

A. Introduction

1 Last year, we celebrated SG50 to reflect on our achievements over the past 50 years. Even in our early years, Mr Lee Kuan Yew was already clear that we needed to address poor sanitation, clean our dirty streets, and detoxify our polluted Singapore River. His vision was of a clean and green Singapore. It was because of this drive that Singapore became one of the earliest countries in the world to set up a Ministry dedicated to the environment in 1972. Mr Lim Kim San, the first Minister for the Environment summed up our environmental challenges well. He said: "Singapore is getting so urbanised that if we don't take action now to keep our environment clean, it will be too late." So he got to work, and he and others who came after, helped to build our City in a Garden that we see today.

2 My Ministry conducted a survey in December last year to better understand Singaporeans' perceptions of environmental issues. The survey shows that most respondents continue to recognise that it is everyone's responsibility to deal with the environment and that most view aspects of the environment as important parts of Singapore life. That's heartening.

3 When asked what were the top environmental challenges in Singapore, respondents identified air pollution, cleanliness of public areas, and vector-borne diseases as the top three, understandably. As you can see, almost three-quarters of the respondents considered air pollution as a top challenge. That is what I will deal with first.

B. Clean Air for All

Local Air Pollution

4 My Ministry, together with the Ministry of National Development, launched the Sustainable Singapore Blueprint (or SSB) 2015 with a holistic vision of a Liveable and Endearing Home, a Vibrant and Sustainable City, and an Active and Gracious Community. It brings together all the things we need to do, so that all of us whether we are government, business or people, can work together as one towards a Sustainable Singapore.

5 Under SSB 2015, we have set air quality targets for 2020 and, as Associate Professor Faishal pointed out, we need to press on in our efforts to reduce local sources of air pollution as well as carbon if we are to fulfil our local and international obligations. Studies by the World Health Organisation and others have confirmed the harm that air pollution does to our health.

6 Therefore, we have systematically introduced policies to reduce air pollution from industries and vehicles. Last year, we tightened standards for emissions from industries and extended the Early Turnover Scheme to include Euro II and Euro III diesel commercial vehicles to incentivise the replacement of older and more pollutive commercial vehicles sooner. Emission standards for new motor vehicles are also being tightened – all new petrol motor vehicles will have to be Euro 6 compliant from September 2017, and all new diesel motor vehicles from January 2018. These are the latest international emission standards for petrol and diesel vehicles.

7 We are taking a step further. Motorcycles are significant contributors to carbon monoxide and ozone. We need to raise their emission standards in step with improvements in technology. We will therefore be tightening the emission standards for new motorcycles to the latest Euro 4 standards. This will be done in phases – for large motorcycles above 200cc from 1st January 2018, and for small motorcycles of 200cc and below from 1st January 2020.

8 We are also concerned about emissions from diesel vehicles. Amidst their increasing popularity worldwide, there are increasing concerns about their health and environmental impact. In the wake of the recent Volkswagen scandal, regulators around the world are looking closely at the real world emissions of diesel vehicles, which have been shown to deviate significantly from that measured in laboratory tests. We have to re-look at the widespread use of diesel technology carefully and minimise the public's exposure to risks in the future. To do this, we will conduct a study of pollution from diesel vehicles *in Singapore*. The results of this study will aid in the review of future vehicular emission policies.

9 Most Singaporeans are only concerned with air quality during haze episodes, especially the PSI shown on their phone apps or TV screens, but there is actually a whole team of NEA officers working behind the scenes to keep tabs on the air we breathe every day. Those of you who follow my Facebook page would know that since the start of this year, I have been featuring MEWR-family staff under #myMEWRkakis, to highlight the work of the staff and show my appreciation. Allow me to highlight 2 more officers here. Mr Heng Jiarui, a scientific officer, and Ms Fareena Abdul Rahim, a chemical engineer, are both officers in the Pollution Control Department who work closely with their teams to continuously monitor criteria air pollutants from some 22 ambient air quality stations islandwide. They also monitor 200 sources of industrial emissions for different types of toxic discharges and gases. If unusual emissions or discharges occur, a response team will have to investigate and stop the discharge. We can sleep easy at night knowing that these dedicated officers are watching our backs.

