

Question: To ask the Minister for the Environment and Water Resources (a) if he can provide an update on NEA's rodent control efforts; (b) how successful is the Rat Attack Programme; and (c) whether the Ministry is looking into how this problem is tackled by other countries.

Answer:

Since 2011, the National Environment Agency (NEA) has been carrying out regular inspections of public areas to identify potential food sources and harbourages for rodents, as well as rodent burrowing activities. Some 32,000 burrows were detected in the first ten months of 2016, a 12.5% decrease over the same period in 2015. Around 90% of these burrows were found in housing estates managed by the Town Councils (TCs), mostly near bin chutes and bin centres. With numerous such facilities located in housing estates, rodent control remains a challenge for many TCs, especially in areas where individual stakeholders fail to adopt proper food storage and waste management practices, resulting in ample food sources for rodents.

2 To tackle this situation, NEA has been working with the TCs to implement the Rat Attack Programme, to proactively take steps to reduce the rodent population in their housing estates. Last year, NEA calibrated the programme further to provide TCs with the flexibility to tailor specific rat control efforts according to the rodent situation in their respective housing estates. For instance, TCs can choose to adopt a combination of rodent control methods, such as population culling or burrow treatment. So far, fifteen TCs have come on board the programme.

3 In some areas, actions by one party to destroy rodent burrows may displace the rodents to another location. NEA has, therefore, taken steps to strengthen the coordination between multiple stakeholders by facilitating the formation of Rat Coordination Task Forces. These working groups, which also include the TCs, facilitate the coordination of rodent control plans amongst the various stakeholders and help ensure that all parties play their part. Progress has been encouraging, especially in areas such as Redhill Close, Clementi Ave 3, Bedok Central and Bangkit Road, where the number of burrows has fallen by more than 30% since coordination efforts began.

4 Beyond these efforts, NEA also regularly inspects retail food establishments for signs of rodent infestation and conducted more than 137,000 inspections last year. Retail food establishments that fail to keep their premises free of rodent infestation could have their licences suspended or revoked. NEA also inspects shopping malls and requires the operators of such premises to put

in place rodent control programmes and proper waste management practices. NEA will not hesitate to take enforcement action against any premises owners for any public health lapses that lead to rodent infestation.

5 NEA has also been studying how the rodent problem is tackled in other countries and will continue to evaluate our programmes and adopt relevant measures in our local context, where feasible.

6 While NEA continues to keep up the surveillance and control of the rodent population in Singapore, it is the responsibility of all stakeholders to ensure a good system of housekeeping, refuse management and routine pest control checks and treatment to keep the rodent population under control. For examples, all homeowners and retail food establishments should bag their food waste properly to minimise access by rodents and reduce the contamination of recyclable waste.

Question by Mr Liang Eng Hwa, Member of Parliament, Holland-Bukit Timah GRC:

Thank you Madam. I must say that the resumption in the building of the new hawker centres is probably the best decision MEWR has made in my view, and my constituency is a direct beneficiary. Hence I also support the NEA's approach to try out the new model to finesse the way how hawker centres are run. I would like to ask SMS whether there are any good learning points since we implemented the not-for-profit model. Has it improved the attractiveness of the hawker profession and lowered the barrier of entry for aspiring hawkers? I also understand from the stall-holders at Bukit Panjang Hawker Centre that their monthly conservancy charges are about almost \$2,000 a month. I would to ask SMS why aren't there benefit of scale, since there is centralised dishwashing and so on, and can this be lowered?

Answer by SMS Dr Amy Khor:

Let me share that for the new centres that have been operated under the alternative management model, for instance Ci Yuan hawker centre at Hougang as well as Our Tampines Hub (OTH) hawker centre which has just opened recently: these socially conscious operators had in their tender proposals proposed an entrepreneurship programme to allow new hawkers to enter the trade, to support and facilitate their entry. Hence, as I have noted earlier that in Ci Yuan hawker centre, they have an entrepreneurship programme where some 16 new hawkers have benefited. They trained these hawkers and provided them the stalls, along with some initial set-up costs to operate these stalls. Over at OTH, the operator also has a Train-and-Place entrepreneurship programme where new hawkers would train with veteran hawkers for about three months, before operating the stalls at OTH. So I think these have helped to lower the entry barrier for aspiring hawkers – whether they are young hawkers or people looking to enter the trade. In fact, between Ci Yuan and OTH, we have new hawkers who were formerly engineer, accountant, and real estate agent. I recently also met a hawker at Chinatown Complex Food Centre who was a former Deputy Superintendent (DSP). She has now been selling herbal bak kut teh for more than a month or so. So I think schemes like these would help.

2 With regards to the conservancy fees at Bukit Panjang Hawker Centre, this does not comprise just one component. This fee of \$1,600 odd amount comprises 3 components: the first component is the service & conservancy fees for general cleaning, routine maintenance and utilities of the common area; the second component is the table-cleaning fees, the third is the centralised dishwashing fees. All these fees are market-determined, and are paid directly to the contractors. For centralised dishwashing, it is really to help the hawkers address manpower constraints and challenges, as well as, to manage manpower costs and improve productivity. With centralised dishwashing, the hawkers can save on the costs of employing someone to wash the dishes. During my visit to Whampoa Drive Market, which does not have a centralised dishwashing programme at the moment, I met a hawker who purchased his own dishwashing equipment. He said that that has helped him address the difficulty of hiring someone to wash the dishes, and that the cost savings was nearly equivalent to hiring one full-time worker, so that definitely offsets the fees paid for centralised dish washing.

Question by Mr Leon Perera, Non-Constituency Member of Parliament:

Would the ministry consider a campaign to put up posters at these wet markets to educate consumers that the stallholders are expected to display their prices, and perhaps to have a hotline whether they can call if there are stallholders who are consistently not displaying the prices?

Answer by SMS Dr Amy Khor:

Indeed there are place managers at these hawker centres and wet markets monitoring the situation. Anyone is free to contact us to give us feedback on the display of food prices and any other issues regarding hawker centers. However, I wish to highlight that we do understand that for market stalls, there are challenges in fulfilling this requirement. As I've said, there are some stalls – in particular those which sell market produce, the prices fluctuate on a daily basis and thus, is difficult for them. So we have engaged and advised them to display a price range instead; this would also comply with our requirement. Clearly, we would do more in terms of reaching out and educating them through our place managers.

Question: To ask the Minister for the Environment and Water Resources (a) whether the running of hawker centres by social enterprises on a not-for-profit basis has achieved its desired outcomes; (b) whether it has reduced the overall operating costs for hawkers and food prices for consumers; and (c) whether it has helped attract new hawkers to the trade.

Answer:

Hawker centres are places where Singaporeans from all walks of life can interact while enjoying hygienic and affordable food. To meet the changing needs of society while ensuring the sustainability of the hawker trade and the affordability of hawker food, the Government has been exploring alternative management models where socially-conscious operators are appointed to manage hawker centres on a not-for-profit basis. These operators have the flexibility to innovate and customise solutions for each centre. With their experience in food and beverage operations as well as property and lease management, we believe these operators are able to improve the dining experience, enhance vibrancy, and improve the operational efficiency of hawker centres under their management.

2 There are currently 4 hawker centres managed by socially-conscious operators, namely at Blk 208B New Upper Changi Road and Bukit Panjang Hawker Centre which are managed by NTUC Foodfare Pte Ltd, Hougang Ci Yuan Hawker Centre managed by Fei Siong Social Enterprise Ltd and Our Tampines Hub Hawker Centre managed by OTMH. The feedback from both hawkers and patrons of these centres has been largely positive. The operators monitor the prices of basic food items at these hawker centres to prevent unreasonable price hikes. In addition, some operators have ensured that the hawkers offer at least a few affordable entry-level meals in their menu. For example, the stalls at the centres in Ci Yuan and Our Tampines Hub need to have at least 2 dishes priced at \$2.80 each or below . The operators also organise events at these hawker centres to further enhance the vibrancy of the centres.

3 To help hawkers address any manpower constraints they may face and manage manpower costs, the operators have implemented some innovative productivity measures. For example, the operator at Ci Yuan Hawker Centre has implemented a self-payment kiosk at all stalls, allowing the hawkers to focus on taking orders and cooking. Similarly, at the hawker centre in Our Tampines Hub, the operator has introduced a cashless payment system for the stalls. The operators at Bukit Panjang, Ci Yuan and Our Tampines Hub hawker centres have also introduced centralised dishwashing to reduce the hawkers' need for manpower for dishwashing. Besides improving the hawkers' productivity, centralised dishwashing can also ensure a more hygienic environment for patrons. Some operators have also offered the purchasing of ingredients in bulk to help hawkers reduce the cost of raw materials.

4 We have also seen encouraging initiatives to attract new entrants to the hawker trade. For example, the operator at Hougang Ci Yuan Hawker Centre has put in place an Entrepreneurship Programme where new hawkers are given on-the-job training to gain skills and knowledge that can help them in operating hawker stalls. Thus far, 16 hawkers have benefitted from this Programme.

5 Given the encouraging outcomes observed in these pilots, we have recently announced an extension of the alternative management model to other hawker centres, with the appointment of NTUC Foodfare Co-Operative Limited, or NFC, to manage a group of new and existing hawker centres. Placing the management of a group of hawker centres under a single operator will enable the operator to derive economies of scale and have greater flexibility and space to experiment with new ideas and processes to further improve the vibrancy and operational efficiency of the hawker centres for the benefit of both hawkers and patrons.

6 Hawkers can be assured that there will be no change to the way rents are determined when the operator takes over the management of the existing centres. Subsidised stall-holders will continue to pay subsidised rents while non-subsidised stall-holders will continue to pay the prevailing market rents as assessed by professional valuers. The National Environment Agency (NEA) will work with the operator to explore ways to increase the vibrancy of the centres to enhance the business there and improve the patrons' dining experience.

