaning industry, cleaners, Environmental Control Coordinators (ECCs) and Environmental Control Officers (ECOs).

3 I fully agree. Let me address the issues.

### **Public Hygiene a Shared Responsibility**

4 **Ms Cheryl Chan, Mr Don Wee, Mr Gan Thiam Poh, Ms Nadia Samdin, Ms Poh Li San, Mr Desmond Choo, Mr Derrick Goh, Ms Joan Pereira, Ms He Ting Ru and Ms Raesah Khan** have spoken passionately about the need for shared responsibility for public cleanliness, especially on the part of consumers and end-users. Members called for a shift away from the mindset of not caring about public spaces or amenities, simply because it is not our own.

5 Building shared responsibility is a key thrust of our SG Clean movement. We are working with partner organisations and SG Clean Ambassadors to communicate simple yet important social norms on cleanliness, such as binning used tissues and litter, and returning one's tray at hawker centres.

6 We have also been exploring the use of behavioural science approaches to shape habits, as suggested by **Ms Cheryl Chan and Ms Poh Li San**. NEA has piloted the use of visual and audio cues to nudge users to return their trays at hawker centres. **Mr Gan Thiam Poh** would be happy to know that this helped to increase tray return rates at Zion Riverside Food Centre and Adam Road Food Centre by 19 percentage points and 42 percentage points respectively.

7 NEA has also piloted behavioural nudges such as placing posters with normative and emotive messages, in strategic locations, to encourage users to keep public toilets clean and dry. We will continue to push on this front.

## **Managing Regulatory Impact on Premises Managers**

8 Let me now touch on how we will manage the regulatory impact on premises managers which several Members, including **Ms Poh Li San** and **Mr Don Wee**, have raised. We fully appreciate the concerns of businesses, especially in difficult economic climate that we are right now in.

9 Premises managers should view the enhanced measures as insurance against potentially much larger costs should an outbreak happen due to unsanitary conditions. Businesses benefit from having good environmental sanitation that protects the health of their customers and employees, and as one member have mentioned, the chefs that are working at the premises. Conversely, lapses in public health can cost them dearly. The F&B outlets and childcare centres involved in the gastroenteritis outbreaks in 2018 and 2019 know this from first-hand experience.

10 Against the backdrop of COVID-19, businesses are prioritising cleanliness and hygiene as assurance to customers and to woo them back. Over 24,000 premises have acquired the SG Clean Quality Mark which provides a stamp of assurance to occupants that the premises are clean.

### **Pragmatic Approach to Regulation**

11 From the outset, we have adopted a pragmatic approach to ensure adequate standards, while managing the impact on businesses. We have been working closely with sectoral leads, such as the Ministry of Education, Ministry of Social and Family Development, Early Childhood Development Agency and Singapore Food Agency (SFA), to develop environmental sanitation standards that take into account the needs and constraints of each sector.

12 As an illustration, let me share how we are working with SFA and coffeeshop owners to implement an environmental sanitation regime, while managing business costs for coffeeshop owners.

13 NEA is working closely with coffeeshop owners to put in place a regime that is practical and effective. The coffeeshop owner who is the premises manager may appoint his outlet supervisor as the ECC. Some members have voiced concerns about many of our elderly cleaners not able to meet the standards of the ECC. Let me assure members that we are not expecting all cleaners to be trained in ECC function. Every coffeeshop needs only one person to be appointed as an ECC. And that person can be an outlet supervisor doing it as part of his or her function. The outlet supervisor, after the requisite training, will have the competencies to tailor an appropriate environmental sanitation programme. It is tailoring because we will come up with a standard template that

the different sectors can tailor to their own circumstances. Smaller coffeeshops may face more manpower constraints, we understand that. So taking in their feedback, NEA will allow a few small coffeeshop owners to collectively appoint one ECC for their premises, for economies of scale, should they require or prefer to do so. Alternatively, the owner may double-up as the ECC.

14 The environmental sanitation programme will focus on key areas that impact public health. For example, it will lay out daily cleaning frequencies for high-touch surfaces, such as seats and table-tops, as well as public amenities such as toilets. There must also be thorough periodic cleaning of hard-to-reach areas such as ceiling beams and overhead fixtures which can harbour rats and birds.

15 The coffeeshop owner will be required to conduct a comprehensive pest management survey periodically, say once every 6 months. Such inspections can surface defects for rectification, such as crevices to be sealed. The ECC will be trained in the basics of pest management so he can monitor pest management works. These preventive measures, coupled with good housekeeping, go a long way in tackling the root causes of the pest issues highlighted by **Mr Gan Thiam Poh**.

### **Sufficient Time for Transition**

16 Let me assure **Ms Nadia Samdin** that we will provide sufficient lead time for stakeholders to adjust to the new regulations. In the first half of next year, NEA will refine the environmental sanitation standards in consultation with industry stakeholders, issue the Code of Practice, and train the ECCs. The training syllabus, which focuses on the basics of hygiene, is applicable to all sectors.

17 Implementation of the environmental sanitation regime will commence from mid-2021. We will start with a six-month advisory period for sectors to gradually adapt to the regulatory requirements, before enforcement begins. That would take us to the end of the year, and we will start enforcing in 2022.

**18 Ms Poh Li San** and **Ms Nadia Samdin** have asked to roll out the environmental sanitation regime to other premises. Ms Raeesah Khan has also asked for the framework in deciding which sectors to go first. So we will start with implementation at higher-risk premises with immuno-vulnerable occupants such as eldercare and childcare facilities, high footfall such as coffeeshops or hawker centres, or a history of outbreaks such as coffeeshops and childcare centres. We will consider their suggestions when extending the regime to other premises in subsequent phases. This is also in response to Mr Shawn Huang's suggestions that we should phase out the implementation so that there is time for the capacity to be built in the industry.

### **Keeping Costs Manageable**

**19 Mr Don Wee, Mr Gan Thiam Poh, Ms Poh Li San, Ms Joan Pereira and Mr Shawn Huang** raised concerns about the cost impact of enhanced cleaning requirements.

20 We will help businesses, especially the small players, manage costs.

21 One area is manpower cost. We will allow flexibility for premises managers of small businesses to double up as ECCs. An ECC will be allowed to supervise cleaning works at a few branches or outlets, so long as he is able to handle the workload.

22 We will also help premises managers improve infrastructure and capabilities to enhance cleanliness, such as through NEA's Toilet Improvement Programme for coffeeshops and hawker centres which **Ms Joan Pereira** might be interested in. We are also exploring with SkillsFuture Singapore (SSG) on the possibility of subsidising training costs for ECCs and ECOs, a suggestion raised by **Ms Nadia Samdin**.

### **Future-Proofing the Cleaning Ecosystem: Developing Capabilities, Supporting Workers**

23 The third cluster of issues, which was raised by **Mr Don Wee, Ms Nadia Samdin, Mr Louis Ng** and **Mr Desmond Choo**, is about future-proofing the cleaning industry by raising capabilities and supporting the workers.

#### **Developing Capabilities in the Cleaning Industry**

24 As **Mr Don Wee** pointed out, the COVID-19 pandemic has exacerbated manpower shortages in the cleaning industry. Indeed, the industry is a growth area in jobs. And we want existing jobs to expand in skills and productivity so that more Singaporeans can get better paying jobs in the cleaning industry. This gives a strong impetus to accelerate the pace of digitalisation and automation in the cleaning industry to enhance productivity. This is a key thrust under the Environmental Services Industry Transformation Map (ESITM).

25 Cleaning companies have tapped on the enhanced Productivity Solutions Grant to adopt technology to overcome manpower constraints. As of 30 Sep 2020, NEA has approved 791 applications, with a total grant amount of \$15.3 million.

26 We are seeing some results. Lionsbot, a local start-up which sells and rents out cleaning robots, has seen an increase in demand for their robots, with 80% more inquiries since the pandemic started. LionsBot will be building 300 autonomous cleaning robots and progressively deploying them across Singapore to scrub, mop, vacuum, sweep, shine and even transport cleaning equipment.

27 The cleaning robots can be rented by cleaning companies on a subscription basis so they do not need to invest in ownership and maintenance.

28 We are also upskilling workers in the cleaning industry. Workforce Singapore (WSG), in partnership with NEA and the Environmental Management Association of Singapore, has rolled out a new Place-and-Train Programme for Cleaning Specialists for Disinfection Services in August 2020. This programme enables cleaners and jobseekers to reskill to take on the role of a cleaning specialist.

29 Local cleaners performing general cleaning duties can also upgrade themselves by enrolling into the Continuing Education and Training courses on environmental infection control, with up to 90% training subsidy from SSG. With enhanced skillsets, these individuals can take on more specialised and skilled job roles that offer better salaries and career prospects.

30 As Members rightly pointed out, we must ensure that workers are fairly rewarded and can make a decent living. All cleaning businesses are required to provide wages stipulated under the Progressive Wage Model (PWM). With enhancements to the PWM, real median monthly gross wages of full-time resident cleaners have increased by 26% from 2014 to 2019, higher than the workforce's median of 21%.

31 Other measures are in place to ensure fair labour practices in the cleaning sector. MOM worked with tripartite partners to encourage premises to provide rest areas for outsourced workers like cleaners. In view of the COVID-19 situation, NEA and MOM worked with tripartite partners to advise service buyers and providers to ensure the safety and health of cleaners, manage their workload, and remunerate them appropriately for additional responsibilities.

### **Developing Capabilities of ECCs and ECOs**

32 The effectiveness of the environmental sanitation regime does not just depend on the cleaning industry; it also requires that ECCs and ECOs have the knowhow to assist the premises manager. **Mr Louis Ng** and **Mr Desmond Choo** have spoken on this.

33 Training for ECCs and ECOs will be customised to their needs and literacy levels as far as possible. For example, to cater for adult learners, the course does not stipulate educational qualifications and can accept trainees so long as ECCs can attain Workplace Literacy and Numeracy (WPLN) Level 5 for reading, listening, speaking and writing. ECOs will require WPLN Level 7, or Level 6 with 2 years of relevant working experience. This basic proficiency is necessary, as the ECCs and ECOs need to learn how to develop an environmental sanitation programme and convey clear instructions to cleaners.

**34 Mr Louis Ng** asked if the training course for ECCs and ECOs can be conducted in more languages and are suitable for seniors. Initially, training will be conducted in English but NEA will review the need to offer the course in more languages, depending on the trainees' needs.

35 Taking into account employers' needs, NEA will work with training providers to make the training course as concise as possible without compromising quality, and will provide bite-sized information or pictorial guides where possible.

36 As we gradually extend the environmental sanitation regime to more premises, there will be greater demand for competent ECCs and ECOs. In the next few years, we expect to enhance up to 15,700 ECC and ECO jobs under the environmental sanitation regime.

## **Other Public Hygiene Issues**

### **Improving Public Toilet Cleanliness**

37 Several Members, including **Ms Poh Li San** and **Ms Cheryl Chan** spoke about public toilets, and the importance of practising social responsibility in keeping them clean. **Mr Louis Ng** and **Ms Cheryl Chan** suggested introducing a cleanliness grading system for public toilets and tying it to licensing duration or fees for hawker centres and coffeeshops.