Transboundary Haze

10 While we are on the topic of air quality and PSI, I thought it would be a good moment to talk about haze. Unfortunately, we are increasingly affected by transboundary haze pollution, as Mr Louis Ng and several Members have highlighted. Last year, we experienced one of the longest haze episodes. There is no easy solution to this complex issue. We need concerted action by all stakeholders to overcome this problem. On the part of Government, we actively work with our neighbours bilaterally and regionally. Let me give you an update.

11 First, we will actively promote regional cooperation because haze is a multilateral issue. As the haze is largely due to peatland fires, Singapore has facilitated the development of the ASEAN Guidelines on Peatland Fire Management with contributions from all Member States. We also host the ASEAN Specialised Meteorological Centre, which helps to monitor the fire and hotspot situation in the region.

12 Singapore has led the development of the ASEAN Sub-Regional Haze Monitoring System which aims to increase transparency and accountability of errant companies responsible for the fires. This system will need to be supported by effective information exchange among governments. We will continue to participate actively in ASEAN initiatives to address transboundary haze and urge all member countries to implement their national action plans and work towards realising the Haze Monitoring System.

13 Second, we will continue to support Indonesia's efforts to tackle haze. Since 2005, we have been offering them assistance to fight fires and will continue to do so. We had also worked with the Muaro-Jambi Regency in Jambi Province on capacity building projects to deal with land and forest fires from 2007 to 2011. We have since offered to renew this collaboration under a proposed Memorandum of Understanding and are awaiting Indonesia's response.

14 Third, we are addressing the commercial roots of transboundary haze by pursuing errant companies and encouraging the agro-forestry industry to adopt more sustainable practices. Er Dr Lee Bee Wah, Associate Professor Faishal and Assistant Professor Mahdev Mohan have asked about the steps being taken under the Transboundary Haze Pollution Act (or THPA) and other measures to deter errant companies. Arising from the 2015 haze episodes, NEA sent Preventive Measures Notices under Section 9 of the THPA to six companies based in Indonesia, requesting that they take immediate measures to mitigate fires and develop plans to prevent their recurrence. Two of them have responded so far. NEA is corresponding with them and verifying the information provided. In addition, NEA served a Notice under Section 10 of the THPA on Asia Pulp & Paper Company Ltd (or APPCL)'s office in Singapore to seek information on its subsidiaries in Singapore and Indonesia, as well as measures taken by its Indonesian suppliers to put out fires in their concessions. NEA is currently reviewing some information received from APPCL.

15 Of the four companies based in Indonesia that did not respond, NEA has recently served Notices under Sections 10 and 11 of the THPA on a foreign Director when he was in Singapore. These Notices require him to provide information and attend an interview in relation to the ongoing investigations. In accordance with the law, we will take what steps we can to enforce the THPA, bearing in mind that outside of Singapore, there are limited possibilities. We will of course hold any Singapore-linked persons or entities to account. At the same time, even if the errant company's officers are foreigners, they will have to comply with the laws of the country, including the notices under the THPA, should they come to Singapore.

16 Assistant Professor Mahdev Mohan has also suggested having settlement agreements and engaging the Law Society for future haze episodes. We could consider these suggestions when we next review the THPA with the experience gained in operationalising it, to see how it can be strengthened to hold errant companies to account – so that people take what we are doing, seriously.

17 Fourth, as consumers, each one of us can influence the agro-forestry industry through our purchasing decisions.

18 Last October, the Singapore Environment Council (or SEC) suspended the green label of APP's exclusive distributor in Singapore and partnered with the Consumers Association of Singapore to advocate for sustainable business practices.

19 Consequently, the larger supermarket chains such as NTUC FairPrice, Sheng Siong and Prime Supermarket responded by removing all APP products from their shelves, while the Dairy Farm Group stopped the purchase of all APP products. Our consumers, and consumers all around the world, are rightfully indignant when companies here and abroad blatantly violate their health and well-being with unsustainable practices. They are sending the right signals. These actions demonstrate the significant power of a collective consumer voice.

20 The Government will do its part as a consumer as well. I am pleased to announce that from 3Q 2016, the Government will take the lead and procure printing paper products that carry the Singapore Green Label – an indication that the supplier practises sustainable forestry management.