7 I would like to assure the Member that regardless of the management model or the operator managing our hawker centres, my Ministry will ensure that hawker centres continue to serve the fundamental objective of providing hygienic and affordable food while at the same time allowing the hawkers to make a decent livelihood

Question: To ask the Minister for the Environment and Water Resources (a) whether it is compulsory for wet market stallholders to display their prices prominently; (b) if so, how does the Ministry enforce this; and (c) how many stallholders have been found to be in breach of such regulations over the past five years.

Answer:

Currently, all stall-holders are required to display their prices as part of their licence conditions. Where it is not feasible to indicate fixed prices, stall-holders can also indicate a price range instead. In 2016, in response to feedback, the National Environment Agency (NEA) issued verbal advisories to more than 110 market stall-holders to display their prices and most of the stall-holders had cooperated.

2 We recognise that many wet market stalls may face difficulty in displaying their prices as the prices of market produce may fluctuate on a daily basis and are currently looking into revising this requirement. Regardless of the requirement, it is a good practice for stall-holders to be transparent about their prices so that consumers will have greater peace of mind when patronising them and can make more informed choices.

Question: To ask the Minister for the Environment and Water Resources (a) what has been our energy usage in the last ten years and what is the forecast for the next ten years; (b) whether our future energy needs can be met and what is the plan to meet this demand; (c) whether our green environment initiative has bore results on energy usage and what more can be done; and (d) whether the Ministry will consider (i) turning off some street lamps on expressways and major roads after midnight till 5am to save energy and (ii) incentives for private residences to install solar panels.

Answer:

Our annual energy demand[1] grew from 38,300 GWh in 2005 to 50,300 GWh in 2015, representing a compounded annual growth rate (CAGR) of 2.8%[2]. Over the next decade, energy demand is expected to grow at a slower rate, with a projected CAGR of about 1.2 – 1.8%[3]. This is due to factors such as lower projected growth rates for GDP and population.

2 Singapore has adopted a liberalised market environment which encourages efficiency and competition. We do not subsidise energy, and rely on price signals from the wholesale electricity market. Based on current projections, there is sufficient supply to meet electricity demand for the next 10 years. Nonetheless, the Government has taken steps to improve our energy security, competitiveness, and sustainability. For example, we built the liquefied natural gas (LNG) terminal to diversify our energy sources, and we are pushing for greater adoption of solar energy.

3 The member has also asked whether our green initiatives have helped to reduce our energy consumption. Yes, it has. Let me give a few examples.

4 The industrial sector is the largest energy user in Singapore, accounting for 67% of total energy consumption in 2014. The Government uses both incentives and regulations to improve energy efficiency amongst companies. So far, 60 projects have been approved under the Grant for Energy Efficiency Technologies (GREET) scheme - these projects are expected to yield energy savings of S\$726 million. We also introduced the Energy Conservation Act in 2012 requiring energy-intensive facilities to put in place energy management practices.

5 Another energy-intensive sector is the building sector. Since 2005, the government has been driving the adoption of energy efficient design and solutions towards more environmentally sustainable buildings. To date, there are more than 2,800 green building projects in Singapore translating to about one-third of the total building stock. Our target is to have 80% of all buildings green[4] by 2030. The government will also lead by example to attain relevant Green Mark ratings for all large and mid-sized public sector buildings by FY2020.

6 For households, since the introduction of the Mandatory Energy Labelling Scheme (MELS) and the Minimum Energy Performance Standards (MEPS) in 2008 and 2011 respectively, we have seen improvements in the energy efficiency of household appliances that contribute to a significant share of the household electricity bill such as air-conditioners and refrigerators. These efficiency improvements will translate to annual energy savings of more than \$100 million for households. Going forward, we will be including more appliances under these initiatives.

7 The member has also asked about street lighting. Singapore follows international guidelines for street lighting. For the safety of all road users, the Land Transport Authority (LTA) will not be switching off street lights on our roads between midnight and 5am. However, LTA will be switching to Light Emitting Diode (LED) street lights, which consume 25% less energy than regular street lights.

8 Notwithstanding this, there is clearly room for us to do more. Singapore is an alternative energy disadvantaged country. That is why improving our energy efficiency is a key strategy to achieving our pledge at the Paris Agreement. We will continue to improve our policies as well as test new technologies such as smart homes, smart grids, zero-energy buildings and electric vehicles. Although we do not provide incentives or subsidies for energy, we have introduced regulatory enhancements to facilitate the entry of renewable energy, such as solar energy, across all sectors including private residences. Lastly, we are working to further increase public awareness and participation in conserving energy.

[1] System demand refers to electricity demand in Singapore, including demand met by generating units (including embedded generators), as well as distribution and transmission losses.

[2] Refers to CAGR from 2006-2015 with base year in 2005.

[3] Refers to CAGR from 2016-2025 with base year in 2015.

[4] Refers to buildings meeting the Building and Construction Authority's (BCA) Green Mark Standards.

Question: To ask the Minister for the Environment and Water Resources (a) what plans are in place to reduce the amount of food waste generated in light of 785.5 million kilogrammes of food waste being generated in 2015; (b) what are the top contributing factors of food wastage; and (c) what are the targeted approaches to be undertaken by the Ministry to tackle each contributing factor effectively.

Answer:

Food waste is a concern to my Ministry. When we throw away food, we waste the resources used in its production and expend manpower and resources for waste collection and cleaning. Food waste, when not properly managed, causes odour and pest issues. It also contaminates recyclable materials when they are mixed. Besides the environmental impact, wasting food is a waste of money.

2 The amount of food waste in Singapore has increased by about 50 per cent over the past ten years. Households generate around half of the food waste, with the other half generated by sources such as food manufacturers, hotels, shopping malls and hawker centres. We can expect the amount of food waste to rise further as population size, incomes and economic activities increase.

3 Unfortunately, there is no easy solution to this problem. My Ministry believes that a multi-pronged approach should be adopted to combat food waste. This starts with avoiding, where possible, excess food production. Where this is not possible, we encourage the re-distribution of excess food. Lastly, we encourage food waste to be segregated for recycling and treatment. Food waste segregation is an important step that reduces the likelihood of recyclable contamination and enhances the effectiveness of our recycling efforts.

4 My Ministry works closely with other Government agencies and private sector partners to combat food waste in the non-household sector. In October 2016, the National Environment Agency (NEA) and the Agri-Food & Veterinary Authority of Singapore (AVA) launched a food waste minimisation guidebook for food retail establishments, with the aim of sharing good practices, such as smart planning and inventory management, to avoid food waste and save costs. To promote food redistribution, guidelines on the proper handling and re-distribution of unsold and excess food have also been incorporated. People sector

organisations, such as Food Bank Singapore and Food from the Heart, also play an important role to re-distribute food to those in need.

5 My Ministry is experimenting with different models to implement on-site food waste treatment to reduce the road traffic created to transport food waste to our waste disposal facilities. Food waste is treated on site at the hawker centres at Block 628 Ang Mo Kio Ave 4 and Tiong Bahru. We have taken this one step further at Our Tampines Hub, where up to 1.4 tonnes of food waste generated from the hawker centre and food and beverage (F&B) outlets can be recycled each day into non-potable water and fertilizer. The NEA has also supported the installation of on-site food waste treatment systems at 19 premises under its 3R Fund, including Resorts World Sentosa, Mandarin Orchard and Amara Hotel.

6 We are also experimenting with district-level food waste treatment. Since last month, our partners comprising selected army camps, schools and food centres have been segregating their food waste at source. This food waste is then sent to a demonstration facility located at the Ulu Pandan Water Reclamation Plant for co-digestion with used water sludge to produce biogas.

7 Households are major contributors of food waste in Singapore. The NEA launched a public education campaign in 2015 to increase awareness of the food waste situation and promote ways to reduce food wastage. These include tips on planning food purchases, food storage and food preparation habits to help consumers minimise food wastage while saving money. The NEA also partnered the North East Community Development Council (CDC) to launch the 'I Love My Food @ North East' initiative in November last year. My Ministry welcomes more stakeholders to come on board to undertake food waste reduction initiatives in the community.

8 We are also studying the experiences of others closely, while being mindful of our local context. For example, households in Taipei segregate their food waste from other household waste before disposal. Some states in Australia have turned to technological solutions instead, such as in-sink grinders for food waste. We will monitor these best practices overseas, and hope to seek the support of Members to partner us in these efforts. Together, I hope that we can gradually change the attitudes and habits of households to reduce food waste.

Thank you.

Question: To ask the Minister for the Environment and Water Resources (a) whether NEA tracks the number of fogging operations carried out in private condominiums and landed estates annually; and (b) whether NEA will consider revising guidelines to limit the number of fogging operations that can be done in one location every year.

Answer:

Source reduction, or eliminating potential mosquito breeding habits, remains the most effective method to reduce the mosquito population. Nonetheless, fogging may still be required as a complementary approach when there is urgency to reduce a large mosquito population, such as in areas with active dengue transmissions. In such instances, repeated rounds of fogging may be necessary while concurrent efforts are made to remove the breeding habitats.

2 The National Environment Agency (NEA) provides guidance on fogging practices to Pest Control Operators (PCOs) to ensure that fogging is carried out properly. PCOs are also required to do a site assessment to ascertain the need to carry out such treatment and have to notify NEA before proceeding with each fogging operation. NEA does not impose any cap on the number of fogging operations that can be carried out in a particular location as such operations need to be calibrated according to the ground conditions such as the mosquito population which could be fairly dynamic in nature. If there are excessive fogging operations, NEA would engage the premises managers and the PCOs to adjust the fogging operations.

3 We cannot rely only on fogging to keep the mosquito population low. Everyone has to play his part in keeping the mosquito population in check by practicing the 5-step Mozzie Wipeout and removing any potential breeding habitats.