38 This overall approach of education and enforcement is broadly in line with our multi-pronged strategy to improve public toilet cleanliness.

a. Our first strategy is to improve design and infrastructure. As part of this, NEA is reviewing requirements for proper toilet design in the Code of Practice on Environmental Health, setting up model toilets in hawker centres, and supporting infrastructure upgrade under the Toilet Improvement Programme.

b. Second, NEA will step up surveillance and enforcement. Through the environmental sanitation regime, we will foster effective cleaning of toilets by mandating baseline standards. This is complemented by training programmes for toilet cleaners. We have also tightened penalties against toilet lapses since 1 April 2020, and NEA will continue with surveillance efforts through regular inspections.

c. Third, NEA will ramp up public education and promote good toilet etiquette. You may have heard of our recent Public Toilet Cleanliness Initiative, where NEA partnered the Restroom Association of Singapore to promote good toilet habits.

In line with **Ms Poh Li San's** suggestion on involving citizens' contribution, we have installed feedback panels in some hawker centre toilets, to gain insights on users' perceptions and make more targeted infrastructural improvements and

cleaning efforts. We are rolling out more initiatives. Do look out for the “Loo of the Future” Challenge to crowdsource for innovative toilet design ideas in the coming months.

39 On **Mr Louis Ng** and **Ms Cheryl Chan’s** suggestion of a cleanliness grading system, our primary focus now is to support the premises in achieving a set of baseline environmental sanitation standards.

40 Nonetheless, SFA will be introducing a new licensing and recognition framework for food establishments which will require them to have good track records on food safety and cleanliness. Major lapses in toilet cleanliness could conceivably affect their licence duration, which means they will have to go through licence audits more frequently if they have a short licence duration. This will motivate coffeeshops to maintain good track records and uphold cleanliness in their premises.

### **Conclusion: A Cleaner, Stronger, More Caring Singapore.**

41 Mr Deputy Speaker, Sir, let me conclude. Public hygiene has always been a priority for the Government, but we must do more following COVID-19. This Bill marks a new milestone to keep Singapore clean by placing greater accountability on premises managers to strengthen public hygiene in their premises.

42 Notwithstanding the focus of the Bill, Members have also spoken passionately and more broadly on a host of other environmental public health related matters, such as pest control, bird nuisance, tray return, smoking and littering. For better focus on the Bill, I will not address them one by one, specifically. These interrelated issues show that public health is multi-faceted and the solutions must also be multi-factorial.

43 This is why all users must play their part if we are to truly move the needle on public hygiene. While the manager can keep his place clean and safe, individuals must take responsibility to maintain good personal hygiene. This is not just about safeguarding public health, but also about building a more gracious society. In properly disposing of our used tissues for example, we help protect our cleaners, many of whom are elderly, from biohazards in their work environment so that they can work safely.

44 Ultimately, public hygiene is a collective responsibility. I ask everyone to work with us to make Singapore a truly clean and liveable home, and instil a national culture of cleanliness. Good public hygiene will help us get over the current pandemic and be better prepared for the next outbreak. We must do our utmost to keep Singapore safer and stronger.

45 Mr Deputy Speaker, I beg to move.



1 Mr Speaker, I beg to move, "That the Bill be now read a second time".

## **A Clean, Liveable and Healthy Singapore**

### **Keeping Singapore Clean**

2 Singapore's reputation as a clean city is a source of national pride. High standards of public hygiene have been a cornerstone of our good public health.

3 Over the years, we have introduced policies and programmes to shape social norms and keep Singapore clean and liveable. These include anti-littering campaigns, mobilising the community, and uplifting the environmental services industry.

4 Internationally, Singapore is known as a clean and green city. Nine in 10 Singaporeans expressed satisfaction with the cleanliness of our public spaces and take pride in keeping Singapore clean, according to a survey by the Singapore Management University (SMU). But there is room for improvement.

5 We are overly reliant on efficient cleaning services. Public toilets in coffeeshops and hawker centres are an area of concern and the cleanliness of bin centres and waste disposal areas need to be improved. One in 5 respondents to the SMU survey thought it acceptable to leave rubbish around if there was already litter in the area. One in 3 respondents believed that it is the cleaners' responsibility to return trays. Clearly, we still have some way to go to inculcate a strong sense of social responsibility in Singaporeans to do their part to keep public spaces clean.

### **Threat of Future Pandemics**

6 At the same time, we remain vulnerable to public health threats. In 2003, SARS came to Singapore and claimed 33 lives. We have also had to tackle local public health incidents such as the gastroenteritis outbreaks that occurred over 2018 and 2019. Linked to contaminated environments, these outbreaks affected more than 1,200 people.

7 There are also waterborne health risks from pathogens that lurk in water, such as the *Legionella* bacteria, which can be transmitted through the inhalation of contaminated airborne water droplets. Aquatic facilities such as swimming pools, spa pools and water playgrounds, and aerosol-generating systems such as cooling towers, can harbor such bacteria.

8 Between 2000 and 2014, the Centers for Disease Control and Prevention reported around 57 Legionellosis outbreaks associated with aquatic facilities in the US. More than 600 fell ill and six people lost their lives. Similar Legionellosis outbreaks have occurred in Australia, France and the United Kingdom. While such outbreaks have not occurred here, we must not be complacent.

9 For the past eight months, we have been battling the COVID-19 pandemic, a public health crisis unprecedented in scale and impact. Among the many lessons learnt, an important one is the need for high standards of sanitation and hygiene. COVID-19 will not be the last global pandemic that we have to face. We must shore up our public health defences and be ready to contain emerging outbreaks, when they come.

### **Sustaining Good Environmental Health – Lessons from Around the World**

10 We can learn from some best practices internationally on managing public health risks more effectively. Take Japan. At the 2018 FIFA World Cup in Russia, the Japanese football team and fans earned worldwide praise for practising social responsibility and cleaning up after themselves.

11 Other than public education, we learnt that a pillar of the national habit of cleanliness in Japan was its Building Sanitation Law. Large premises, such as schools and shopping centres, are required to conduct thorough cleaning periodically and undertake checks on pest control, indoor air quality and cooling towers.

12 Japan's legislation also places the responsibility for a building's sanitary conditions on its owners, and formalises the role of environmental health personnel to oversee all environmental matters in the premises, including off-neglected back-of-house areas such as bin centres. This has fostered a strong sense of ownership on cleanliness.

13 South Korea is another example. It transformed its cleaning industry and processes following the deadly outbreak of MERS in 2015. Through courses by the International Sanitary Supply Association, cleaners are better-trained and certified on the correct cleaning procedures and disinfection methods.

14 In New York City, regulations were passed for cooling towers to be registered, tested and regularly maintained after a Legionellosis outbreak in 2015. This has enhanced New York's capability to manage waterborne public health risks.

15 These are useful lessons as we seek to strengthen our framework to keep Singapore clean.

### **Keep Singapore Clean – The SG Clean Movement**

16 We have adopted a multi-pronged approach to keep Singapore clean under the national SG Clean movement launched earlier this year. The SG Clean movement builds on existing hygiene measures, and goes further to raise our standards in public hygiene and inculcate a culture of cleanliness, so that we can emerge stronger from COVID-19.

17 SG Clean has three key thrusts: (1) Raising cleanliness standards of premises by working with premises owners; (2) Transforming the cleaning industry to meet greater demands; and (3) Inculcating shared responsibility for cleanliness among individuals, as end-users and patrons of premises. Let me elaborate on these thrusts and explain how the initiatives under the proposed Bill fit in.

#### *Raising Cleanliness Standards of Premises by working with Premises Owners*

18 First, to raise cleanliness standards of premises, we must “Build Right”, “Clean Right” and “Audit the Results”. To “Build Right”, we have incorporated in the building plan process, requirements on premises owners such as the provision of sensor-operated toilet flushing systems and proper layout of bin centres. Well-designed and well-maintained infrastructure is an enabler of good public health.

19 To support premises owners in rejuvenating infrastructure, the National Environment Agency (NEA) recently announced the Toilet Improvement Programme for hawker centres and coffeeshops, to incentivise premises to renovate ageing toilet infrastructure.

20 “Clean Right” and “Audit the Results” are important steps where premises owners adopt proper cleaning regime as guided by NEA’s advisories on cleaning and disinfection. And NEA’s SG Clean Quality Mark certifies premises that adopt good cleaning practices.

21 A key part of the Bill is to support this thrust under SG Clean, by clarifying lines of accountability for maintaining clean premises, and setting clear standards expected of premises owners. I will speak more on this later.

#### *Transforming the Cleaning Industry to meet Increased Demand for Cleanliness*

22 Second, we will continue to transform the cleaning industry to meet increased and more sophisticated demand for cleaning services. In doing so, we also hope to create more good jobs. The Environmental Services Industry Transformation Map (ESITM) launched in 2017 has laid the foundation for this. For example, by

driving technology adoption, upskilling the workforce, and enhancing productivity through job redesign and outcome-based contracting.

23 Our cleaners are the unsung frontline heroes of the COVID-19 outbreak, working tirelessly to keep Singapore clean and safe. We will continue to support cleaners as part of the industry transformation journey. For example, we had introduced the Progressive Wage Model (PWM) and PWM Bonus to raise employment standards, facilitate career progression and promote better wages for skilled cleaners.

24 Since we went into the COVID-19 period, NEA has also collaborated with training institutions to launch new Continuing Education and Training courses on environmental infection control to ensure that cleaners are trained to protect themselves against public health threats at work. Through this structured training framework, cleaners can become multi-skilled and expect to earn higher wages.

*Inculcating a Shared Responsibility among Individuals, as End-Users and Patrons*

25 Third, we will promote good personal hygiene and social norms among end-users and patrons at premises. We launched a campaign under SG Clean earlier this year to promote positive behaviour in our shared spaces, and stepped up recently with initiatives on returning trays and using public toilets responsibly in hawker centres and coffeeshops. More than 5,000 SG Clean Ambassadors have stepped forward to spread SG Clean messages across the country.

26 All in, we have a sound framework that has enabled us to maintain good public health.

### **Strengthening Our Public Health Defences**

27 Mr Speaker, Sir, it is in this context that I am introducing the Environmental Public Health (Amendment) Bill. It will introduce three broad shifts in our approach to environmental sanitation and hygiene.

28 First, we will adopt a more proactive approach in guarding against public health threats, and institute baseline environmental sanitation standards for routine and periodic cleaning across high-risk premises. For example, the standards will cover daily cleaning frequencies for high-touch surfaces such as toilets and lift buttons, and often neglected areas such as bin centres; periodic thorough cleaning, say every six months, covering areas that are not easily accessible and not covered by routine cleaning; a pest management plan; and a cleaning and disinfection protocol. The standards will also specify desired

outcome-based cleanliness indicators to be achieved, and the tools and training requirements for workers to carry out cleaning effectively.