21 Similarly, the Government will be taking the lead in fighting climate change and procure only electrical products that have been certified with high energy efficiency. We will start with four electrical items - air-conditioners, lamps, televisions, and refrigerators, and will gradually extend this to more items.

22 A silver lining is that civil society and the private sector have stepped up to raise awareness of the sustainability of agroforestry products. We are heartened that the WWF-Singapore, PM.Haze and the Singapore Institute of International Affairs jointly organised the “We Breathe What We Buy” campaign to highlight the link between purchasing products made from palm oil from unsustainable sources and the haze episodes. SEC has also announced the expansion of the coverage of the Singapore Green Labelling Scheme to certify products made using sustainable palm oil.

23 In the financial industry, we saw the Association of Banks in Singapore launching its Responsible Lending Guidelines and the Singapore Exchange moving towards its “Comply or Explain” sustainability reporting regime. These are good steps, some only baby steps. I hope to see more and stronger ground-up initiatives that demonstrate the business case to embrace sustainability.

24 It is the sum of all these:

1. Regional and international agreements and cooperation
2. Bilateral support
3. Bringing errant companies to task
4. Consumer action including government procurement
5. Civil society advocacy
6. Green financing

These will help us edge closer to years in the future without haze. We must press on with our efforts, not just during the haze season, but consistently throughout the year because this is a serious environmental disaster with wide-ranging impact for us now, and for the future. Irresponsible burning over the years has affected the health of millions of people, impacted regional economies, and caused irreversible loss of biodiversity. Singaporeans are therefore rightfully outraged because of its health impact; but more than that, the world is rightfully outraged because it also contributes to global warming. As mentioned by Er Dr Lee Bee Wah, based on the Global Fire Emissions Database, the fires in Indonesia produced more emissions per day than the entire US economy. That is not a small number. This massive amount of emissions from a single source is a huge setback in our global efforts to combat climate change.

C. Climate Change

25 This is a good juncture to move on to climate change, which Mr Pritam Singh, Mr Louis Ng, and Ms Cheng Li Hui have asked about.

26 Indeed, while our pioneers were concerned with the environment impact of urbanisation and dense population to health and hygiene, we, are now faced with the impact of climate change. Climate change will have far-reaching implications on us and future generations. As an island state we are most vulnerable. Our delegation therefore worked hard to broker consensus on the Paris Agreement so that all countries will take concrete action for it to be effective. Although Singapore only contributes 0.11% of global emissions, we are no less serious and have an ambitious target to reduce Emissions Intensity.

27 The Inter-Ministerial Committee on Climate Change, under the leadership of DPM Teo, is formulating our national response to fight climate change to meet our obligations and prepare for its impact. We will have to look systematically at every area while continuing to ensure environmental sustainability, economic competitiveness and energy security. It also means consumers, households and industries, all of us, need to be prepared to make significant adjustments and trade-offs.

28 To reduce emissions, energy efficiency remains our key strategy - we will enhance existing policies and study the introduction of new measures to improve the energy efficiency of industrial equipment and processes, our buildings, and transportation.

29 Although Singapore has limited alternative energy options, we can do more in terms of adopting solar energy. We have made progress towards increasing the deployment of solar energy to at least 350 MegaWatt peak by 2020. This will make up 5 percent of the projected peak electricity demand.

30 Madam Chair, climate science is a complex subject that we need to understand more deeply so that we can better prepare ourselves for climate change adequately. We cannot over-build as this incurs high cost; nor under-build for this will spell disaster. Therefore, the Meteorological Service Singapore has been building up expertise to understand tropical weather at a higher resolution because Singapore is so small that the results from global models would not be meaningful. We have to pioneer our own studies.

31 I would like to highlight another #myMEWRkakis at work. Mr Raizan Rahmat, a Senior Research Scientist, from the Centre for Climate Research Singapore, and his team worked hard for 2 years to effectively simulate a hundred years of temperature, rainfall, wind and sea-level projections for Singapore and the region. Drawing on a range of disciplines such as physics, climate science and atmospheric dynamics, the team developed climate scenarios that were used by our agencies to conduct impact risk assessments and make more informed decisions on how we can bolster our climate resilience. I wish to share some projections that these studies made. By the last few decades of this century, sea levels are projected to rise by between 0.25m and 0.76m; temperatures may increase by 1.4 to 4.6 degree Celsius; and Singapore will experience more intense rainfall.