Question: To ask the Minister for the Environment and Water Resources (a) whether the Ministry will be working with schools to raise awareness about food wastage and ways to manage the issue; and (b) whether the Ministry will consider setting up a network of food banks within communities so that households with excess food items can donate them via these neighbourhood food banks.

Answer:

My Ministry works closely with schools to raise awareness on the importance of reducing food wastage. The National Environment Agency (NEA) supports schools by providing educational resources such as posters, videos and presentation materials on food waste reduction.

2 Later this year, the NEA will implement a two-year food waste reduction and recycling project for schools. Under this project which will involve 10 schools, emphasis will first be placed on reducing the amount of food waste produced and then on recycling the remaining food waste using on-site food waste recycling machines. There will be assembly talks on managing food waste in participating schools and training will also be provided on the proper segregation of food waste for recycling to the schools' staff, students and canteen stall-holders. In addition, they will host learning journeys for neighbouring schools and their community partners to share about their food waste reduction and recycling efforts. Apart from raising awareness about food wastage, the project will demonstrate the benefits of proper food waste management to other schools and encourage them to set up similar systems.

3 Currently, food redistribution organisations such as The Food Bank Singapore, Food from the Heart and Fei Yue Community Services accept donations of excess food items from households. For example, The Food Bank Singapore currently has 15 collection points for households to drop off their food items. As these organisations are located within the communities, they are able to channel food efficiently to those in need. My Ministry will continue to support these organisations' efforts on food redistribution and encourage companies and households to donate their excess food to them.

4 While food redistribution is one step towards reducing food waste, we should move upstream to avoid generating food waste in the first place. The

NEA has developed a food wastage reduction guide for households with a wide range of useful tips on how to reduce food wastage, such as planning food purchases to avoid having to throw out expired food items that are not consumed.

5 To raise awareness and minimise food wastage in the community, my Ministry works with the Community Development Councils (CDCs) and Non-Governmental Organisations (NGOs). For example, the NEA has partnered the South East district on the 'Eco-Kepalas @ South East Organisations' programme and North East district on the 'I Love My Food' initiative to encourage households to reduce food wastage.

Question: To ask the Minister for the Environment and Water Resources what measures can be taken to prevent smokers who drop cigarette ashes and dispose used cigarette butts from their flats to their neighbours' units resulting in potential fire hazards and health concerns.

Answer:

The indiscriminate disposal of cigarette butts from one's residential unit is an anti-social act which also poses a potential fire hazard if the cigarette butt is still lit when it is dropped.

2 When such feedback is received, the National Environment Agency (NEA) will first work with the respective Town Councils and grassroots organisations to conduct outreach efforts to residents to advise them against carrying out such inconsiderate acts. NEA will deploy surveillance cameras if the situation does not improve, and enforcement action will be taken against any persons caught littering.

3 My Ministry encourages all smokers to play their part by practising social graciousness and disposing of their cigarette butts and ashes in a responsible manner, so that everyone can enjoy a clean and safe environment.

Question: To ask the Minister for the Environment and Water Resources (a) what measures are being taken to encourage consumers and waste management companies to adhere to environmentally sound practices in managing e-waste; (b) how effective have these measures been; and (c) whether the Government will consider establishing strict guidelines on e-waste collection, disposal and recycling for consumers, businesses and waste management companies.

Answer:

Electrical and electronic waste (e-waste) is a key waste stream in Singapore. Approximately 60,000 tonnes of e-waste is generated in Singapore each year. E-waste contains valuable and scarce materials, but also small amounts of hazardous substances such as mercury and cadmium. The release of such substances into the environment may pose pollution and health problems.

2 To encourage environmentally sound management of e-waste, my Ministry supports voluntary recycling programmes such as REcycling Nation's Electronic Waste (RENEW), which is led by Starhub, DHL and recycler TES-AMM. Under this programme, consumers can place their e-waste in bright green e-waste recycling bins which are conveniently located in shopping malls and commercial buildings. The e-waste will then be collected by DHL and delivered to TES-AMM. RENEW, which is an expansion and replacement of its predecessor StarHub E-waste Recycling Programme, now covers almost 280 locations around Singapore. Since 2012, these programmes have collected and recycled about 110 tonnes of e-waste. Businesses that want to recycle their e-waste, can participate in the HP Planet Partners Programme or Dell Recycling Programme. The e-waste collected is sent to e-waste recycling facilities, which are subjected to pollution control requirements.

3 As the amount of e-waste generated in Singapore is likely to increase as technological advancement leads to faster product replacement, my Ministry has been exploring options for a comprehensive nationwide system for the collection, disposal and recycling of e-waste.

4 The National Environment Agency (NEA) commissioned a study in March 2016 to develop possible options for an e-waste management system. The

ongoing study includes a survey of the entire e-waste collection and recycling value chain, including treatment and disposal. In addition, consultations were conducted in October and November 2016 to seek industry's views on elements of an e-waste management framework. The results from the study and industry consultations are expected to be released this year.

Question:

Assoc Prof Randolph Tan: to ask the Minister for the Environment and Water Resources (a) whether the Ministry conducts regular spot checks for works which undermine the capacity of the public drainage system to deal with floods; (b) whether there is an effective system that triggers early warnings about flood threats that particular works can pose; and (c) whether the penalties to deal with errant contractors are on par with the severity of the potential damage from the resultant flooding.

Mr Ang Wei Neng: to ask the Minister for the Environment and Water Resources in light of recent flash floods across the island and global climate change, whether the Ministry will work with other agencies to reduce incidents of flash floods in key areas of Singapore.

Answer: Over the past few decades, we are observing upward trends in rainfall intensities and frequency of heavy rain events. This, coupled with growing urbanisation which increases stormwater run-off, has made flood management more challenging.

To reduce flood risk, PUB adopts a holistic "source-pathway-receptor" approach that addresses flood protection, not just through drains and canals, that is, the pathway; but also in areas generating stormwater run-off, that is, the source; and areas where floods may occur, that is, the receptor.

First, the pathways. Since 2011, PUB has raised drainage design standards for new developments and redevelopments, which would increase their drainage systems' capacity by up to 50%. PUB has also been carrying out improvement works to progressively increase the capacity of existing drains and canals, and rehabilitate older drains. In the last three years, drainage improvement works at 192 locations have been completed and there are on-going projects at 90 other locations.

Given land scarcity, we cannot rely solely on more and bigger drains to mitigate floods. As such, PUB also requires developers to implement "Source" solutions to better manage storm-water discharges from developments. These include on-site detention measures for larger developments. In addition, PUB also requires "Receptor" solutions, such as higher platform levels, crest protection and flood barriers, especially for critical installations. These help to protect developments when floods occur.

Keeping our drains free flowing is the joint responsibility of all stakeholders – be they public agencies, private developers and contractors, and members of the public. PUB works closely with NEA's Department of Public Cleanliness (DPC) to

regularly remove debris, litter and leaves from the drains. It also encourages the public to keep our environment litter-free and give feedback on drain conditions.

In reply to Mr Ang's question, PUB does indeed work with the major development agencies to get their contractors to conduct checks on the public drains near their construction sites to ensure that the drains are free of debris. This is supplemented by PUB's audit checks on approved drainage works on site. During critical stages such as drainage diversion works and decommissioning of existing drains, more frequent checks are carried out. PUB also leverages on technology, for example, CCTVs, to facilitate the monitoring of work sites.

Mr Ang mentioned the recent flash floods, of which one recent occurrence is at Upper Thomson Road. PUB has investigated and found out that it was due to unauthorised works which affected our public drainage system. PUB takes a serious view of such unauthorised works and will not hesitate to take action against errant parties under the Sewerage and Drainage Act. Any person found guilty may be fined up to \$50,000 for unauthorised works affecting the public drainage system, and up to \$20,000 for unauthorised alteration or interference to the public drainage system. Such penalties and reputational damage, as well as being liable for civil penalties if they cause third-party damage, have been sufficient and effective in the past, and PUB will continue to review the amounts from time to time.

While PUB continues with efforts to reduce flood risks, we should be realistic to note that it is not possible to eliminate floods altogether. Localised conditions, exceptionally heavy downpour, tides and errant behaviour all contribute to flash floods now and then. As such, our focus is also to help members of the public better manage floods when they occur. To this end, PUB has put in place monitoring and alert systems to keep the public updated, through a network of water level sensors and CCTVs. Members of the public can subscribe to receive SMS alerts from selected water level sensors via PUB's website. These sensors are placed in flood prone areas and hotspots and could provide public with early information on the rising water levels in drains in selected flood prone areas.

In the event of a flash flood, PUB works closely with LTA and the Police to monitor road conditions and provide real-time updates on PUB's Facebook and Twitter pages and via radio broadcast, as well as LTA's Expressway Monitoring Advisory System (EMAS) on the roads.

Our stormwater management strategies have served us well. Despite increased urbanisation and more variable weather, flood prone areas have been reduced from 3,200 ha in the 1970s to 30.5 ha today. PUB will continue its efforts to reduce flood prone areas and ensure the proper functioning of the drainage system. However, measures such as drain upgrading, canals and centralised

detention tanks take time to implement, and may not be able to cope with all extremities in rainfall.

As such, I urge all parties to play a part in ensuring that our drains are free-flowing, and to appreciate the importance of source and receptor requirements in their developments. Finally, we need to work together to manage floods when they occur, through better and more extensive alerts. Through concerted efforts, we can minimise flood risks and better manage flood events.

Supplementary Questions:

Mr Ang Wei Neng (Jurong): Mdm Speaker, I thank the Minister for the very comprehensive reply. The Minister mentioned about improvements to pathways in 90 locations. Recently, there were floods in Paya Lebar and Tanjong Pagar, besides Upper Thomson. So, are Paya Lebar and Tanjong Pagar part of the 90 locations? That is the first clarification. The second clarification is: the Minister mentioned that for the flood at Upper Thomson, PUB had concluded that the errant contractor diverted the drainage and caused the flood. So, has PUB taken action to prosecute the contractor?

