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 nation-wide.

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 kilo-tonnes 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.