32 Mr Pritam Singh made a suggestion about the possibility of setting up a Climate Change Fund. The Government is taking concrete action to prepare for climate change. We have set aside funds for various sectors and agencies to build up capabilities in climate resilience and look at how we can develop more cost-effective solutions. For example, the Government issued a call for proposals, under the Land and Liveability National Innovation Challenge, for researchers to propose innovative solutions to reduce the ambient temperature in residential estates by 4 degrees Celsius, and that is not just by air-conditioning. The Government is mindful of the potential fiscal costs of implementing climate change measures. Therefore, we are working with the relevant agencies and MOF to determine the required adaptation plans and financing requirements so that we are well-prepared.

33 Currently, where it is practical we have made hard structures to protect our coastline. We are raising a stretch of Changi Coast Road and Nicoll Drive to guard against sea level rise and we expect this to be completed by mid-2016. These are just some examples of the measures we have taken to safeguard Singapore against rising sea levels. We are confident that Singapore is adequately protected from coastal inundation in the immediate future. To prepare for the longer term, the Building and Construction Authority is conducting a coastal adaptation study which will inform us if additional protection will be needed in the future for our coasts.

34 The warmer temperatures are also of concern as they could lead to heat-induced illnesses, among other impacts. Government agencies have SOPs and safety guidelines on how to prevent and mitigate heat injury amongst vulnerable groups, as well as those involved in outdoor activities. The Government is also undertaking studies to see how we can reduce ambient temperature, whether it is through having more urban greenery, the use of different building materials or the design of developments.

D. Dengue Control

35 As Er Dr Lee Bee Wah mentioned, rising temperatures also pose an increased and significant threat for vector-borne diseases, like dengue and Zika. We have had more than 6,300 cases in the first three months of this year – more than double the same period last year. The recent decrease in cases does not mean that we are safe. It is not yet time to celebrate. Similar to past years, cases may increase as we enter the traditional dengue season in June.

36 As Mr Liang Eng Hwa and Ms Sylvia Lim pointed out, unless immediate measures are taken, the number of cases this year may exceed 30,000, higher than the record of 22,170 cases in 2013.

37 Mr Liang Eng Hwa also mentioned the threat of Zika. We have not seen any cases of Zika so far, but as Singapore is an open and globally connected city, Zika can eventually arrive at our shores. MOH and NEA have introduced additional surveillance measures. Zika, like dengue, is transmitted by the *Aedes* mosquito, so the same control measures for dengue also apply to Zika. Hence, all of us need to step up efforts to eradicate mosquito breeding in our homes and neighbourhoods.

38 I am glad to see the strong community response in the effort against dengue – we have more than 5,800 Dengue Prevention Volunteers. We need more of them and will train 5,000 more volunteers this year.

39 Our 850 dengue inspectors have also been hard at work. I have featured some of them in #myMEWRkakis Facebook series. In the first three months this year, they carried out about 350,000 inspections islandwide. While we step up this effort by engaging another 250 temporary officers this year, we are searching for better ways to tackle dengue. Our trial to pilot Radio-controlled Aerial Inspection Crafts to aid inspections of roof gutters is expected to complete in 2Q 2016.

40 In the longer term, we will need new tools. NEA is conducting a feasibility study on the use of *Wolbachia*-carrying male *Aedes* mosquitoes to suppress the *Aedes* mosquito population. NEA will conduct a small-scale study involving the release of male *Wolbachia-Aedes* at the end of the year at a few selected sites. This study will help us understand the behaviour of these mosquitoes in local conditions. We are not embarking on this lightly. We have studied this for years and have taken all steps to ensure that public health and safety will not be compromised. Our comprehensive risk assessment has concurred with previous findings on the safety of this technology. The release of male *Wolbachia-Aedes* will not pose any risk of biting nuisance or disease. We will engage residents and stakeholders to provide more information on the technology and the study in due course.