Mr Masagos Zulkifli B M M: For the Paya Lebar flood on 24 December 2016, it was caused by intense rain which overwhelmed the upstream section of Geylang River, thereby causing low-lying areas to flood. Drainage improvement works have been on-going in Geylang River. The expected completion of the drainage upgrading works is in the third-quarter of 2018. The flood protection to Paya Lebar areas will be enhanced then.

On the action against the contractor, we are taking steps right now to put up the charges. We will be investigating and putting up the charges when we are ready.

Assoc Prof Randolph Tan (Nominated Member): Thank you, Mdm Speaker. I would like to ask the Minister specifically about unauthorised works, as he mentioned increasing urbanisation. What is the danger that some of these unauthorised works and the impact that they have on the drainage system, will not be discovered until way into the future? Thank you.

Mr Masagos Zulkifli B M M: The flash flood at Upper Thomson Road on 24 December 2016 was due to localised constriction at a temporary diversion drain

built by the contractor, Sato Kogyo, and this affected the public drainage system. The temporary diversion constructed by the contractor within the worksite was under-sized. More importantly, it did not inform PUB before commencement of works. The public drainage system across Upper Thomson Road was also found to be altered by the contractor without PUB's approval. PUB therefore will be taking action against the contractor.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) how has the community volunteer scheme helped in reducing cases of littering in public; (b) how many litter bugs booked last year have arisen from public tip-offs; and (c) whether the reporting of litter bugs will be made easier for the public to assist NEA.

Answer by Dr Amy Khor

Littering is an unacceptable and irresponsible behaviour that dirties the living environment and causes potential public health problems. As part of our efforts to tackle littering, the National Environment Agency (NEA) launched the Community Volunteer (CV) programme in 2013 to foster greater ownership of the environment.

2 CVs have to meet stringent selection criteria and fulfil the requisite training to be appointed. They are required to adopt specific geographical areas and lead by example to promote good social norms, through participation in monthly environmental activities such as litter picking and educating environmental offenders within their adopted areas.

3 CVs help to strengthen the social norm of keeping the environment clean by encouraging fellow members of the public to bin their litter. I am heartened that more than 330 individuals from all walks of life have come on board the CV programme. Our CVs have engaged more than 3,700 litter bugs, most of whom were cooperative when asked to pick up their litter.

4 NEA will continue with their enforcement efforts in support of the community. In 2016, NEA issued more than 31,000 tickets for littering offences, 17 of which were to uncooperative litterbugs that our CVs had encountered and whose particulars had been forwarded to NEA for further action.

5 Members of the public can report a littering offence through various channels, including by email, the online feedback form on NEA's website, the MyENV mobile app or the NEA Contact Centre hotline. Many of the tickets issued for littering from vehicles, for example, arise from reports from civic-minded members of the public. We welcome suggestions on how to make it even more convenient for the public to give feedback.

6 The problem of littering cannot be solved just by enforcement or public feedback. I urge everyone to take ownership of the environment and keep it clean. To this end, I also hope that more members of the public will come forward to volunteer as CVs.

Supplementary question by MP Er Dr Lee Bee Wah: I have two supplementary questions. How many enforcement officers does NEA has currently and are there plans to deploy more enforcement officers? How can we encourage more CVs to come forward? Of course enforcement is not the only way, there is education. But I think we cannot do away with enforcement. I was

picking litter with my residents at East Coast Park and there was actually a lot of litter there.

Answer by SMS Dr Amy Khor:

With regards to the first question on the number of environment officers enforcing, I do not have the exact number so I will follow up with the member. Whether we will increase the number of enforcement officers, I think we have, over the years increased the number but there is a limit to the number that we can increase. We have also engaged the help of our Community Volunteers (CV), not just those who have signed up as CVs with us, but also volunteers under our Keep Singapore Clean programme and so on, to help encourage as well as build up the community's sense of ownership for the environment and to do the right thing.

2 Regarding how we can encourage more volunteers, I think we have, over the years, been doing campaigns. For instance, NEA also actively engages premise owners such as shopping malls, and community organisations to get their members to sign up as CVs.

Question by MP Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources considering the ready availability of 'haze-free' cooking oil (or certified sustainable palm oil) in Singapore (a) whether the Government will consider subsidising its higher cost to increase the uptake by restaurants; and (b) what other methods the Ministry is considering to encourage its uptake.

Answer by Mr Masagos Zulkifli

My Ministry supports efforts by industries and non-governmental organisations to promote the use of certified sustainable palm oil (CSPO). Uncontrolled burning for land preparation is not permitted in the production of CSPO. Wider adoption of CSPO would help to reduce the likelihood of haze pollution in South East Asia where nearly 90%^[1] of the world's palm oil is produced.

2 Globally, the availability of CSPO is limited. The Roundtable on Sustainable Palm Oil (RSPO), an internationally recognised certification body for sustainable palm oil, certifies only about 17%^[2] of the total palm oil produced globally. Emerging markets, such as China and India^[3], account for nearly half of the global palm oil imports. We hope that greater awareness of the impact of unsustainable farming practices in the palm oil sector will encourage consumers to demand more CSPO. This is already happening in Europe, where companies and Governments have started to harmonise initiatives across countries to green the palm oil supply chain^[4].

3 My Ministry is pleased to see ground-up efforts in Singapore, by industries and non-government organisations (NGOs), to promote the adoption of CSPO. We support the mission of the Singapore Alliance on Sustainable Palm Oil (SASPO), founded by the World Wide Fund (WWF) Singapore, Unilever, Danone, Ayam Brand, IKEA and Wildlife Reserves Singapore. In addition, the Singapore Environment Council (SEC) has launched a new product category for products that contain palm oil under its Singapore Green Labelling Scheme (SGLS). Consumers can play a part by purchasing products with either the RSPO label or, in future, the SGLS label.

4 We are heartened that Singapore's biggest supermarket chain NTUC FairPrice carries CSPO products^[5]. The People's Movement to Stop Haze (PM.Haze), a local NGO, has also produced a "Haze-Free Cooking Oil" Guide for local consumers and businesses to encourage them to make the switch to cooking oil from CSPO sources. Contrary to general perception, the price of CSPO cooking oil can be comparable to that of non-CSPO cooking oil^[6].

5. Together, we can work towards the vision of CSPO becoming the norm in Singapore and internationally.

^[1] Source: <https://www.worldpalmoilproduction.com/>

^[2] Source: <http://www.rspo.org/about/impacts>

^[3] Source: <https://www.bloomberg.com/view/articles/2015-10-15/india-and-china-are-key-to-ending-asia-s-haze>

^[4] Source: <https://www.idhsustainabletrade.com/news/game-changer-sustainable-palm-oil/>

[5] Source: <http://www.straitstimes.com/singapore/environment/eco-friendly-cooking-oil-now-available-at-fairprice>

[6] An example of CSPO cooking oil available in Singapore that is not more expensive than non-CSPO cooking oil is Cabbage Brand cooking oil.

Question by MP Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources whether the Ministry can clarify what is (i) the contamination rate of recyclables from household recycling and (ii) the most common form of or reason for this contamination.

Answer by Mr Masagos Zulkifli:

Under the National Recycling Programme (NRP), Public Waste Collectors (PWCs) are required to provide a blue co-mingled recycling bin at every HDB block and for all landed residential premises. Recycling receptacles must also be provided in condominium developments. This co-mingled recycling bin system under the NRP makes it convenient for residents as they do not have to spend additional time and effort to segregate the different types of recyclables (i.e. paper, metal, plastic and glass) nor set aside space in their homes to store different types of recyclables separately.

2 While much effort has been put into encouraging domestic recycling, our domestic recycling rate was only 19% in 2015. We need to work harder to achieve our target of a domestic recycling rate of 30% by 2030. This includes inculcating responsible recycling habits, such as preventing the contamination of recyclables in the co-mingled recycling bins by placing only items which can be recycled in such bins.

3 According to the PWCs, about 40% of items found in the recycling bins have to be disposed of as they cannot be recycled. Some of the common non-recyclable items found deposited in recycling bins include soft toys and old shoes. Food waste found mixed with recyclables is another problem. Recyclables contaminated with food waste cannot be recycled and also create pest and odour problems.

4 All co-mingled recycling bins in the NRP have clear labels that indicate what items can be recycled, such as clean paper, plastics, metal cans, glass and old clothing. Through public education programmes in schools and at grassroots events, my Ministry and the National Environment Agency strongly encourage everyone to contribute to our recycling efforts and to ensure that only items which are suitable for recycling are deposited in the co-mingled recycling bins.

Question by MP Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) what is the reason for the rise in littering resulting in more than 31,000 summons issued by NEA last year; (b) whether any analysis been done to understand the underlying cause; and (c) what is the Ministry doing to address this problem

Answer by Mr Masagos Zulkifli:

A survey commissioned by the National Environment Agency (NEA) in 2010 found that around a third of Singaporeans would litter if they think they can get away with it. In addition, the survey found that while people realise that littering is an anti-social act, many still hold the false perception that throwing small items such as tissue papers and plastic wrappers does not constitute littering.

2 To tackle the littering problem, NEA has stepped up enforcement against littering. Last year, NEA issued more than 31,000 tickets to littering offenders, about 18% more than in 2015. We have also enhanced the penalties for litterbugs. In Apr 2014, the Environmental Public Health Act (EPHA) was amended to double the maximum fines for littering to \$2,000 for the first court conviction, \$4,000 for the second conviction and \$10,000 for the third and subsequent convictions. Repeat offenders would also be issued Corrective Work Orders.

3 In 2013, NEA launched a Community Volunteer (CV) programme to foster greater ownership of the environment by engaging volunteers to encourage members of the public to bin their litter. More than 330 individuals have come on board the CV programme and engaged over 3,700 litterbugs.