29 Second, we will work with industry partners to co-develop environmental sanitation standards applicable to their respective sectors and tailored to their needs. We will progressively implement these from mid-2021, starting with higher-risk premises with immuno-vulnerable occupants, high footfall or a history of outbreaks, such as our preschools, schools, youth and eldercare facilities, hawker centres and coffeeshops.

30 Third, we will place greater responsibility on the Managers of high-risk premises to ensure that the environmental sanitation standards are met. With the support of trained environmental control coordinators and environmental control officers – ECCs and ECOs in short – the Managers will be required to implement environmental sanitation programmes developed for the premises by the ECCs and ECOs that meet the environmental sanitation standards.

31 To provide a pipeline of competent ECCs and ECOs, we will introduce a two-tiered competency-based framework. In general, premises such as a preschool or coffeeshop will require an ECC while more complex or multi-tenanted premises will require an ECO, with a higher level of competency to coordinate efforts amongst different tenants within the premises. This will provide a career progression pathway for ECCs to become ECOs, as they gain experience and upgrade their skills to take on more responsibilities. We expect to train 3,800 ECCs from the first quarter of 2021.

32 Similarly, we will proactively regulate higher-risk aquatic facilities and aerosol-generating systems, to manage risks from potential waterborne disease outbreaks.

33 Mr Speaker, Sir, let me now highlight the main elements of the Bill.

### **Key Features of the Bill**

34 The Environmental Public Health (Amendment) Bill establishes an environmental sanitation regime for specified premises, and regulatory regimes for aquatic facilities and aerosol-generating systems.

### **Environmental Sanitation Regime**

35 I will speak first on the environmental sanitation regime.

#### *Introduction of Environmental Sanitation Standards*

36 The new **section 62A** empowers NEA to designate, with Minister's approval, specified premises for which an environmental sanitation programme is required. The new **section 99A** gives powers to the Director-General to issue, approve, amend or revoke codes of practice and standards of performance with respect to the provisions of the EPHA, including programmes and measures relating to environmental sanitation.

#### *Duties of the ECC or ECO and the Manager*

37 A key feature of this Bill is to clarify the responsibilities for keeping specified premises clean. The new **section 62B** prescribes the duties of the ECC or ECO, which include developing an environmental sanitation programme for the specified premises, monitoring its implementation and recommending remedial measures to address any default in implementation.

38 The Manager of the specified premises must endorse and submit to the Director-General the environmental sanitation programme, implement the programme and any remedial measures recommended by the ECC or ECO. In accordance with the lines of accountability, the Manager will be responsible for any failure to implement the programme.

39 To ensure that ECCs and ECOs have the technical competence required to perform their roles, the new **section 61A** empowers the Director-General to register or refuse to register an individual as an ECC or ECO, and stipulates the circumstances under which the Director-General may suspend or cancel such registration. The new **section 61B** provides for appeals to the Minister against the Director-General's decisions made under section 61A.

#### *Power of the Director-General to give Directives*

40 Notwithstanding upstream preventive efforts under the environmental sanitation regime, we must be prepared to intervene at the first warning signs of a potential health risk. The new **section 62C** empowers the Director-General to issue directives to close any premises, clean or disinfect the premises or any public service vehicle, or take other necessary measures in respect of the premises or public service vehicle, to prevent or manage health risks or disease outbreaks.

#### *Monitoring Powers*

41 Finally, we must ensure that the environmental sanitation regime is properly implemented and the directives are complied with. The new **section 62D** empowers the Director-General and authorised officers to conduct compliance checks, and obtain documents and information for the purposes of the new sections 62A, 62B and 62C.

## **Aquatic Facilities and Aerosol-Generating Systems**

42 Mr Speaker, Sir, I will next talk about how the Bill strengthens environmental hygiene in higher-risk aquatic facilities and aerosol-generating systems under the new **Parts VII** and **VIIA** in the Bill.

### *Licensing of Aquatic Facilities and Registering Aerosol-Generating Systems*

43 Presently, swimming pools are the only type of aquatic facilities licensable under the EPHA. We will extend our licensing regime to more categories of aquatic facilities, such as multi-use spa pools and water playgrounds, which have become commonplace in Singapore. To effect this, the new **section 63** requires the owner or occupier of any premises with a licensable aquatic facility to obtain a licence from the Director-General, prior to its use or operation.

44 While we currently have regulations for aerosol-generating systems such as cooling towers, we do not have a registry of these systems and their locations. To strengthen our ability to respond to potential health risks, such as in the event of an outbreak, the new **section 66A** requires the owner or occupier of any premises with a registrable aerosol-generating system to register it with the Director-General prior to its use or operation.

### *Shutdown of Aquatic Facilities and Aerosol-Generating Systems*

45 To prevent or manage potential health risks or disease outbreaks, the new **section 64** empowers the Director-General to require the cessation of the use or operation of any aquatic facility, or class of aquatic facilities. This section also empowers the Director-General to require the cessation of the use or operation of a licensable aquatic facility if there has been a contravention of any applicable requirement. Similar powers are provided under the new **section 66B** for aerosol-generating systems.

### *Monitoring Powers*

46 We will introduce monitoring powers under the new **sections 65 and 66C** for the Director-General and authorised officers to conduct compliance checks on any aquatic facility or aerosol-generating system, and to obtain documents and information to administer, enforce or ascertain compliance with the requirements in Parts VII and VIIA.

## **Conclusion**

47 Mr Speaker, Sir, this Bill marks another milestone in our efforts to keep Singapore clean and safe. The state of public cleanliness reflects the character of our citizens. Through collective action and co-ownership, we will forge a cleaner, stronger and kinder Singapore for generations to come.

48 Mr Speaker, I beg to move.

Ladies and Gentlemen,

1 A very good morning to all. I thank Global Compact Network Singapore for organising this virtual Summit, and for inviting me to join you.

### **DECADE FOR DECISIVE ACTION**

2 Our generation is facing challenges on multiple fronts. The COVID-19 pandemic has had devastating impact on our lives, and led to loss of jobs and income. The Government has set aside close to \$100 billion for COVID-19 support packages for our people and businesses, and we intend to spend another \$8 billion to save jobs, create new ones and seize new growth opportunities.

3 Even as we do this, however, we need to push on in our fight against climate change, which will be the crisis of many generations. Last month, the World Meteorological Organisation, a United Nations agency, reported that global warming could exceed the key threshold of 1.5 degree Celsius by 2024 — far sooner than scientists had earlier predicted. I am sure many of you would have been alarmed by the dramatic photo of an ice block, larger than the size of Paris, breaking off from Greenland's glacier. Unless global carbon greenhouse gas emissions drop sharply this decade, there will be little chance of limiting warming to safer limits.

4 As we recover from the effects of the COVID-19 pandemic, we have an opportunity to reflect on the lessons learnt, and incorporate them in our way forward. This will enable us to emerge from this crisis stronger, and build the Singapore we want for our future generations. As GCNS puts it, this is the "Decade for Decisive Action".

### **GOVERNMENT'S COMMITMENT**

5 The Government will push for a green recovery, to support a competitive transition to a low-carbon and climate-resilient future. We are putting in place energy efficiency schemes to help our companies transform to be best-in-class globally in energy and carbon efficiency. We are also partnering the industry and our research community to study the feasibility of low-carbon technologies such as carbon capture, utilisation and storage (CCUS), and use of low-carbon

hydrogen. We will continue to work with industry stakeholders to maximise solar deployment on the rooftops of private industrial and commercial buildings to meet our solar target of at least 2 GWp by 2030.

6 We will continue to invest in climate science, to enable the development of meaningful solutions to tackle climate change. We have launched a \$10 million National Sea Level Research Programme to develop more robust projections of rising sea levels, and we have set aside an initial funding of \$5 billion for the Coastal and Flood Protection Fund to protect Singapore against rising sea levels. By the end of this year, we will set up a Climate Science Research Programme Office to drive efforts to formulate Singapore's national climate science research masterplan.

7 Climate change will affect access to critical resources, including water and food. We will strengthen our water and food security, by investing in weather-resilient sources, and producing more with less. We will work with industry and community partners to address our key waste streams and pursue circular economy approaches. New jobs and opportunities will be created for our people through these efforts.

### **IMPORTANCE OF COLLECTIVE ACTIONS**

8 Climate change is a global challenge that requires collective action by everyone — governments, businesses, civil society and individuals of all ages. Our youths, as leaders of today and tomorrow, play an important role in shaping the future not just for this generation, but the next. I am glad to see many youths rising to the challenge. I understand that the programme for the Youth Track at this Summit was conceptualised, planned and implemented by the Youth Organising Committee.

9 Youths can be powerful agents of change. Let me share three ways you can make a difference. First, you can reduce your individual impact on the environment by consciously looking at what you are purchasing and consuming each day. Find ways to reduce, reuse and recycle. Order only what you can finish eating, to help reduce food waste. Bring your own bag the next time you go shopping, to reduce the use of disposable bags. Recycle your electronic products

instead of throwing them in the bin. Our individual actions may seem insignificant, but the sum of our individual actions can make a difference.

10 Second, influence those around you to do the same. Many youths are stepping up to organise movements and initiate projects to rally people to be part of the solution. Singapore Youth for Climate Action, for example, recently produced a citizens' guide to disposing e-waste in Singapore. Zero Waste Singapore, a youth-led non-governmental organisation, drives the Bring Your Own (or BYO) Singapore movement, which works with retailers to offer incentives to customers to bring their own reusable bags, bottles and containers. I am encouraged by their passion, and others like them. The recipients of the Young Leaders SDG Awards have also embarked on very interesting projects. I look forward to meeting them later.

11 Third, learn from one another. There are youths from different ASEAN countries in the audience today. Each of our countries has our own national priorities and circumstances, but there is much we can learn from one another in our common pursuit of sustainability. I hope everyone will be generous in sharing your unique experiences and perspectives in this summit.

## **CONCLUSION**

12 Let me conclude. The road to recovery and sustainability may be long, but I believe we can overcome the challenges if we work together as one united people and stay the course.

Thank you.

**Speech by Ms Grace Fu, Minister for Sustainability and the Environment,  
at the Eco-Business Webinar: ‘Packaging waste: A circular future,  
or talking in circles?’, 19 October 2020**

Ms Jessica Cheam, Managing Director, Eco-Business  
Mr Seah Kian Peng, Group CEO, FairPrice Group  
Fellow guests and viewers

1. Good afternoon. I would like to first thank Eco-Business and Fairprice Group for bringing us together for today’s webinar. The management and reduction of packaging waste is an issue of growing salience.

**Optimising the use of packaging**

2. With rising consumption, packaging waste, food waste and e-waste are becoming increasingly challenging to deal with. These are the three key waste streams that Singapore is targeting under our Zero Waste Masterplan. Packaging and food waste are generated in large quantities and have low recycling rates. E-waste, while a smaller proportion of the waste generated, could be detrimental to the environment if not properly treated. Managing these waste streams well will be our focus as we strive towards zero waste, and in extending the lifespan of Semakau Landfill beyond 2035.