E. Adequate, Sustainable and Resilient Water

Water Supply

41 Madam Chair, my personal worry from more extreme weather patterns due to climate change is the new challenges it poses to our water sustainability. The drier weather this couple of years saw the water level in Linggiu Reservoir drop to historic lows, from about 80% at the start of 2015 to 36.9% as we speak, and decreasing as we have no rain. This has impacted the reliability of imported water that supplies half our current needs. Fortunately, because we have diversified our water sources, we have been able to mitigate the impact of the drier weather. But we cannot be complacent. Last month, the MIT published a study, which cited that 1 billion more people in Asia may experience severe water stress by 2050 due to economic and population growth on top of climate change.

42 Mr Gan Thiam Poh and Ms Cheng Li Hui have asked about our long term plans to ensure water sustainability and drought resilience in the face of climate change. We will continue to plan and invest ahead of demand. PUB, the national water agency, has completed its Water Master Plan 2016 review.

43 Under this Master Plan, PUB will continue to diversify and strengthen our water supply inventory. A second NEWater Factory at Changi will be completed by the end of the year. This will be our 5th NEWater plant and will be able to produce 50 million gallons per day (mgd) of NEWater. PUB will also be building more desalination plants, on top of the existing 2 plants. Construction of the 3rd plant in Tuas is underway, and will be completed in 2017. The 4th plant is planned for in Marina East, and when completed towards the end of 2019, will also strengthen the supply reliability to the city centre. To further enhance resilience, PUB is exploring the development of a 5th desalination plant on Jurong Island.

44 PUB is also planning to harness more seawater as a resource, and will work with companies on Jurong Island to meet cooling demand with seawater instead of freshwater supply. Mr Gan Thiam Poh asked about new advances in water treatment technology. This is vital and PUB is working closely with the industry to develop and test low-energy desalination technologies, one of which is a demonstration plant with Evoqua using electrochemical processes to remove salts from water. This technology has the potential to halve the energy requirement for desalination.

45 While we ensure we have enough water, our drinking water must also be clean and wholesome. This is achieved through multiple treatment and control barriers and a source-to-tap water monitoring system, which is supported by a team of 80 water quality professionals trained in disciplines such as water treatment, microbiology, and water chemistry – three of #myMEWRkakis shown, Eunice, Yin Mei and Jia Ling. Every year, PUB conducts over 400,000 tests to ensure that our water is perfectly safe to drink straight from the tap without the need to filter or boil.

Flood Management

46 Paradoxically, with weather extremities brought about by climate change, we can expect more frequent and intense rainfall. As Er Dr Lee Bee Wah and Mr Louis Ng have pointed out, this will pose challenges to flood management. To prepare for this, PUB has been adopting a holistic “Source-Pathway-Receptor” approach that addresses flood protection at all parts of the drainage system. We have an ongoing island wide drainage improvement programme to increase the capacity of our “pathway” drains. There are on-going projects at 101 locations that will be completed in the next 3 years. This year, we start works at another 30 locations.

47 In addition, PUB requires property developers and owners to implement “source” measures, including detention tanks, to slow down the flow of stormwater runoff into public drains. Developers should also implement “receptor” measures, such as higher platform levels, to protect their developments from flash floods.

Water Conservation

48 While PUB continues to find a balance between minimising flood risks and strengthening drought resilience of our water supply in the face of climate change, we must also minimise leaks and manage our water demand sustainably.

49 In response to Mr Gan Thiam Poh and Ms Cheng Li Hui, we are mindful of leakages in our water infrastructure and are required to report to Cabinet periodically on this. PUB has a comprehensive programme to inspect and promptly fix problematic pipes. Through these efforts, Singapore’s unaccounted-for-water is maintained at around 5% and our leak rate is at about 6 leaks per 100 km each year. Both are among the lowest in the world.

50 More importantly, everyone has a role to play in preventing water wastage. Over the years, we have made some progress in water efficiency. In 2014, we used 150 litres per person per day, down from 165 litres in 2003. However, this rebounded to 151 litres last year. As we strive towards our SSB target of 140 litres by 2030, everyone can do their part by adopting more water saving habits and making use of more water-efficient technology.

51 Er Dr Lee Bee Wah and Mr Lee Yi Shyan asked about our plan to encourage efficient water use. PUB will push for the use of more efficient fittings and appliances. We will implement two measures in early 2017. First, we will introduce a 4-tick rating for washing machines. Today, washing machines are labelled

with two or three ticks. The introduction of the 4-tick rating will enable households to select the more water efficient machines from among the current 3-tick models.