4 We have also been working with stakeholders such as the Public Hygiene Council (PHC) to encourage everyone to keep Singapore clean and inculcate a sense of responsibility toward our environment. The annual "Operation Keep Singapore Clean!" is one such activity by the PHC which aims to galvanise the community through litter-picking activities across the island. The NEA and the PHC, together with partners such as the Singapore Kindness Movement, have also worked with the Ministry of Education (MOE) to encourage students to undertake daily cleaning in their schools, to inculcate a sense of responsibility among the students.

5 The problem of littering cannot be solved just by enforcement or by the Government alone. Everyone has to take greater care of our environment and play a part in keeping Singapore clean.

Questions by

Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) whether there will be assistance for households who cannot cope with the forthcoming increase in the price of water; (b) what is the current percentage of households that are consuming more water than the national average; and (c) whether the Ministry has conducted a study on the water usage of non-residential facilities.

Mr Png Eng Huat: To ask the Minister for the Environment and Water Resources for the past ten years, what has been the average number and percentage of households whose annual water consumption are below the national average, broken down by HDB flat types and private housing types respectively.

Mr Png Eng Huat: To ask the Minister for the Environment and Water Resources for the past ten years, what has been the domestic water consumption per capita of Singapore compared to other first world countries.

Answer by Mr Masagos Zulkifli:

In raising the water price to ensure sustainability in water supply, the Government will be providing assistance to help lower income households manage the price increase. Details on the revisions in water prices, and measures to assist households, will be announced by Minister (Finance) in the Budget Statement on 20 Feb 2017.

2 Members have asked about water consumption by households and businesses. Currently, 45% of water demand is from the domestic sector, while 55% is from the non-domestic sector, which covers industries and commercial buildings.

3 Today, the national average water consumption for households is 17 cubic metres of water per month, down from 19 cubic metres ten years ago. About 40% of households consume more water than the national average today, as was the case ten years ago. [For more details on the monthly average water consumption by dwelling type, members may refer to the SP Services website^[1].]

4 If we look at per capita usage, households' water consumption in Singapore is 148^[2] litres per capita per day (LPCD). This is lower than that of Melbourne (159), London (155), New York City (476), Tokyo (220), and Hong Kong (211). But, we should not be complacent. We must continue to learn from other cities such as Copenhagen and Amsterdam, which have achieved lower LPCD levels of 101 and 136 respectively. Notwithstanding contextual differences such as climate, we can still save more water by adopting more water-saving habits and making use of more water-efficient appliances in our households.

5 As for the non-domestic sector, PUB has since 2015 required the submission of Water Efficiency Management Plans (WEMP) for large water users that consume 60,000 cubic metres or more a year, equivalent to 24 Olympic-sized swimming pools. These plans help companies identify ways to reduce consumption. In 2016, more than 600 large water users have submitted their plans. With the data collected from WEMP, PUB will develop water efficiency benchmarks and good practice guidelines for water intensive sectors to help them further identify opportunities to improve water efficiency.

[1] <http://www.singaporepower.com.sg/irj/servlet/prt/portal/prtroot/docs/guid/609ffede-040d-2f10-f5b4-de464caacd39>

[2] From 2016 onwards, Singapore's per capita water consumption indicator has been revised to focus on water consumption within household premises only (i.e. usage in purpose built dormitories and common areas excluded).

Madam Speaker,

Thank you for giving me the chance to speak. I would like to respond to the points raised by members, particularly on the issue of the water price revision.

2 In Singapore, water is unlike any other ordinary commodity. We subsidise housing, healthcare, education, but not water consumption. Water is a strategic issue. It is a national security issue. We must price water fully. Even as we give targeted assistance to households, such as U-Save vouchers to help them pay for their utilities bills, we must price water correctly. The consumer must feel the price of water, realise how valuable water is in Singapore, every time he or she turns on the tap, right from the first drop.

3 Let me take us back to the last time the Government revised the price of water, which was 1997. We had not revised water prices for some time then. Elements in Malaysia were threatening to block our supply of water from Johor. We were embarking on desalination to secure our water supply. We needed to register with Singaporeans the strategic importance of water, and the importance of saving every drop possible.

4 The Government therefore decided to revise the water price substantially, to reflect water's true scarcity value. If we needed any additional water, where would it come from? How much would that additional litre cost? That is what we call the Long Run Marginal Cost (LRMC). That is the cost which consumers must see.

5 At that time and even today, the Johor supply was fixed. Local reservoirs had been almost fully developed, maybe except for the Marina Reservoir. NEWater was not even invented in 1997. It came later in 2002. Apart from conventional methods of collecting rainwater, the only proven technology then was to produce drinking water through desalination. And desalination was very expensive, at \$3 to \$3.50 per m³, through the multi-stage flash distillation. This number did not even include cost of pipelines.

6 There was no way for the government then to move the water price to the true cost of the next litre – the price of desalination, so it was moved instead in steps, over the period 1997 to 2000, to today's water price.

7 Since then, water technology has progressed steadily. PUB itself invested in R&D. This resulted in NEWater, which was much cheaper than desalination. Desalination technology has improved, from multi-stage flash distillation to membranes today. As a result, we have been able to keep down the cost of water, and to hold water prices unchanged for 17 years.

8 But costs have gone up gradually over the years. At some point, a price revision becomes essential.

9 Let me give a few examples of how costs have risen in the recent review. Firstly, the LRMC is a mix of NEWater and desalination costs. Now, in the blend between NEWater and desalination, we have to depend more on desalination for the next litre as water demand increases. There is also a limit to recycling used water in our NEWater plants. Therefore, to increase our water supply further, we must build more desalination plants. In fact, we are building three desalination plants within the next three years.

10 Secondly, as we increase the proportion of used water being reclaimed for NEWater, effluent becomes more concentrated and more difficult and costly to process.

11 Thirdly, Singapore is becoming more urbanised, so it is costing us more to build the new and replacement pipes to deliver water.

12 Here are some figures from our recent expenditures, which will give an indication of how it will be in future. Looking at the first year price of desalination for instance, while the first-year price for our first plant, SingSpring desalination plant, was \$0.78/m³ (2005), the first-year price of our latest plant at Marina East was \$1.08/m³, some 40% increase. For conveyance costs, we now tunnel below the road to lay pipelines. This minimises inconvenience to road users and the public, but it costs two and a half times as much as conventional pipe-laying techniques. Also as our pipelines age, PUB will have to more than double the rate of renewal for old pipelines from the current 20km per year to 50km per year, to minimise pipe leaks and disruptions.

13 All these point to the need to update the LRMC, which the 30% price increase has reflected. We are unable to provide details of its computation because of commercial sensitivities. We still need to build more

desalination plants and NEWater plants. As more desalination, NEWater and water reclamation plants are yet to be built or expanded, revealing the specifics of the LRMC could prejudice future bids. But rest assured that the LRMC reflects the best the market can offer.

14 Mr Pritam Singh asked whether technology is taken into account in the computation of LRMC. My answer is a definite yes – it has always been and it is also the case for this review. Technologically, we have squeezed everything we can from the current water processing technology. It will take several more years to achieve the next breakthrough and bring it to a deployable scale.

15 I thank members for reminding the house that we have had a serious problem with the depletion of Linggiu Reservoir in recent years. It is not clear if the current situation is due to climate change, but we cannot discount the possibility that such dry weather may persist, and in the future when climate change effects become more pronounced, it will be more severe. As members are aware, Johor is also drawing water from the Johor River, and Singapore is discussing this with Malaysia to ensure that Johor's actions do not compromise our ability to draw the 250 mgd that Singapore is entitled to from the Johor River under the 1962 Water Agreement. What is clear is that Linggiu is operating today at a level way below what we are comfortable with, and it will take years to build up again to a reliable capacity.

16 Taking all these together, there is therefore urgency to have our policies, including right pricing, in place so that we can moderate demand by both businesses and households, while also building the infrastructure we need to have a secure water supply.

17 It is the job of my ministry and PUB to plan and build the infrastructure, which we will do, but it is only through right pricing that we can have everyone valuing water as a strategic resource and consciously conserving it. With 30% increase that we have announced, the price will be close to, though still slightly lower than, the price of the next drop or LRMC today. This is the best way to emphasise the scarcity value of water.

18 Members have expressed concerns over the magnitude of 30%. Clearly, this 30% increase has generated a lot of discussion on water. I hope it also raises awareness of scarcity and strategic value where water is concerned. But what does 30% translate to in reality? For businesses, 75% will see an increase of less than \$25 per month in water bills. This is less than a dollar a day. Indeed, I am heartened that some businesses have taken this increase in context and have explicitly said that they would not increase prices. For households, the Government has provided additional U-Save rebates. 1- and 2-room HDB households will not experience any increase on average. For other HDB flat types, monthly water bills will go up by between \$2 to \$11 per month. Overall, water will still be affordable. It will remain at about 1% of household income. So, that is what 30% price revision translates to; less than a dollar a day for 75% of our businesses, and still within 1% of household income for water expenses.

19 Madam Speaker, let me conclude. Despite our investments in desalination and NEWater plants, the truth is that we are still a water-stressed nation. Singapore was ranked first among countries with the greatest risk of high water stress in 2040, according to the World Resources Institute. It is not a description of what we do, it is a description of who we are. We hope that through right pricing everyone will cultivate the habit of water saving as part of Singapore's DNA, whether we are a household or business.

20 Just this morning, I attended a water rationing exercise at Woodgrove Secondary School. Many other schools are participating this year, to raise awareness of the value of water and importance of water conservation among our young. Even during the prolonged dry spell in 2014, Singapore did not face any serious shortages, because we had NEWater and desalination plants. There was no water rationing. But water conservation was something earlier generations of Singaporeans had imbibed. Singaporeans back then knew that every now and then, elements in Malaysia were threatening to turn off our taps. So they bore with water rationing, supported water saving campaigns and even paid the cost of cleaning up rivers and their catchment areas. Indeed, 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. If we take this same approach, we will secure our water future for ourselves and our children, and that, I think members will agree, is well worth doing.