3. Today our focus is packaging waste, which accounted for a third of our domestic waste. But let me first say that packaging has many useful functions. It helps reduce food spoilage, extend the shelf life of food, and protect our products as they move through the logistics chain. Important information is also printed on product packaging, such as nutritional value, best-by and expiry dates, and safety instructions.

4. Therefore, our approach should not be to eliminate packaging, but to see how we can optimise the use of packaging and ensure a sustainable end-of-life management of packaging waste.

5. We made good headway on this since the establishment of the Singapore Packaging Agreement (SPA) in 2007. This is a voluntary joint initiative by the Government, industry, and non-governmental organisations to reduce packaging waste. Through improvements to packaging design and optimising the use of packaging materials, a cumulative reduction of about 54,000 tonnes of packaging waste and S\$130 million in savings was achieved between 2007 and 2020. This bears testimony to the fact that making environmentally-friendly changes can benefit the bottom-line.

6. But we need to do more. Our recycling rate for plastics, which make up a large component of our packaging waste, stood at just 4 per cent in 2019. We need a serious, concerted effort by all parties - the Government, industry, and consumers - to make bigger strides. And how?

**Government and industries’ role**

7. First, the Resource Sustainability Act introduced last year gave us the regulatory framework to target the three waste streams. For packaging waste, we will start with the Mandatory Packaging Reporting (MPR) framework from 2021. This will be followed by the Extended Producer Responsibility (EPR) framework.

8. Under the MPR framework, businesses with an annual turnover of more than S\$10 million will be required to report the types and amount of packaging materials they place on the market annually. They include producers of packaged products, and retailers such as supermarkets. They will also

submit their plans to reduce, reuse or recycle packaging to NEA. This will lead companies to look at the potential for waste reduction within their business operations.

9. To help companies fulfil these obligations, NEA has partnered the Singapore Manufacturing Federation (SMF) to introduce the Packaging Partnership Programme. This industry-led programme will help to build industry capability in packaging 3Rs, exchange best practices, and move companies towards sustainable packaging waste management.

10. NEA is also working on the framework for a Deposit Refund Scheme (DRS) for beverage containers. Under the DRS, producers such as soft drink companies will be required to fund the collection of used beverage containers. Consumers receive a refund when they return their empty beverage containers.

11. The DRS will serve as the first phase of the Extended Producer Responsibility (EPR) framework. Under the EPR, producers will be responsible for the collection and treatment of their end-of-life products. This will increase recycling rates downstream, and encourage innovation upstream, spurring the design of products that require less packaging or material, and are more easily recycled.

12. These regulations will create economic opportunities and capture new areas of growth in the area of sustainability. For example, the DRS will aggregate post-consumer plastic waste such as PET beverage bottles - providing a steady supply of feedstock for local recycling capacity. We are actively engaging companies that are interested to set up mechanical recycling capabilities in Singapore. We are also pursuing chemical recycling solutions to treat plastics that are not suitable for mechanical recycling. These efforts will close the plastic loop, create higher-value products from our waste, and create jobs for Singaporeans.

### **Consumers' role**

13. Even as the Government works with the industries, consumers have an important role to play. Consumer expectation and demand for sustainable products and packaging will drive and influence product design. For instance, when purchasing a product, look for its quality and not its packaging as a proxy, and support businesses that make an effort in optimising packaging resources. More sustainable packaging reduces the amount of resources used and carbon emissions generated in its production.

14. Another way for consumers is to reduce the use of disposables such as single-use carrier bags. The NEA launched the second run of the "Say 'YES' to Waste Less" campaign last month to encourage this. It is working with close to 100 commercial partners, covering more than 2,100 premises, to encourage consumers to take simple, positive actions such as bringing reusables and declining disposables for takeaways and online food orders. Fairprice is one such partner. They have taken a proactive stance by initiating a month-long "No Plastic Bag" trial in September 2019. The initiative sought to reduce the use of single-use plastic carrier bags, by requiring customers to pay for them. This initiative was subsequently extended for a year from November 2019, and the number of participating stores increased from seven to 25. I commend Fairprice for taking a lead in the supermarket sector and urge other players to follow suit.

15. Will this work, what more can we do? We are encouraging public conversations and action through a Citizens' Workgroup on Reducing Excessive Consumption of Disposables. The Workgroup convened last month, and we hope to partner citizens to co-create and co-deliver practical and inclusive solutions to deal with this issue.

### **Conclusion**

16. Our individual actions as consumers, businesses and communities contribute towards the bigger vision of a Green and Sustainable Singapore. How we come together to reduce and recycle packaging waste will be one substantive way to realise this vision. By working together, pushing boundaries, and exploring opportunities and innovative solutions, we can transform Singapore's environment for the better, with new and exciting green jobs. Together, let us build a vibrant and sustainable Singapore!

17. Thank you.

Ms Jessica Cheam, Managing Director, Eco-Business  
Mr Seah Kian Peng, Group CEO, FairPrice Group  
Fellow guests and viewers

1. Good afternoon. I would like to first thank Eco-Business and Fairprice Group for bringing us together for today's webinar. The management and reduction of packaging waste is an issue of growing salience.

### **Optimising the use of packaging**

2. With rising consumption, packaging waste, food waste and e-waste are becoming increasingly challenging to deal with. These are the three key waste streams that Singapore is targeting under our Zero Waste Masterplan. Packaging and food waste are generated in large quantities and have low recycling rates. E-waste, while a smaller proportion of the waste generated, could be detrimental to the environment if not properly treated. Managing these waste streams well will be our focus as we strive towards zero waste, and in extending the lifespan of Semakau Landfill beyond 2035.

3. Today our focus is packaging waste, which accounted for a third of our domestic waste. But let me first say that packaging has many useful functions. It helps reduce food spoilage, extend the shelf life of food, and protect our products as they move through the logistics chain. Important information is also printed on product packaging, such as nutritional value, best-by and expiry dates, and safety instructions.

4. Therefore, our approach should not be to eliminate packaging, but to see how we can optimise the use of packaging and ensure a sustainable end-of-life management of packaging waste.

5. We made good headway on this since the establishment of the Singapore Packaging Agreement (SPA) in 2007. This is a voluntary joint initiative by the Government, industry, and non-governmental organisations to reduce packaging waste. Through improvements to packaging design and optimising the use of packaging materials, a cumulative reduction of about 54,000 tonnes of packaging waste and S\$130 million in savings was achieved between 2007 and 2020. This bears testimony to the fact that making environmentally-friendly changes can benefit the bottom-line.

6. But we need to do more. Our recycling rate for plastics, which make up a large component of our packaging waste, stood at just 4 per cent in 2019. We need a serious, concerted effort by all parties - the Government, industry, and consumers - to make bigger strides. And how?

### **Government and industries' role**

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12. These regulations will create economic opportunities and capture new areas of growth in the area of sustainability. For example, the DRS will aggregate post-consumer plastic waste such as PET beverage bottles - providing a steady supply of feedstock for local recycling capacity. We are actively engaging companies that are interested to set up mechanical recycling capabilities in Singapore. We are also pursuing chemical recycling solutions to treat plastics that are not suitable for mechanical recycling. These efforts will close the plastic loop, create higher-value products from our waste, and create jobs for Singaporeans.

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### **Conclusion**

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17. Thank you.

Chairperson  
Excellencies  
Distinguished delegates

1. Allow me to begin by thanking Malaysia as the APEC Chair for hosting the APEC Virtual Ministerial Policy Dialogue on Food Security. This dialogue is particularly salient, given the challenges that the COVID-19 global pandemic has presented us. Besides being a health crisis, COVID-19 has also hurt economies, and caused major disruption to both food production and distribution. Supply chains have also been impacted, resulting in bottlenecks and threatening food security.

### **COVID-19's impact and the need to ensure functioning supply chains**

2. In Singapore, we import over 90% of our food from more than 170 countries and regions. The continued flow of food and food-related products remains key to Singapore's food security. In line with APEC's goal for free and open trade and investment, underpinned by the rules-based multilateral trading system which Singapore supports, it is important for all APEC Member Economies to pursue initiatives to maintain the free movement of goods across borders. Singapore is deeply appreciative of APEC Member Economies' efforts to maintain the movement and free trade of goods across borders, including food and agricultural inputs, and ensuring that key infrastructure needed for the movement of goods, such as ports and airports, remain fully operational during COVID-19, despite movement restriction measures in place.

3. Globally, we are not just dealing with a health pandemic but an economic crisis. Maintaining trade connectivity is critical to enable countries to respond efficiently and effectively to manage the pandemic, and also rebuild our economies. It is through renewed commitment to keep markets and supply chains open that economies can also minimise disruption and facilitate the global recovery from this crisis.

4. In addition, it is also important for APEC Member Economies to accelerate the processing of food shipments and expedite customs clearance of food products. In Singapore, we have further streamlined our food accreditation process based on science and risk assessments, and have approved more source countries to expand the number of economies we can import food from. It is also vital for Member Economies to ensure that any trade-related measures do not disrupt the food supply chain and refrain from imposing or intensifying export and other trade restrictions that are not based on evidence and scientific risk assessments.

5. Besides ensuring that supply chains continue to function, it is also important to address the challenge of managing restrictions on the movement and availability of workers in the agri-food sector and to prevent outbreaks of COVID-19 among them. In Singapore, we have required businesses to implement safe management measures and where relevant, business continuity plans, so that any COVID-19 incident can be identified quickly, contained and managed. This has strengthened our capacity to ensure that key food distribution sites or establishments continue to function even if there are cases of COVID-19.

### **Leveraging technology and R&D**

6. As COVID-19 increases the vulnerability of global supply chains, Singapore is doing more to further enhance our food security by implementing plans to produce more food locally and sustainably. We have a goal to produce 30% of Singapore's nutritional needs locally by 2030, from less than 10% today. We call this our "30 by 30" goal. The increase in food production will also enhance regional food security as more food will be produced within the region and some of the urban food solutions developed locally may be applicable overseas.

7. To achieve our "30 by 30" goal, we have put in place plans to build an innovative agri-food sector that leverages technology and R&D to increase productivity and meet the challenges of an increasingly resource-constrained world. We have a \$63 million Agriculture Productivity Fund to incentivise our farms to adopt automation and productivity-enhancing technologies, such as hydroponics and recirculating aquaculture systems, for our urban farms to achieve big leaps in food production within our scarce land area.

8. To increase food production in a sustainable manner, we encourage our farms to embrace sustainability and to employ circular economy principles. For example, Sustenir, a high-tech indoor vegetable farm in Singapore, uses technology to control farming variables like lighting and temperature. By

doing so, production is consistently reliable and of high-quality. Another example is local egg farm N&N Agriculture which carries out bio-digestion of their poultry waste to produce energy. The energy generated is then used to dry the by-products from the food manufacturing industry, such as okara, which is from soy, to produce chicken feed. The result is a win-win – the farm requires low energy input and generates less waste that needs to be incinerated. Farms are recognising the economic opportunities and environmental benefits of designing circularity into their processes. These interventions allow companies to gain a competitive advantage in the face of increasing resource constraints.