52 Second, we will phase out 0-tick taps and mixers, and allow only taps and mixers with 1-tick or more to be sold or supplied. These are part of our plans to eventually phase out less efficient fittings and appliances by 2018. We will be consulting the industry on these plans.

53 Mr Lee Yi Shyan and Mr Gan Thiam Poh also pointed out that we need to help our commercial water users to use water more efficiently. Singapore's water demand is projected to double by 2060, and the non-domestic sector will account for 70% of future water demand. From January 2015, we have mandated the submission of Water Efficiency Management Plans (or WEMP) by large water users. I am heartened that more than 600 large water users have submitted their plans to improve water efficiency and reduce water consumption.

54 PUB will study this data, the data collected from WEMP. We will develop water efficiency benchmarks and good practice guidelines. We will start with the big companies and then move on to the smaller companies.

55 In addition, PUB has been investing in industrial water solutions, such as used water recycling. Since 2006, we have been working with relevant agencies to promote water-related R&D and develop the water industry under the Research Innovation and Enterprise (or RIE) plans. We will continue to leverage government schemes where possible, including the RIE2020 plan and the newly announced industry transformation roadmaps, to foster industry innovation and growth.

[In Malay]

56 Madam Chair in Malay please.

57 Our pioneers have transformed Singapore over the past 50 years into one of the most admired cities in the world.

Sepanjang lima dekad yang lalu, para anggota generasi perintis kita telah merubah Singapura sehingga menjadi salah sebuah negara yang amat dikagumi di dunia.

However, challenges like climate change means that what has worked in the past may not work for the next 50 years.

Namun, cabaran-cabaran seperti perubahan iklim menunjukkan bahawa apa yang dahulunya berkesan tidak semestinya masih sesuai diamalkan untuk lima puluh tahun akan datang.

For example, how do we manage our coast with rising sea levels? How do we deal with diseases like dengue with increasing temperatures? And how do we manage floods with more intense rainfall?

Sebagai contoh, bagaimanakah kita melindungi kawasan persisiran pantai kita dengan kenaikan aras laut? Bagaimana pula kita menangani isu-isu penyakit seperti Dengue yang mudah menular dalam keadaan iklim yang semakin panas? Begitu juga dengan masalah banjir kilat yang dijangka semakin genting dengan jangkakan hujan semakin lebat pada masa akan datang.

We need to constantly assess how new global trends and the actions of others will affect us.

Kita perlu sentiasa menilai bagaimana trend-trend baru di dunia dan tindakan orang lain akan memberi kesan kepada kita.

We cannot go about our daily lives as if it were business as usual.

Kita tidak boleh meneruskan kehidupan seharian kita seolah-olah semuanya berjalan lancar tanpa masalah.

We have to work with our neighbours and international partners to address these problems together.

Kita perlu bekerjasama dengan negara jiran dan rakan kongsi antarabangsa kita bagi menangani masalah ini bersama.

Ultimately, the world has to ensure that development doesn't occur at the expense of the environment.

Pada dasarnya, negara-negara di dunia mesti memastikan bahawa pembangunan dijalankan tanpa mengorbankan alam sekitar.

I believe every Singaporean can, and should, step up to do their part for the future – a future where our children will lead better lives because of the actions we take now.

Saya percaya setiap rakyat Singapura boleh dan harus membuat lebih banyak usaha untuk memainkan peranan mereka menjaga alam sekitar demi masa hadapan - masa hadapan yang mana anak-anak kita dapat menjalani kehidupan yang lebih baik hasil daripada tindakan-tindakan yang kita ambil sekarang.

F. Conclusion

58 Madam Chair, in conclusion, I would like to assure Members that my Ministry will strive to uphold the high standards of our environment and water resources we have inherited, even as we face new challenges like climate change. We are doing this not only to benefit Singaporeans now, but also provide a better environment for future generations and the world.

59 For each one of us, this means living out the beliefs and values underpinning our Sustainable Singapore Blueprint:

Use only what we need, and use it well;

Care for the place we live;

Leave something good for the future.

60 Madam Chair, I hand over to Senior Minister of State Dr Amy Khor to address other environmental issues.