Question by Mr Leon Perera: To ask the Minister for the Environment and Water Resources whether the Ministry will consider conducting a study to quantify the savings in healthcare costs that can be obtained from various possible levels of incremental improvements in air quality in the short, mid and long term.

Answer by Dr Amy Khor:

There have been several studies estimating costs associated with air pollution. The World Bank and Institute for Health Metrics and Evaluation published a study in 2016 which estimated the economic costs attributable to air pollution across various countries. Locally, a study was published in 2013 by Professor Euston Quah and Associate Professor Chia Wai-Mun to estimate the economic cost of particulate air pollution (PM10) on public health in Singapore.

2 While the exact figures may differ as they depend on the assumptions and methodologies in each study, it is clear that air pollution has direct impact on public health. To address this public health concern, my Ministry included in the Sustainable Singapore Blueprint 2015 a set of Air Quality Targets which we aim to achieve by 2020. These standards are based on the World Health Organisation (WHO)'s Air Quality Guidelines.

3 To date, we have already initiated several measures to reduce the emission of pollutants. We have recently tightened the emission standards for industries. We have also introduced measures to manage the emissions from vehicles. These include stricter standards for fuel quality and emissions standards for new vehicles, as well as incentive schemes to encourage the purchase of new and cleaner vehicle models. We will continue to review these measures as we work towards our 2020 Air Quality Targets.

Supplementary question from Mr Leon Perera: Thank you SMS for the answer. Going forward, when the Government presents measures in the Budget in two other platforms in relation to air quality, will the Government also consider providing an estimate of the positive impact on healthcare costs on Medishield Life and other components of healthcare costs, so that a better assessment can be made about the investment that we are putting into air quality and the likely savings that will result in healthcare costs on the other side of the equation?

Answer by SMS Dr Amy Khor:

I thank the Member for his supplementary question. As I have noted, we have many local and international studies that seek to establish the impact of air pollution on health and healthcare costs. Depending on the methodologies and the assumptions used, the figures may vary. What we have done really – to inform policy review and formulation – is to gather these various studies and

have a holistic picture of the economic costs to health and healthcare. From there, we then determine our policies.

2 As I have said, we have a set air quality targets based on WHO's air quality guidelines in our Sustainable Singapore Blueprint 2015. WHO has a set of air quality guidelines that help to determine when health risk is largely reduced, because every reduction obviously matters. However, WHO also acknowledged that when we set guidelines, we have to take into account the local constraints, such as mitigation costs, for instance, the accessibility, affordability and availability of the technologies available. So when we review our policies as well as develop new policies to reduce air pollution and improve air quality, we take these into account as part of the CBA analysis. But as I said, figures can vary significantly, and we have to look at it holistically.

Question by Mr Leon Perera:

To ask the Minister for the Environment and Water Resources if his Ministry will introduce guidelines for the eco-labelling of products to prevent consumers from being potentially misled by non-governmental sanctioned eco-labelling initiatives in the future.

Reply by Minister Masagos Zulkifli:

We are encouraged by the increasing awareness of eco-labels among consumers in recent years. Eco-labels are one form of environmental performance certification which can be useful in helping consumers make informed decisions when purchasing environmentally friendly products.

2 There are several internationally well-established organisations, such as the International Organisation for Standardisation (ISO), which establish guiding principles and procedures for the development of eco-labelling programmes to identify products which are environmentally preferable[1]. Taking guidance from them locally are the Singapore Green Labelling Scheme (SGLS)[2], which is administered by the Singapore Environment Council (SEC), and the Singapore Green Building Product Labeling Scheme[3] (SGBPLS), which is administered by the Singapore Green Building Council.

3 My Ministry will continue to encourage the administrators of other eco-labels to take reference from these international guidelines to build public confidence in the credibility of their labels with a view to move more people towards environmentally sustainable purchasing practices.

Supplementary question from Mr Leon Perera:

I want to thank the Minister for his reply. Just a few quick supplementary questions. Would there be anything to stop a private organisation from setting up their own private eco-labelling initiative? Would there be anything in the law or elsewhere that would stop a private organisation from doing so, without any connection with the international standard body or any of the other body like the SEC like Minister mentioned? If there is no such restriction, then how would consumers be able to tell if this is really a credible eco-labelling or otherwise? Thank you.

Reply by Minister Masagos Zulkifli:

In Singapore, there are credible organisations like SEC, which even the Government has taken a signal from in their purchases. In fact, from last year onwards, we have been purchasing paper based on the SGLS issued by SEC. And therefore, I urge the consumers to use the same credible bodies in making their choices.

[1] ISO developed three sets of guidelines for environmental labelling, i.e. Types I to III. Type I Environmental Labelling guidelines are the most stringent. Source: <http://www.iso.org/iso/environmental-labelling.pdf>

[2] SGLS was audited as meeting ISO Type I Environmental Labelling guidelines. Source: <https://sgls.sec.org.sg/news2.php?id=16>

[3] The SGBPLS's assessment is based on ISO Type I Environmental Labelling guidelines. It complements green building rating schemes. Source: <http://www.tuv-sud-psb.sg/sg-en/resource-centre/certificate-finder/singapore-green-building-product-labeling-scheme>. The Building and Construction Authority (BCA) awards Green Mark Points for products certified under the SGBPLS.

A. INTRODUCTION

1. Madam Chair, may I have your permission to display some slides and a video on the LED screens.
2. Madam Chair, the late Mr Lee Kuan Yew once said: "After independence, I searched for some dramatic way to distinguish ourselves from other Third World countries. I settled for a clean and green Singapore". Thus, Mr Lee, together with the pioneer generation of Singaporeans, embarked on an unprecedented journey to transform Singapore from a slum to a Garden City.
3. Today, as we work towards further enhancing Singapore's liveability, we too need to think and act boldly on matters relating to the environment as Mr Lee did. All the more so, as we face huge challenges such as manpower constraints, an ageing population and acute land scarcity.

B. BECOMING A ZERO WASTE NATION

4. Associate Professor Muhammad Faishal Ibrahim and Ms Cheng Li Hui raised relevant points on waste management. Let me first outline my Ministry's overall strategy and priorities in managing waste. There are 3 waste streams of greatest concern to us.
5. The first is electrical and electronic waste, or e-waste for short. As Associate Professor Randolph Tan and Mr Louis Ng have highlighted, about 60,000 tonnes of e-waste are generated annually. Currently, consumers can participate in e-waste recycling programmes which industry stakeholders voluntarily provide. For example, StarHub provides e-waste recycling bins at almost 280 convenient locations, such as shopping malls and community centres, through its RENEW programme. The e-waste collected is sent to recyclers such as Tes-Amm, where resources such as copper, aluminium and gold are extracted for reuse.
6. 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. Some countries, such as Germany and South Korea, have implemented similar systems. We will take into account our local context, such as product coverage and the physical and financial responsibilities of key stakeholders, when developing the system. More details will be released later this year.
7. Mr Ng spoke about HCFCs. Singapore is a Party to the Montreal Protocol, and will phase out the use of HCFCs by 2030. We have put in place measures to help us achieve this, such as controls on the import of HCFCs for local use. Apart from regulatory control, we encourage the recycling of refrigerants recovered from refrigeration and air-conditioning systems. Local recycling facilities such as Vemac Services Pte Ltd, recover refrigerants from decommissioned industrial and commercial systems. We will monitor developments in this area, and assess the feasibility of implementing a management framework for HCFCs, taking into consideration the risk to human health, technical limitations, and the potential compliance costs which businesses would have to bear.
8. The second concern is packaging waste, which makes up around one-third of our domestic waste. Since the launch of our voluntary Singapore Packaging Agreement in 2007, we have achieved a cumulative reduction of more than 32,000 tonnes of packaging waste, but more can be done. We are exploring possible regulations for businesses, such as mandatory reporting of packaging placed on the local market and the submission of packaging waste reduction plans, over the next 2 to 4 years. We will study the issues and announce the details when ready.
9. The third concern is food waste, which Mr Liang Eng Hwa and Ms Cheng have raised. My Ministry has been pursuing several initiatives on this front.
 - a. We are encouraging more on-site food waste initiatives in individual entities, such as hotels, shopping malls, educational institutions and hawker centres.
 - b. Mr Liang asked for an update on the district-level food waste treatment pilot in Clementi. Since the end of last year, source-segregated food waste from 9 sites including schools, army camps and a food court has been transported to a demonstration facility in the Ulu Pandan Water Reclamation Plant. About 3 tonnes of food waste are collected daily, but we aim to increase this to 15 tonnes a day. If successful, this process will allow us to recover energy from food waste more efficiently.
 - c. Good practices start from young and our schools have always been an enthusiastic partner in our recycling efforts. As part of these efforts, we will be launching food waste digesters in 10 schools in the

second quarter this year.

Dual Chutes System and Recycling Efforts

10. Under the Sustainable Singapore Blueprint (SSB), we have set an overall recycling target of 70% by 2030. Over the last few years, our overall recycling rate has been around 60%. The non-domestic sector comprising industries and commercial premises have achieved a recycling rate of 77%. However, our domestic recycling rates have stagnated at around 20% in recent years. More needs to be done to put recycling at the heart of our culture.

11. Referring to Associate Professor Faishal and Miss Cheng's queries, we will be reshaping the infrastructure in our physical environment to make recycling more convenient for households. We hope this will bring us closer to our domestic recycling target of 30% by 2030. Since January 2014, all new HDB Build-to-Order (BTO) flats have installed recycling chutes adjacent to centralised refuse chutes at every level. Studies have shown that households living in apartments with dual chute systems recycle up to three times more than those in apartments which do not have such facilities. We are now ready to widen the adoption of such systems.