9. Last year, Singapore also committed \$144 million to research in the areas of sustainable urban food production, future foods such as alternative proteins, and food safety. We are looking forward to translating the outcomes of these R&D projects to feasible and scalable initiatives that our local industry, and eventually other countries, can adopt.

### **Conclusion**

10. As the COVID-19 pandemic continues to evolve, attention and cooperation among all APEC Member Economies will be needed to arrive at a sustainable new normal. Singapore will continue working with like-minded partners to reiterate our strong commitment to keep trade lines open. The adoption of the Declaration on Facilitating the Movement of Essential Goods by APEC Ministers Responsible for Trade in July this year is a clear demonstration of APEC's commitment to facilitate the flow of essential goods, including food products. The APEC Ministerial Statement on Food Security further reaffirms Member Economies' commitment on this. Working together, I am confident that we will all bounce back stronger from this global challenge.

11. Thank you.

## **SPEECH BY MS GRACE FU, MINISTER FOR SUSTAINABILITY AND THE ENVIRONMENT, AT THE OPENING CEREMONY OF THE ASIA CLEAN ENERGY SUMMIT 2020 ON 27 OCTOBER 2020**

Mr Edwin Khew, Chairman, Sustainable Energy Association of Singapore

Distinguished Guests

Ladies and Gentlemen

1 It is a pleasure to be here at the 7<sup>th</sup> edition of the Asia Clean Energy Summit. While only a limited number of people can attend the conference physically this year, I commend the Sustainable Energy Association of Singapore for organising this hybrid event, bringing together thought leaders and stakeholders from the region in the clean energy space.

### **Sustaining efforts to mitigate climate change**

2 The COVID-19 pandemic has changed the way we live, work and play. Even as we address the challenges from the pandemic, we must continue to focus on the climate crisis confronting us, and keep sustainability at the core of everything we do.

3 This is especially important for Singapore, given our vulnerability to climate change threats such as sea-level rise. We must sustain efforts to mitigate climate change. Today, I would like to share Singapore's efforts in adopting clean energy solutions and improving energy efficiency. These are two important strategies to mitigate climate change, and we have been steadily advancing progress on these fronts.

### **Adopting clean energy solutions**

4 First, adopting clean energy solutions. As many of you may know, solar energy is Singapore's most viable renewable energy option, given our limited access to alternative energy sources such as geothermal, wind and hydropower. We achieved our 2020 solar deployment target of 350 megawatt-peak (MWp) in the first quarter of this year, and aim to deploy at least 2 gigawatt-peak (GWp) by 2030. This would be sufficient to power around 350,000 Singaporean households a year. However, the deployment of solar energy remains challenging due to our limited land space, competition for alternative uses and dense urban landscape. We have therefore ventured to make use of alternative spaces, such as water bodies.

5 In August this year, PUB, Singapore's National Water Agency and Sembcorp started constructing the floating solar photovoltaic (or PV) system on Tengeh Reservoir, which will be one of the world's largest. When completed, the energy

generated will power all of PUB's local water treatment plants and offset 7 per cent of their annual energy needs. This large-scale floating solar PV system is an expansion of an earlier testbed deployed on Tengeh Reservoir by PUB and the Economic Development Board (or EDB) in 2016, to study the feasibility of deploying floating PV systems on reservoirs. The Solar Energy Research Institute of Singapore (or SERIS) played a critical role as project manager for the testbed and found that floating solar PV systems performed 5 to 15 per cent better than conventional rooftop solar systems. This lent support to PUB's plans to deploy large-scale floating solar PV systems on reservoirs to reduce their carbon footprint and mitigate climate change.

6 To further develop capabilities in the areas of near-shore and offshore floating PV systems, I am happy to share that SERIS will be collaborating with Fred. Olsen Renewables under a research agreement to develop various floating PV solutions for seawater and different climatic conditions. The Fred. Olsen companies, which are based out of Norway, have more than 170 years of global experience in shipping, offshore construction, offshore energy production, and renewable power production. More details will be shared at the 4<sup>th</sup> International Floating Solar Symposium (IFSS).

7 Besides reducing carbon emissions, solar deployment has other benefits. Earlier this year, as part of efforts to manage the COVID-19 pandemic, the Government set up a number of Community Care and Community Recovery Facilities to house recovering patients. To reduce carbon emissions, fumes and noise created by mobile diesel generators, more than 650 made-in-Singapore, REC Alpha Series solar panels were installed at the recovery facility at the Changi Exhibition Centre. These produced about 20 per cent of the facilities' projected energy needs and contributed towards a better recovery environment for the patients.

8 On this note, I am pleased to share that Maxeon Solar Technologies will be establishing their global head office and R&D centre in Singapore to develop next-gen solar panel technologies. Being a leader in solar innovation with access to over 900 patents and two best-in-class differentiated panels, the entry of Maxeon will further strengthen our local R&D ecosystem, and is aligned with Singapore's ambition to ramp up installed solar capacity by 2030.

### **Improving energy efficiency**

9 Given our limited access to clean energy, we must be prudent in using our precious energy resources. Improving energy efficiency is therefore the second key strategy in our journey to sustainability and mitigating climate change. Since the Energy Conservation Act (or ECA) came into effect in 2013, companies regulated under the Act achieved an average annual energy efficiency improvement rate of 1 per cent from 2014 to 2018. Translated to carbon abatement, this represents about 250 kilo-tonnes of carbon dioxide equivalent

emissions per year — similar to removing 70,000 cars from the road each year! The Government will continue to support energy efficiency efforts, through grants such as EDB's Resource Efficiency Grant for Energy, and the National Environment Agency's Energy Efficiency Fund. To date, over \$100 million have been committed to help local manufacturers in their energy efficiency projects.

10 Singapore is also pursuing opportunities to improve energy efficiency through a circular economy approach. An example of this is the Tuas Nexus, Singapore's first integrated water reclamation and solid waste treatment facility, and the first in the world when completed. By co-digesting food waste and water sludge, and combusting the biogas produced, not only will the electricity generated sustain the operations of the facility, there will be excess energy to power up to 300,000 four-room HDB flats.

11 The Government is also committed to working with companies and businesses to drive our sustainability agenda. I am pleased to announce that ENGIE Factory and EDB New Ventures will be signing an MOU to build a portfolio of new sustainability start-ups that will help companies in Singapore and Southeast Asia to decarbonise more quickly and profitably. These new ventures will accelerate the zero-carbon transition, boost employment in a critical and growing segment and establish Singapore as a hub for sustainability innovation in the region. We hope that more pioneering solutions and breakthroughs in sustainable development could arise from this partnership.

12 These are some innovative ways we have undertaken to raise energy efficiency and generate clean energy. We are also studying emerging technologies such as hydrogen and carbon capture, utilisation and storage, and exploring the potential of tapping on regional power grids to access sustainable energy resources.

## **Conclusion**

13 Let me conclude. This is a prime period for companies and policymakers to leverage opportunities in harnessing clean energy and improving energy efficiency, as we push for a green recovery post-COVID-19. Fighting climate change and making the transition towards a greener economy will require a concerted whole-of-nation effort by industries, individuals and the Government.

14 While promising progress has been made thus far, we must continue to push the frontiers of sustainability. I wish everyone a fruitful Summit ahead, and for the discussions to catalyse positive actions for our environment. Together, we can game change climate change.

Thank you.

Ms Lisa Liaw, Chair of the Board of Governors of AmCham Singapore

Dr Hsien-Hsien Lei, CEO of AmCham

Ladies and Gentlemen

1 A very good afternoon to everyone. I thank AmCham for inviting me to address you today.

## **FIGHT AGAINST CLIMATE CHANGE MUST CONTINUE**

2 Earlier this month, climate scientists from Europe reported that 2020 could be the world's hottest year on record, as September temperatures reached 0.63 deg C above a 30-year historical average. The warming effects of climate change are being felt around the world — the Arctic sea ice is declining at an increasing rate, while countries such as Australia and the United States have witnessed large areas ravaged by devastating wildfires.

3 These statistics and events are grim reminders that even as we focus our efforts on overcoming and recovering from the COVID-19 pandemic, we must sustain our efforts in the fight against climate change, which poses existential challenges.

4 In Singapore, we remain committed to doing our part to mitigate climate action, on national, regional and global fronts. In March this year, we submitted our enhanced Nationally Determined Contribution (NDC) and long-term low-emissions development strategy to the United Nations Framework Convention on Climate Change (UNFCCC). Under Singapore's enhanced climate pledge, we target to peak emissions at 65 million tons of carbon dioxide equivalent (MtCO<sub>2</sub>e) around 2030. We also aspire to halve our emissions from its peak to 33MtCO<sub>2</sub>e by 2050, with a view to achieving net zero emissions as soon as viable in the second half of the century. These are challenging and ambitious goals for Singapore. They demonstrate our firm commitment to supporting global climate action and a low-carbon future.

## **THE SINGAPORE GOVERNMENT'S EFFORTS**

5 During his Ministerial statement in Parliament earlier this month, Deputy Prime Minister Heng Swee Keat spoke on the importance of environmental sustainability and highlighted that investing in sustainability can open up new business opportunities. Indeed, the Singapore Government is committed to push for a green recovery. We are putting in place energy efficiency schemes to help our companies transform to be best-in-class globally in energy and carbon efficiency. We are also partnering the industry and research community to study the feasibility of low-carbon technologies such as carbon capture, utilisation and storage (CCUS), and the use of low-carbon hydrogen. We are on track to meet our solar target of at least 2 Gigawatt Peak by 2030, by maximising solar deployment and investing in innovative solutions such as floating solar photovoltaic systems on our reservoirs.

6 We will invest heavily in research and development for climate action. As part of these efforts, we have launched a S\$10 million National Sea Level Programme to develop more robust projections of sea level rise. A Climate Science Research Programme Office will be set up this year to drive efforts to formulate Singapore's national climate science research masterplan. We have also set aside dedicated resources in the Coastal and Flood Protection Fund to fund infrastructures that protect Singapore against rising sea levels.

7 We know that climate change will affect access to critical resources, including water and food. This is why we continue to strengthen our water and food security, by investing in weather-resilient sources, and to find ways to produce more with less. We will also work with the community, industry partners and stakeholders to better manage Singapore's key waste streams and pursue a circular economy approach.

8 These efforts to build a climate-resilient and sustainable Singapore will not only benefit the environment, but also open up new areas of growth in related sectors and create new and upgraded jobs for Singaporeans.

## **HOW BUSINESSES CAN CONTRIBUTE**

9 Businesses can play an important role in fighting climate change too. Let me share three ways in which companies can lower your carbon footprint and pursue sustainable growth.

10 First, businesses can be agents of change and lead industries towards sustainable business practices. Some U.S. companies are charting the way by setting ambitious targets for carbon emissions. These targets are in turn causing ripple effects within their industries and the downstream businesses. Google and the Alphabet Group is one such example, creating demand for green data centres and clean energy with their target to operate on carbon-free energy, 24/7, by 2030.