12. The provision of recycling chutes will be extended to private residential developments. Buildings taller than four storeys in all new non-landed private residential developments will be required to install dual chutes for refuse and recyclables. This measure will apply to all new non-landed residential development applications submitted from 1 April 2018.

13. Regarding Miss Cheng's query on plans to reduce contamination rates of recyclables, education remains key. Through continued public education programmes in schools and at grassroots events, we encourage everyone to practice responsible recycling habits - the 3Rs and ensure that only items which are suitable for recycling are deposited in the recycling bins and recycling chutes.

Pneumatic Waste Conveyance System (PWCS)

14. As Dr Chia Shi-Lu and Miss Cheng have observed, our current methods of manual waste collection in the older flats are manpower intensive and unsustainable. Moving forward, we will transform our waste collection system into a more efficient, manpower light one.

15. The Pneumatic Waste Conveyance System (PWCS) is an automated system which transports waste by air suction through a network of pipes to a central collection station. This reduces our reliance on manpower to collect refuse. The whole system will be enclosed, and residents will enjoy a more liveable environment, with a reduction in pest nuisance, odours and exposed waste.

16. There is increasing adoption of PWCS in Singapore. In the public sector, HDB piloted the PWCS at Yuhua estate in Jurong under the HDB Greenprint Programme and will be installing PWCS in new HDB areas such as Tampines North and Bidadari. Private developers, such as City Developments Limited and CapitaLand, have done likewise. To date, more than 100 condominium developments such as the Palette at Pasir Ris and Sky Habitat at Bishan have installed the PWCS.

17. Therefore, to improve the efficiency and hygiene of waste collection, all new non-landed private residential developments with at least 500 dwelling units will need to be installed with PWCS. This measure will apply to all new non-landed residential development applications submitted from 1 April 2018.

18. We have consulted extensively with industry players, including the Real Estate Developers' Association of Singapore (REDAS) and have taken their feedback into account in determining the threshold limits and implementation date. We will also work closely with managing agents and community partners to educate residents on the correct use of the PWCS.

19. To reap greater economies of scale, my Ministry is studying the feasibility of implementing PWCS at a district level, where different developments can be connected to the same network. An automated and enclosed network of district-level PWCS would bring us even closer to our vision of a manpower efficient waste collection system in a liveable environment.

C. ENHANCING SOCIAL SPACES FOR A LIVEABLE HOME Smoking Prohibition

20. Next, I turn to smoking. As Mr Ng highlighted, our long-term goal is to prohibit smoking in all public spaces except at designated areas. Last year, we extended the smoking prohibition to areas around reservoirs and more than 400 parks. With this, more than 32,000 premises are now smoke-free in Singapore. We will look into progressively extending the smoking prohibition to other areas.

21. We recently set up five Designated Smoking Areas (DSAs) in Orchard Road to study the effectiveness of DSAs in reducing smoking in a commercial area. We hope this will encourage smokers to be considerate by smoking only at the DSAs. This study when completed at the end of the year, will inform us on the public's reception towards DSAs, and give us insight into the location and design considerations of the DSAs. We will take into consideration the results of this study, before we consider extending the implementation of DSAs at other locations.

Public Cleanliness

22. On public cleanliness, we have stepped up enforcement against littering. Last year, NEA issued more than 31,000 tickets to litterbugs. This is almost 18% more than 2015 and the highest since 2009. To Mr Gan Thiam Poh's question about the effectiveness of CWOs, over the past five years, less than 6% of litterbugs who have undergone CWOs have been caught for littering again.

23. Mr Gan also asked about the effectiveness of cameras against high-rise littering. NEA adopted the use of surveillance cameras in August 2012 and has since made more than 4,100 deployments and taken more than 3,300 enforcement actions against high-rise litterbugs. These cameras create an effective deterrent effect, as only about 1% of high rise litterbugs are caught offending again.

24. But beyond enforcement, the most effective and sustainable way to have a litter-free environment is to inculcate the right social values, so that the responsibility for keeping Singapore clean and caring for our environment is part of everyone's DNA.

Hawker Centres

25. Madam Speaker, our hawker centres are a unique and integral part of our Singapore identity. Not only do they serve an important function of providing affordable food in a clean environment, they are key social spaces where people from all walks of life can enjoy a meal together.

26. The Government had previously announced that 20 new hawker centres will be ready by 2027. This will add about 800 more cooked food stalls across the island. I am pleased to update that 3 new hawker centres have been completed so far. The most recent one being Our Tampines Hub, which commenced operations in November 2016.

27. As highlighted by Associate Professor Daniel Goh, NEA has been exploring alternative management models by engaging socially-conscious operators such as NTUC Foodfare Co-Operative (NFC), Fei Siong and OTMH as managing agents for our hawker centres. The feedback from both hawkers and patrons of these centres have been largely positive. NFC, in particular, is an established socially-conscious operator and has been managing the existing Bedok Interchange Hawker Centre since 2014. Rentals at this centre have remained unchanged and food prices have been kept stable. Besides monitoring hawker food prices for affordability and ensuring that any price revision is justified, these operators have put in place initiatives like offering bulk purchase of ingredients to help hawkers reduce their cost or putting in place productivity measures such as centralised dishwashing, to help hawkers address their manpower constraints.

28. Given the encouraging outcomes of these initial efforts, we extended this approach to other hawker centres. We have appointed NFC to manage a group of 5 existing centres, with incumbent stall-holders, and 2 new centres. Allowing NFC to manage a bundle of hawker centres will enable them to have the necessary scale to enhance the vibrancy and hygiene standards across more hawker centres, as well as the flexibility to experiment with new ideas and processes, to benefit patrons and hawkers. This is the first expanded pilot and we will need to evaluate the results of this approach before we decide on the next steps.

29. We are calling for tenders for the 2 new centres at Yishun and Jurong West. The tenders are open to all socially-conscious operators who are interested to manage the centres. We will select the best tender proposal to ensure that our hawker centres continue to fulfil the fundamental objective of providing affordable food in a hygienic environment while allowing the hawkers to make a decent livelihood.

30. To Associate Professor Goh's query on subsidised rents in new centres, the subsidised rents were

offered to encourage street hawkers to relocate to hawker centres in the 1970s and early 80s. Some hawkers were also allowed to operate stalls at subsidised rents under the previous hardship scheme which was discontinued in 1990. Since then, all new hawkers are required to pay rental at market rate. Hence, there are no subsidised rents in all our new centres.

Hawker Centre 3.0 Committee Recommendations

31. Last year, I announced the formation of a Hawker Centre 3.0 Committee to review and make recommendations to improve the management of hawker centres and ensure the sustainability of the hawker trade to benefit Singaporeans.

32. Following a year of extensive consultations with many stakeholders, including hawkers, patrons, cleaning service providers and members of the public, the Committee submitted its recommendations to the Minister in February 2017.

33. Mr Liang asked about our response to the HC 3.0 Committee's recommendations. I am pleased to announce that the Ministry has accepted all the recommendations. We will therefore work together with relevant stakeholders to implement them. Let me highlight a few plans that we will put in place in the coming months.

34. First, one key recommendation is for the Government to provide training opportunities and pathways for aspiring hawkers, young or otherwise. For a start, we are working with the People's Association to develop a "Hawker Fare" series of culinary classes, starting in May. Members of the public can learn how to cook hawker dishes, like chicken rice, yong tau foo and mee goreng from veteran hawkers themselves. While not all trainees will eventually become hawkers, such courses will also help to generate interest in hawker food and culture among Singaporeans, and contribute to sustaining the hawker trade in the long run.

35. There are a handful of culinary certification courses in the market today. However, these courses are largely not tailored to the hawker trade. Hence, in addition to the Hawker Fare series that focuses on culinary skills, we are working with ITE to develop a separate short course to teach aspiring hawkers relevant business management skills, like basic profit and loss analysis and how to tender for a stall, to help them set up and manage a hawker business. More details will be released later in the year. We welcome other interested parties such as training providers to work with us to provide appropriate training to aspiring hawkers.

36. In the second half of this year, we will set up a one-stop information and service centre, which will provide useful information to both existing and aspiring hawkers, like how to tender for a stall, where to go for courses on food hygiene and the hawker trade, and the range of kitchen automation equipment available.

37. During the second half of the year, we will also be launching an incubation stall programme, where some hawker stalls at several hawker centres will be pre-fitted by NEA to let eligible aspiring hawkers try out being a hawker for a period of say 6 months. This will allow them to decide if they are cut out for the trade without heavy investments.

38. Madam Chair, with your permission, I would like to say a few words in Mandarin.

委员会的第二项建议，着重于提高小贩中心的生产力。委员会建议，政府应该更广泛地推广措施，通过生产力的提升，减轻小贩们的工作量，从而解决人力的短缺所带来的挑战。其实，我们已经规定新建的小贩中心，必须实行提高生产力的措施，如中央洗碗和无现金支付系统等。而不少现有小贩中心，如文礼坊，的摊主们也自愿参与了中央洗碗计划。

[Translated] Second, the Committee recommended that the Government implement productivity measures in the hawker centres to help hawkers reduce their workload and address the manpower challenges that hawkers are facing. Productivity initiatives such as centralised dishwashing and cashless payment are already a requirement in new centres. Some stallholders in existing centres have also voluntarily subscribed to centralised dishwashing services, such as those at Boon Lay Place Market and Food Centre.