11 Second, businesses can adopt a circular approach towards business processes and 'close the loop' with each product group, for example by harnessing the waste or by-product of a process as a resource or raw material for another process. An example would be the recent collaboration between Dow and Sport Singapore (SportSG). They plan to recycle 300,000 pairs of used sports shoes to build jogging tracks, fitness corners and playgrounds. The rubberised soles and midsoles of the shoes will be ground up into rubber granules, and bounded together using water-based and solvent-free binder technology, creating environmentally friendly materials that are safe for sports. This project demonstrates how we can harness the value of our resources so that we waste less, and use wisely.

12 Third, partnerships in collective sustainable efforts will allow companies to reap economies of scale, and facilitate knowledge sharing that could improve operations and processes. One example in Singapore is the formation of the F&B Sustainability Council to address environmental issues in the industry. The Council held its first meeting earlier this year, where local F&B operators discussed green solutions, including the idea of pooling food waste across different F&B premises for treatment in a central digester.

## **CONCLUSION**

13 Let me conclude. Singapore has always strived to turn our challenges into opportunities, and our limitations into a competitive edge. A good demonstration of this is how we have developed a robust and diversified supply of water through early and consistent investments in water infrastructure and research, despite being one of the most water-stressed countries in the world. Food and energy will be the next frontier of our efforts in sustainability. We will plan ahead, invest in research and development, open up spaces through policy sandboxes and innovations, and collaborate with 3P (People, Private and Public) partners.

14 I thank AmCham members for embarking on sustainability initiatives, and look forward to your continued support as we pursue a smooth transition to a low-carbon and climate-resilient future.

15 Thank you and I look forward to our discussions.

Mr Loh Chin Hua, CEO of Keppel Corporation and Chairman of Keppel Land

Mr Tan Swee Yiow, CEO of Keppel Land

Ladies and Gentlemen

1 A very good afternoon. I thank Keppel Land and Sustainable Singapore Gallery for organising the “R.I.S.E. to the Challenge” programme. This is a meaningful community project to raise awareness of the impacts of climate change and to encourage sustainable habits that will make a positive difference to our environment.

### **Climate change, an existential challenge for Singapore**

2 Recently, scientists in Europe reported that the Arctic sea ice cover this September had shrunk to its second lowest extent since the late 1970s. The extent of Arctic sea ice also hit a record low for October, as unusually warm waters slowed the recovery of ice.

3 The climate obviously affects a place very far away from us but at the same time, it has an impact on us. It is not just affecting far-flung areas. It is also in Singapore that we are worried about our own existential challenge. As a low-lying island city-state, we are particularly vulnerable to the effects of sea level rise. While our immediate priority is to battle the COVID-19 pandemic, we cannot afford to lose sight of our battle against climate change.

### **Strategies to tackle climate change and develop sustainably**

4 This exhibition that we are launching today is very aptly named. We must indeed unite as one people, take collective action and rise to the challenge of climate change. Only then can we ensure that Singapore remains a sustainable, vibrant and liveable city for current and future generations.

5 Singapore is tackling climate change on three fronts. First, we have been investing in climate science to understand how climate change will affect Singapore, so that we can develop meaningful solutions. We have launched a \$10 million National Sea Level Research Programme to develop more robust projections of rising sea levels, and have set aside an initial funding of \$5 billion for the Coastal and Flood Protection Fund to protect Singapore against rising sea levels. We will soon launch a Climate Science Research Programme Office to drive efforts to formulate Singapore’s national climate science research masterplan.

6 Second, we are stepping up our efforts in climate mitigation. On the clean energy front, we achieved our 2020 solar deployment target of 350 megawatt-peak (MWp) in the first quarter of this year. We aim to deploy at least 2 gigawatt-peak (GWp) by 2030. To overcome our land constraints, we are investing in innovative solar technologies such as floating solar photovoltaic (PV) systems on our reservoirs. In fact, three of our reservoirs will have such PV systems very soon.

7 At last week’s Singapore International Energy Week, the Government announced a new \$49 million Low-Carbon Energy Research Funding Initiative to support the research and development of low-carbon technologies such as hydrogen and carbon capture, utilisation and storage (CCUS) over the next five years. These efforts will go a long way in reducing our carbon footprint and achieving our emissions targets.

8 Third, we are taking measures to adapt to climate change. As climate change will affect access to critical resources, we are strengthening our water and food security by investing in weather-resilient sources, and finding ways to produce more with less. We will also help companies engage in sustainable production and consumption by pursuing circular economy approaches.

9 Our pursuit of sustainable development will not only benefit the environment, it will also create economic opportunities and jobs for our companies and Singaporeans, in areas such as agri-food, climate science, environmental services and waste.

### **Building a Sustainable Singapore together**

10 The Government cannot fight climate change, or build a sustainable Singapore alone. We need everyone to come on board this national effort and take collective action together — whether you are a business, a community group, or an individual. Each of us can start with simple positive habits everyday — using less disposables, conserving water and electricity, and recycling where possible.

11 We also want to hear from Singaporeans what building a sustainable Singapore means to you, and how we can work together to achieve our shared vision. To this end, my Ministry has organised a series of Emerging Stronger Conversations and invited Singaporeans to share their perspectives on sustainability. We have also convened three Citizens' Workgroups to co-create solutions to improve recycling, reduce excessive use of disposables, and increase demand for local produce.

## **Conclusion**

12 Let me conclude. Today's launch of "R.I.S.E. to the Challenge" is another step towards having more meaningful conversations on climate change. I commend and thank Keppel Land and Sustainable Singapore Gallery for this initiative, and hope to see more outreach programmes and activities by organisations to sustain the momentum on climate action. I encourage all individuals and organisations to join us in co-creating and co-delivering solutions to achieve our long-term environmental goals. Together, we can build a Sustainable Singapore for our future generations.

Thank you.

Pak Luhut Pandjaitan, Coordinating Minister for Maritime Affairs and Investment,  
Associate Professor Simon Tay, Chairman of the Singapore Institute of International Affairs,  
Distinguished Guests,

1 Good morning to everyone. I am pleased to join you at the 7<sup>th</sup> Singapore Dialogue on Sustainable World Resources. To our friends from overseas, thank you for joining us virtually.

### **COVID-19: FROM CRISIS TO OPPORTUNITY**

2 This year's dialogue takes place amidst a global crisis which has dramatically altered the way we live and work. The COVID-19 pandemic has triggered the sharpest contraction in the global economy since the Great Depression and is a vivid reminder that we live in an interconnected world. Being an open and globally connected economy, Singapore has been hard hit and our economy is expected to contract by five to seven per cent. But we are working hard to build back better.

3 In this context, I would like to discuss the importance of putting sustainability at the core of our recovery from COVID-19. Even as we battle the immediate public health and economic challenges, there are new opportunities to build a stronger and greener future.

4 All of us are important stakeholders in managing our resources and environment. We are at a significant juncture, where we have the opportunity to put sustainability at the core of our recovery plans and policies, and change the way we produce and consume. We should also work to strengthen our resilience to future shocks, including climate change, supply chain disruptions and other public health threats.

5 Let me make three points on how we can rebuild post-COVID in a sustainable and inclusive manner.

### **BUILDING A ZERO WASTE, CIRCULAR ECONOMY**

6 **First**, we must work towards a zero waste, circular economy. In an increasingly resource- and carbon-constrained world, countries, corporations and communities must make the paradigm shift from a linear "take, use, throw" model, to a circular one where waste becomes a resource to be reused again and again, and repurposed into valuable secondary products, including harnessing waste for energy.

7 This concept of circularity is not new to Singapore. We have closed the water loop by reclaiming wastewater to become NEWater, and reusing water endlessly, putting the circularity concept into practice.

8 But we can and hope to do more, as part of our vision to becoming a Zero Waste Nation. Last year, we launched our Zero Waste Masterplan, where we set ourselves the target of reducing waste sent to landfill by 30% by 2030.

- (a) This will involve becoming much more sustainable in production. For example, by adopting more energy efficient practices, as well as practising industrial symbiosis, where the waste streams from one part of the production process becomes feedstock for another.
- (b) It also means consuming in a more sustainable way. This would mean reducing waste, reducing single use disposables and encouraging reuse of products and materials.
- (c) It also means exploring more innovation to close our waste loops. We are now trialling the use of treated Incineration Bottom Ash as construction material, or NEWSand. We are also exploring chemical recycling solutions to turn waste plastics into pyrolysis oil, or NEWOil, which can be feedstock for our petrochemical industry.

9 These moves are supported by strong regulatory measures such as our Resource Sustainability Act, which puts in place an Extended Producer Responsibility framework for our priority waste streams, to drive circular economy approaches nationally. We will start with our three priority waste streams namely, packaging waste including plastics, e-waste, and food waste.

10 Let me share an example that embodies the exciting possibilities of the circular economy approach. For over 30 years, Singapore has operated our incineration plants and water reclamation plants separately. We are now seeking to realise synergies from co-locating these plants. By 2025, we will establish the Tuas Nexus, where a water reclamation plant will be co-located with an Integrated Waste Management Facility (IWWMF). At Tuas Nexus, food waste will be mixed with used water sludge and co-digested, increasing biogas production by 40%. This in turn enhances the thermal efficiency of the IWWMF, which will generate more than enough energy to power Tuas Nexus. This and other enhanced processes at Tuas Nexus will

contribute to a reduction of an estimated 200,000 tonnes of carbon emissions a year, equivalent to taking 42,500 cars off the road.

#### **CATALYSING INNOVATION AND SUPPORTING ENTERPRISE**

11 **Second**, we should go big on innovation and redesign for greater sustainability, resilience, resource-efficiency, and with a smaller carbon footprint.

12 Singapore is pressing on to make our towns greener, by installing smart lighting, solar panels, centralised cooling systems, and car-lite features, all aimed at reducing energy consumption and hence reducing emissions. Besides exploring new energy solutions including hydrogen, we are ramping up deployment of solar energy throughout the island, including floating solar PV on three of our reservoirs; one of which, at 60 megawatt-peak, will be among the world's largest when completed. PUB's solar PV system will generate sufficient energy to power all the water treatment plants in Singapore. This is a significant step in PUB's efforts to produce water from green energy.

13 In the area of food, Singapore aims to locally produce thirty per cent of our nutritional needs by 2030. This is our "30 by 30" goal. Given that we produce less than ten per cent now, we will need to aggressively tap on technology and develop a good master plan. Earlier this year, we launched the "30x30 Express" grant to ramp up food production and almost \$40 million has been extended. Our farms also aim to become more resource efficient. A good example is Eco-Ark, a floating fish farm, which uses solar power to supplement its energy use. Through smart design, Eco-Ark also uses gravity and head pressure to push seawater through the filtration system towards final discharge, thus reducing its energy use.

14 We will continue to encourage our farms to adopt climate-control technologies that mitigate adverse weather conditions and adopt productive techniques like vertical farming. Currently, an average vegetable farm in Singapore produces about 130 tonnes/ha per year. In contrast, a high-tech vegetable farm has the potential to produce over 1,000 tonnes/ha per year. With about 1% of Singapore land available for agriculture, technology certainly enables us to overcome our limited resources.

#### **REMAINING STEADFAST IN ADDRESSING CLIMATE CHANGE**

15 **Third**, even as we deal with the immediate challenges of COVID-19 pandemic, we must continue our efforts to address the existential challenge of climate change.

16 In March this year, while battling the pandemic, Singapore submitted our enhanced Nationally Determined Contribution (NDC) and Long-Term Low-Emissions Development Strategy (LEDS) to the United Nations Framework Convention on Climate Change (UNFCCC). Our LEDS aspires to halve our emissions from its peak by 2050, with a view of achieving net zero emissions as soon as viable in the second half of this century. This is an ambitious aspiration given our constraints as a small island city state, with limited option to deploy renewable energy at scale. We are pressing ahead with these long-term decarbonisation plans not only to demonstrate our commitment to address climate change, but also to support our recovery plans by unlocking new economic opportunities and jobs in a low-carbon, climate-resilient and more sustainable future.

17 To drive climate action nationally, we have put in place a comprehensive suite of measures to reduce carbon emission across all sectors. This includes the implementation of a carbon tax, grants to improve industrial energy efficiency, and the greening of our transport. This year, we introduced further measures to mitigate climate change, including to reduce the use of refrigerants with high Global Warming Potentials in the refrigeration and air-conditioning sectors, a \$25 million Climate-Friendly Household Package to help households purchase energy-efficient appliances, the Maritime Singapore Decarbonisation Blueprint 2050, and the commissioning of net zero energy buildings at our army camps. Singapore has also set the goal of planting more than one million trees over the next 10 years, as part of efforts to become a City in Nature.

18 In our climate actions, we must be guided by science. We are setting up a new Climate Science Research Programme Office, under the Centre for Climate Research Singapore, to lead the formulation of Singapore's national climate science research masterplan, and to build up local expertise in climate science. Last year, we played host to the Scoping Meeting for the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Cycle Synthesis Report. The report is scheduled to be published in 2022, and will inform governments and policymakers around the world with the most up-to-date climate data and projections to guide their adaptation plans. At the regional level, the ASEAN Specialised Meteorological Centre based in Singapore committed \$5 million in 2018 through its 5-year Regional Capability Building Programme to help ASEAN countries build capabilities in weather forecasting, sub-seasonal and seasonal prediction, climate change projection and haze monitoring. We will continue to support international engagements and global efforts to address climate change.

#### **CONCLUSION**

19 Let me conclude. While the COVID-19 crisis has introduced new challenges, it also provides us with new opportunities to put sustainability at the core.

20 Last week, A/P Simon Tay and Ms Meixi Gan from the SIIA co-authored a commentary which was published in The Straits Times. They argued that we should turn climate risks, such as forest fires, into business opportunities by monetising forest and peat conservation through the generation of carbon credits. There were two things that stood out in their piece.

21 First, South-east Asia has largely been spared from fires and haze this year. While risks of reoccurrence remain, there are opportunities to be gained if action is taken. I would like to acknowledge the strong leadership and determination that President Joko Widodo and his government have exhibited in reducing land and forest fires in Indonesia. With climate change, warmer and drier weather can be expected in the years to come. We must continue to enhance regional cooperation to achieve ASEAN's vision of a haze-free region.

22 Second, governments alone cannot drive sustainability. Partnerships with industry and civil society organisations are necessary. By using technology, incorporating environmental, social and governance (ESG) principles into decision-making, and pooling ideas and resources, corporates and communities can co-create solutions that enhance resilience and contribute to environment protection. I believe several of the participants here are active members of such partnerships and I would like to acknowledge their efforts.

23 As we navigate our way forward during these uncertain times, we must continue to set our sights on building a brighter and greener future for the generations to come. This can only be achieved if we place sustainability high on our agenda, and fully harness the potential and opportunities that come with it. Together, we can ensure recovery not only makes our businesses and communities stronger, but also set us on a path that is more sustainable.

24 I commend SIIA for organising this annual event despite the challenging times and for bringing together key stakeholders who are passionate about forging a sustainable future.

25 I look forward to fruitful discussions. Thank you.

Her Excellency Barbara Plinkert, EU Ambassador to Singapore,  
Mr Mauro Petriccione, Director-General of the European Commission's Directorate-General for Climate Action,  
Distinguished Guests,

1. A very good morning to all. This session's theme on "*Accelerating Climate Action Post-COVID-19*" is timely and salient.

2. COVID-19 has had a devastating impact on our lives and livelihoods. It has given us a foretaste of the socioeconomic and financial shocks that we can expect if we do not decisively tackle the climate crisis. It has also sensitised us to how vulnerable we are to the forces of nature and underscored the importance of collective action to overcome global challenges.

3. The EU is taking decisive actions to facilitate a green recovery from COVID-19 with the adoption of the Next Generation EU Plan. Singapore has also set ambitious plans to facilitate the transition to a more sustainable, low-carbon, and climate-resilient future. Like the EU, Singapore believes that a green recovery from COVID-19 – one that addresses economic and climate objectives at the same time – will allow us to not only build back, but build back better. To succeed in our efforts, we need to: (i) plan long-term to support the low-carbon transition and seize green growth opportunities; (ii) build greater sustainability and resilience into our systems; (iii) invest in low-emissions solutions, leveraging green finance; (iv) and forge stronger collaborations and partnerships. Let me elaborate.

#### **PLANNING LONG-TERM TO SUPPORT THE LOW-CARBON TRANSITION AND SEIZE GREEN GROWTH OPPORTUNITIES**

4. COVID-19 has accelerated pre-existing trends, including rising protectionism, rising inequalities, and global warming. The onus is now on us to continue to look beyond the immediate COVID-19 crisis and prepare for these long-term challenges, notably climate change. This has always been Singapore's approach to development – to look and plan long-term.

5. This was why we pressed ahead to submit our enhanced Nationally Determined Contribution and Long-Term Low-Emissions Development Strategy (LEDS) to the United Nations Framework Convention on Climate Change (UNFCCC) in March 2020, notwithstanding the challenges of COVID-19. Our LEDS now serves as a lodestar to guide our transition to a low-carbon future amid the other competing priorities we face; and also support a green recovery by unlocking new economic opportunities and jobs in emerging areas such as clean energy, sustainability services, and climate science. More importantly, it sends a powerful signal to other stakeholders, notably the private sector and investors, to act. For instance, Temasek and Singtel have set a net-zero emissions goal by 2050. If we all develop and implement long-term decarbonisation plans, it will facilitate the shifts needed for the transition to a more sustainable post-COVID future. Crucially, it will strengthen the momentum on global climate action by showing that we are all committed to achieving the goals of the Paris Agreement.

6. The Singapore government will support companies in their efforts to make this transition. Our Economic Development Board's (EDB) Resource Efficiency Grant for Energy, along with enhancement of the National Environment Agency's (NEA) Energy Efficiency Fund, will help our industries improve their energy efficiency and reduce their emissions. Companies should use this period of lowered activities to consider implementing energy efficiency improvement projects so that they can be more cost-competitive and emerge stronger from this crisis.

7. We will also position ourselves to seize business opportunities in the green economy and support companies to develop new capabilities, products, and services. We aim to anchor new investments and activities in sustainability in Singapore, notably in the clean energy sector. For example, with world-class R&D centres such as the Solar Energy Research Institute of Singapore and Energy Research Institute at NTU, Singapore has attracted many European companies such as REC and ENGIE to develop clean energy capabilities here. Not many may know, but one of the largest biofuel plants, run by Neste, operates in Singapore. We are pleased that All Nippon Airways (ANA) recently signed a preliminary agreement to start buying sustainable aviation fuel from the Singapore refinery run by Neste. We will continue to welcome global companies which are keen to use Singapore as a base for innovation and collaboration to develop and commercialise sustainable solutions for Asia.

#### **BUILDING GREATER SUSTAINABILITY AND RESILIENCE INTO OUR SYSTEMS**

8. COVID-19 has also underscored the importance of building greater sustainability and resilience into our systems.

9. Take food security for example. Singapore imports more than 90 per cent of our food, which makes us vulnerable to external shocks and supply disruptions. Even before COVID-19, Singapore had made early moves to boost our local food production to buffer ourselves against such disruptions. In 2019, we set a “30 by 30” goal to meet 30 per cent of our nutritional needs locally by 2030. Given Singapore’s land constraints, this requires us to push the boundaries of innovation towards productive, climate-resilient, and resource-efficient food solutions. To support the transformation of the agri-food industry, we have made available funding schemes such as the \$63 million Agriculture Productivity Fund and awarded over \$39 million under the “30 by 30 Express” grant call. In the coming years, we will masterplan our agriculture region and allocate more resources to grow our local food production capabilities in a sustainable manner.

10. To enhance our resource resilience in an increasingly resource-constrained world, we will continue to pursue Circular Economy approaches and work towards our vision of a Zero Waste Nation. We are pushing boundaries in the Circular Economy by transforming waste treatment residue into construction materials (or what we call “NEWSand”) and discarded plastics into higher-value products like pyrolysis oil (or what we call “NEWOil”), which can be used to manufacture plastics and chemicals. Closing our resource loops locally and turning “trash into treasure” will reduce our vulnerability to global supply shocks and extend the lifespan of our landfill. The Circular Economy also presents exciting opportunities to develop new products, services, and business models that could in turn create new job opportunities.

### **INVESTING IN LOW-EMISSIONS SOLUTIONS AND LEVERAGING GREEN FINANCE**

11. Just as the international community is investing resources to find a vaccine for COVID-19, so too must we continue to invest in low-emissions solutions for the transition to a low-carbon future.

12. Singapore is pushing the envelope on solar deployment. We earlier announced our aim to increase solar deployment by about five times from 0.4 gigawatts peak today to at least 2 gigawatts peak in 2030. Just last week, we announced that government agencies will frontload our target to achieve 1.5 gigawatts peak by 2025. To resolve the issue of intermittency and overcome our space constraints, the Singapore government awarded a research grant to pilot Singapore’s first *floating* Energy Storage System (ESS) last week, which if successful, can be rolled out at scale and facilitate further solar deployment.

13. Singapore is investing and pursuing partnerships with industry players and leaders in emerging technologies, such as Carbon Capture, Utilisation and Storage (CCUS) and low-carbon hydrogen, to drive the decarbonisation of our electricity grid and industrial processes. Our National Research Foundation (NRF) has set aside \$49 million to fund low-carbon energy research and test-bedding efforts in hydrogen and CCUS. We hope these research programmes will help to pioneer promising technologies that can become commercially viable and open new decarbonisation pathways and opportunities in environmental sustainability in the post-COVID era.

14. We are also leveraging green finance as a critical enabler of green growth. The Monetary Authority of Singapore (MAS) has developed a Green Finance Action Plan to support a more sustainable Singapore and facilitate Asia’s transition to a sustainable future. Singapore is also actively contributing to global efforts on sustainable finance. MAS is one of the founding members of the Network for Greening the Financial System, which aims to enhance the ability of the financial system to manage the risks of climate change and mobilise capital for green and low-carbon investments. More recently, in June 2020, Singapore joined the EU-initiated International Platform on Sustainable Finance to contribute to efforts to scale up sustainable finance globally and promote the integration of markets for green finance products on an international scale.

### **GALVANISING PARTNERSHIPS AND GROUND-UP ACTIONS**

15. As with our recovery from COVID-19, galvanising a whole-of-nation effort will be a key determinant of our success against climate change. We will continue to foster deeper partnerships with stakeholders and citizens to rally them to co-create and co-deliver solutions to address climate change. For instance, we convened a Climate Action Week in August this year, which featured a line-up of 30 ground-up initiatives organised by 27 partners from the People, Private and Public (3P) sectors. We also organised several Emerging Stronger Conversations focused on sustainability to gather ideas on how Singapore can recover and rebuild in a sustainable manner. We hope to tap on citizens’ collective strengths and resources to realise our vision of a sustainable Singapore.

## **POTENTIAL EU-SINGAPORE COLLABORATION**

16. As Singapore continues our journey towards a low-carbon and more sustainable future, we welcome opportunities to partner European companies. In Southeast Asia, we expect to see more sustainability-related growth opportunities in areas such as infrastructure, renewable energy, carbon services, and financing. As a global-Asia node and a leading financial and business hub, Singapore can be the bridge to connect European companies to opportunities in this region.

## **CONCLUSION**

17. The decisions we make today on our post-COVID recovery will determine if we will emerge stronger and be better placed to address the looming threat of climate change. Singapore is committed to push for a green recovery from COVID-19, one that supports a transition to a more sustainable, low-carbon, and climate-resilient future. We look forward to working with the EU to support global efforts to build a better future for all.

18. Thank you and wish all a productive dialogue ahead.

Distinguished Guests

Ladies and Gentlemen

Good morning. I thank the National Sustainable Procurement Roundtable (or NSPR) for inviting me to today's forum.

2 The NSPR has been championing sustainable procurement in Singapore, through developing strategies and corporate publications to embed best practices in sustainable procurement. The growing membership of the Roundtable is encouraging. I hope more businesses and organisations will come onboard to advance sustainable procurement in Singapore.

### **Building a Sustainable Singapore**

3 2020 has been a year of upheaval and uncertainty due to the COVID-19 pandemic. Despite this, the Government has been pressing on in our efforts to address the existential threat of climate change and its long-term impact on our environment and economy. We are committed to put sustainability at the core of everything we do, to ensure Singapore emerges stronger from this crisis.

4 The general definition of sustainability is meeting current needs without compromising the ability of future generations to do the same. But what exactly does being sustainable mean for Singapore?

5 To me, being sustainable is about building a Singapore that is leaner, stronger and kinder. A leaner Singapore means becoming more efficient in our use of resources. A stronger Singapore means strengthening our food and water security and building a climate-resilient green economy. Last but not least, a kinder Singapore means being considerate to our environment and those around us, and exercising personal responsibility in taking climate action to mitigate the risks faced by future generations.

6 Today, businesses are defining sustainability, or risk having sustainability defined for them. Firstly, businesses are realising the benefits of implementing sustainable practices. There is increasing understanding that environmental sustainability can be complementary to business growth. We have seen how efforts to improve resource and operational efficiency

can reduce wastage, resulting in lower spending on transportation, materials and waste disposal. Over time, these translate to significant cost savings.

7 Secondly, consumers' demands and shareholders' expectations are shaping the sustainability agenda profoundly. Large institutional investors are gaining climate awareness and allocating more funds to companies with sustainable practices. Consumers are equally awakening to the environmental impact of their products. According to a 2019 study by the IBM Institute for Business Value, nearly eight in 10 respondents indicated that sustainability was important for them. And for those who ranked it high in importance, over 70 per cent were willing to pay a premium for brands that are sustainable and environmentally responsible. The drive for sustainability will cause companies to impose sustainability goals through the supply and logistic chains, impacting the way they procure their downstream supplies and services.

### **Importance of sustainable procurement**

8 Sustainable procurement is thus a key strategy to support this transition. Today, we see more companies in the private sector procuring sustainably. For example, DBS purchases laptops in bulk packaging, where seven laptops are shipped in one single large box. Packaging materials were also changed from styrofoam to recyclable cushioning. In doing so, DBS has reduced the amount of packaging materials, cost and carbon emissions during transportation.

9 Another example is Wildlife Reserves Singapore. Their green procurement policy ensures that 40 per cent of the vegetables purchased for Singapore's zoos are sourced from suppliers of 'ugly food'. Quality whole fruit and vegetables that do not make it to supermarket shelves for aesthetic reasons are used as animal feed at the parks' Wildlife Nutrition Centre. This helps to reduce unnecessary food wastage, and brings Singapore a step closer to becoming a Zero Waste Nation.

10 By including more sustainable requirements into tenders and actively sourcing for and developing more sustainable alternatives, buyers of goods and services can send a strong and clear message that sustainable procurement is the way forward. When more businesses buy sustainably, others within the supply chain would be encouraged to do so. Collectively, we can all play our part to drive sustainable demand in Singapore.

### **Government's efforts in sustainable procurement**

11 The public sector takes a whole-of-Government approach to sustainable procurement. For example, the Economic Development Board and the Housing and Development Board have been leading the SolarNova programme since 2014 – this is a whole-of-Government effort to accelerate the deployment of solar photovoltaic (or PV) systems in Singapore. The programme aggregates demand for solar PV across Government agencies to achieve economies of scale, and provides funding to agencies to conduct feasibility studies and determine their solar PV requirements.

12 Some of you may have heard of the Public Sector Taking the Lead in Environmental Sustainability (or PSTLES) initiative. This was introduced in 2006 and updated in 2014. Under this initiative, the Government has set green procurement requirements for Information and Communications Technology (or ICT) equipment, electrical appliances and paper products. Official events and functions must also be held in venues with at least a Green Mark certified rating. We are reviewing PSTLES with the intention of raising the standards on sustainability, so that the public service can continue to lead in sustainability and climate action.

## **Conclusion**

13 Let me conclude. The Government will continue with our efforts towards sustainability. We need every individual, business and organisation in Singapore to join us on this national agenda and make sustainability a part of our everyday lives.

14 It is heartening to know that many of you here today are making strides to push the sustainable procurement agenda. By working together, we can build a Sustainable Singapore for our current and future generations.

Thank you, and I wish you an enjoyable and fruitful forum.

Mrs Ursula Von de Leyen, President of the European Commission,

Mr Federico Donato, President of EuroCham,

Ambassador Barbara Plinkert,

Ladies and Gentlemen,

1 A very good afternoon to all. I thank the European Chamber of Commerce (or EuroCham) for inviting me to speak at today's seminar.

### **Common goals**

2 Singapore and the European Union (EU) are important trade and investment partners. The inclusion of strong rules on sustainable development in the landmark EU-Singapore Free Trade Agreement (EUSFTA) confirms that we share common goals to protect the environment. Singapore anticipates and welcomes further partnership with the EU to green our economies together.

3 I commend the EuroCham for embracing sustainability as your focus this year. Singapore is similarly committed to put sustainability at the core of everything we do. This is underscored by the renaming of my Ministry this year. Even as we battle the COVID-19 pandemic, we continue to press ahead with our plans to understand, mitigate and adapt to climate change, and to realise our vision for a climate-resilient and sustainable Singapore.

### **Understanding, mitigating and adapting**

4 Let me share some of our key efforts this year. To better understand how climate change will impact Singapore, we launched our Climate Science Research Programme Office earlier this month. The Programme Office will drive the formulation and implementation of our National Climate Science Research Masterplan, and help ensure our climate policies are supported by robust science. The Programme Office will oversee research grant programmes such as the S\$10 million National Sea Level Programme.

5 To play our part to mitigate climate change, we have sought to green our energy sources, and to look at how we produce, consume and manage energy. Last month, the Government announced that we have set aside about S\$50 million to fund low-carbon energy research and test-bed efforts in hydrogen and carbon capture utilisation and storage

solutions. We are also working to accelerate our adoption of solar energy, which is the most viable source of renewable energy for Singapore. We plan to achieve 1.5 gigawatt peak (GWp) of solar deployment by 2025. This is equivalent to powering about 260,000 households a year, meeting about 2 per cent of Singapore's total electricity needs.

6 To adapt to climate change, we will ensure Singapore's critical resources, such as food and water, will remain uncompromised for both our present and future generations. On water, we have developed our four national taps approach to ensure water supply resilience, and we are striving to integrate green technology with water treatment. In August, we started the construction of a large-scale floating solar PV system at Tengeh Reservoir, which will generate enough clean energy to power our local water treatment plants.

7 On food, we announced our goal last year to increase local food production to meet 30 per cent of our nutritional needs by 2030, in order to strengthen our food security. In September this year, we accelerated the ramp up in local food production with the award of close to S\$40 million of funding to support the growth of our local agri-food enterprises.

8 We are also pursuing circular economy approaches and working to become a zero-waste nation. We will mandate key responsibilities to enable the reusing and recycling of food, e-waste and packaging, and support the localisation of our recycling capabilities. We are pushing boundaries to turn our trash into treasure by transforming waste treatment residue into construction materials (or NEWSand), and discarded plastics into higher value products like pyrolysis oil (or NEWOil). Last month, we announced that the National Environment Agency and Shell are jointly studying the feasibility of chemically recycling plastic waste in Singapore.

9 These are just some examples of what the Singapore Government is doing to pursue sustainability. But our efforts alone will not be enough. Fighting climate change and successfully transiting to a low-carbon future will require a concerted effort not just locally, but also globally. We need businesses and organisations to come on board this journey, to make sustainability a part of our everyday lives.

### **Companies leading in sustainability initiatives**

10 The EuroCham Sustainability Award nominees have embarked on this journey already, giving them a head start. Specialty chemicals company Evonik Industries has invested in research on resource efficiency, and is increasingly tapped on to support the development of resource-saving applications that help its customers achieve their sustainability goals. It has embarked on research-based partnerships across Southeast Asia, including with the Housing Development Board in Singapore.

11 In the area of green finance, ING Wholesale Banking is making an impact by financing renewable energy projects. Earlier this year, it provided Singapore-based solar energy systems provider Cleantech Solar a US\$75 million green loan to support its expansion across Southeast Asia. Cleantech Solar's projects will benefit local and multinational corporates across the region with reliable and long-term clean energy solutions. ING is also working with its clients to facilitate their transition to become more sustainable, and measuring and steering its lending portfolio to meet the Paris Agreement's climate goal.

## **Conclusion**

12 Let me conclude by congratulating all the recipients of the EuroCham Sustainability Awards. You demonstrate that all of us, regardless of the sector we are in, have the power to make a positive difference in fighting climate change. I hope that your efforts and achievements will inspire many other organisations to join us in this journey towards sustainability. Singapore looks forward to deepening our collaboration with the EU, EU member states and European entities towards our common goal of fostering sustainability and building a better environment for our people.

13 Thank you.