为了减轻小贩们的工作量，并辅助他们克服人力短缺所带来的挑战，政府将拨款九千万元，协助小贩中心推行生产力措施。此资金所覆盖的措施，如中央洗碗服务等，将惠及整个小贩中心。政府也会拨款，通过增设厨房自动化设备等方式，帮助各熟食摊主，提升生产力。

[Translated] The Government will set aside about \$90 million in funding support to facilitate the adoption of productivity initiatives, which will help lighten the workload of hawkers and address manpower constraints. This will include some funding to increase the adoption of centre-level productivity initiatives, like centralised dish washing and stall-level productivity initiatives like the purchase of kitchen automation equipment.

39. We recognise that hawkers may have concerns about the cost of productivity initiatives. Hence, as noted earlier, to alleviate these cost concerns, the Government will set aside about \$90 million to facilitate the adoption of productivity initiatives in hawker centres. The funding will support the progressive re-configuration of up to 25 existing centres over the next few years to facilitate the rolling out of centre-level productivity initiatives, such as centralised dishwashing integrated with tray return and cashless payment solutions similar to those seen at the hawker centre in Our Tampines Hub or Ci Yuan Hawker Centre. We will co-fund up to 70% of the operating costs of such initiatives for hawkers in these centres for a period of time. This will help lower the initial costs of adoption of productivity measures that will help realise manpower and cost savings in the longer term.

40. To promote stall-level productivity, we will set up a Hawkers' Productivity Grant to co-fund the purchase of suitable kitchen automation equipment for cooked food stall-holders. Each stall-holder can claim 80% of the qualifying cost of the equipment on a reimbursement basis, up to a total of \$5,000 within 3 years. Hawkers can start applying for this grant in the third quarter of this year.

41. Some hawkers are already using automation equipment. When I visited Smith Street Food Centre recently, I came across a cooked food stall-holder who sells steamed yam cakes. She uses an automated stirrer to mix ingredients which reduces a lot of manual labour. Through the Hawkers' Productivity Grant, we hope to encourage greater adoption of such labour-saving equipment.

42. Third, more than just dining spaces, hawker centres are places where Singaporeans of all walks of life can interact. In response to the Committee's recommendation to encourage regular organised activities at hawker centres in a sustainable manner, I am happy to announce that we will be providing funding support of \$2,000 per event to adopters of hawker centres, up to an annual cap of \$10,000 for each adopter, to organise events to enhance the vibrancy of hawker centres. Such events can enhance patrons' dining experience at hawker centres, while increasing footfall and benefitting hawkers.

43. Fourth, on graciousness in hawker centres, people recognise that the act of tray-return is a kind and considerate behaviour to be cultivated. To Mr Png Eng Huat's question, we introduced tray-return to hawker centres in 2012 and since 2015, tray-return facilities have been implemented in all hawker centres. The tray-return rates vary, with the highest tray-return rates at Tiong Bahru Market, Blk 137 Tampines Street 11 and Our Tampines Hub. We have also been working on making tray-return stations more visible, prominent and accessible, as seen in the newer hawker centres.

44. To study how to further improve tray return rates, we are also currently running a pilot involving the use of specially designed tray decals and working with our cleaning contractor at Zion Riverside Food Centre to train the cleaners to encourage patrons to clear their trays after their meals.

45. These initiatives that we are rolling out are part of our efforts to ensure the sustainability and viability of the hawker trade. They should help to support both existing and aspiring hawkers. This in turn will allow Singaporeans to continue enjoying affordable food in a clean and hygienic environment.

D. CLEANER AND GREENER LIVING ENVIRONMENT

Vector Control

46. Lastly, let me give an update on our dengue cases. Despite earlier concerns that warmer weather would contribute to a spike in dengue cases to beyond 30,000 last year, we managed to bring the situation under control. There were instead 13,000 dengue cases last year. The World Health Organisation has also commended our efforts in managing the Zika outbreak. However, we cannot be complacent, and should remain vigilant by doing the 5-step Mozzie Wipeout.

47. Mr Gan asked for an update on the small-scale field studies of Wolbachia-Aedes mosquitoes that commenced last year. We have seen encouraging results so far. About half of the Aedes aegypti eggs collected from a trial site were unable to hatch. Our panel of international experts recently affirmed the good progress and expressed their support of NEA's plan to move to the next phase of the suppression trial later this year.

E. CONCLUSION

48. Madam Chair, in conclusion, everyone must take responsibility for the environment. To achieve the vision of a liveable and sustainable Singapore as laid out in our Sustainable Singapore Blueprint, everyone needs to be part of the solution. The little things that we do, like throwing away our trash properly, recycling our waste responsibly and returning our trays with the crockery, can make a big difference. With the support of this house, Singaporeans can rise up and do this together.

A. INTRODUCTION – ON TRACK FOR A LIVEABLE AND SUSTAINABLE SINGAPORE

1. With your permission, Madam Chair, may I ask the Clerks to distribute an infographic for MEWR COS 2017.
2. The environment has been at the top of our minds this Budget. I thank everyone who has spoken about the need to protect our resources for future generations. Singapore is not alone. Many other countries are paying closer attention to the environment, even as they grow their economies.
3. We have a plan called the Sustainable Singapore Blueprint (SSB). This plan brings together all that we are doing, in pursuit of a Liveable and Endearing Home, a Vibrant and Sustainable City, and an Active and Gracious Community. I am glad to say that we have made progress over the course of 2016, and remain on track to meet the SSB targets progressively by 2030. A strong commitment to sustainability remains critical as we build our future economy. As Er Dr Lee Bee Wah and Ms K Thanalethimi have highlighted, it will take not only Government support but also the collective effort of every individual to realise the SSB vision. That is why we launched the Sustainable Singapore Movement in July last year, to galvanise the community to action.

CLIMATE CHANGE

4. While we stand on solid footing, the road ahead is uncertain. A major concern for us is climate change, a far-reaching threat we can already see and feel today. Our Met Service recorded 2016 as the hottest year since 1929, when we started keeping temperature records. In recent years, our water managers, too, have had a foretaste of the looming challenge of coping with extended dry spells on the one hand and higher intensity rainfall on the other. Singapore has to plan ahead to deal with climate change impacts. We will not only need to protect our buildings, coasts, and infrastructure, but also foster greater awareness, so that we are a resilient people.
5. As a responsible member of the international community, Singapore is committed to fulfilling our pledges under the Paris Agreement to reduce our greenhouse gas emissions. Both households and industry play a role in this, as Mr Gan Thiam Poh has noted. Industry, however, contributes the lion's share – 60% – of Singapore's greenhouse gas emissions. We therefore need to focus our efforts there. The upcoming carbon tax to be imposed on large emitters, as announced by the Finance Minister, will help send the right price signal to industries to reduce their emissions when and where it makes the most business sense.
6. The carbon tax, however, is not a panacea for achieving our 2030 emissions pledge. We will need other measures to complement the tax. That is why we introduced the Energy Conservation Act (ECA) in 2013, to put in place measures such as mandatory energy management and encourage companies to enhance their energy efficiency. I am pleased to report that we have made progress on this front since then.
7. Let me give an example. Murata Electronics Singapore, which manufactures electronic components, is becoming an early adopter of efficient motors. Murata is replacing 50 motors with higher efficiency ones. This will save Murata some 160 MWh of electricity each year. These annual savings of \$21,000 in energy costs will last throughout the 15-year lifespan of the motors. Murata is a good example of how industrial energy efficiency measures can benefit the environment as well as the company's bottom line, but for the industry sector as a whole – there is clearly more to be done.
8. Data collected shows that our companies achieved an annual energy efficiency improvement rate of 0.6% in 2015, a slight improvement over 0.4% in 2014. This is still low. To meet our 2030 pledge, we need to work towards the 1 to 2% improvement rates achieved by leading countries such as Belgium and the Netherlands.
9. On a positive note, companies that I spoke to at a recent consultation session recognised the importance of improving their energy efficiency. They, however, mentioned that they faced operational and capability constraints. Some also asked for best practices and useful data to be shared with them.
10. We are studying their feedback and for a start, we will amend the Energy Conservation Act to introduce a new set of initiatives to help companies improve their energy efficiency. First, all ECA-registered companies will now be required to implement structured energy management systems and conduct regular energy efficiency opportunity assessments. Second, companies expanding their facilities will need to factor energy efficiency into their designs upfront, as well as measure and report energy usage for key energy-consuming systems. Third, NEA's data shows that a substantial proportion of common industrial equipment

is inefficient. Hence, Minimum Energy Performance Standards will be introduced, first for motors, and then other systems and equipment progressively. These practices are in line with that of leading jurisdictions and will help companies to adopt more efficient equipment, conserve energy and enjoy life cycle cost savings.

11. To pave the way for a robust carbon tax regime, we need to have a sound measurement, reporting and verification (MRV) system in place. The ECA will thus be amended to require larger industrial emitters to improve the quality of measurement and reporting processes for their greenhouse gas emissions. This will help companies to better understand and manage their emissions. My Ministry will continue to work closely with the NCCS and MTI to consult the affected companies on how to best achieve this.

12. We have also received feedback on the need to improve the current incentive schemes. NEA will be consolidating their existing energy efficiency incentive schemes into a single fund called the Energy Efficiency Fund (E2F). NEA will redesign the E2F to better support companies to identify and undertake energy efficiency retrofits. We will especially help our SMEs by co-funding up to 30% of their investments in energy efficient technologies. Further details will be released by NEA.

13. We need a sustainable way to grow our economy. This is even more important as the world becomes increasingly carbon-constrained.

B. CLEAN AIR FOR ALL

LOCAL AIR POLLUTION

14. Madam Chair, let me move onto another key priority of the SSB: ensuring good air quality, which Mr Chia Shi-Lu, Associate Professor Daniel Goh, and other Members have spoken about. Indeed, just this week, the World Health Organisation reported that, worldwide, more than half a million children die every year due to air pollution.

15. Over the years, we have taken steps to improve Singapore's air quality, all to safeguard the health of our population. Measures include tightening industrial emission standards, updating emission standards for new vehicles and introducing schemes to turn over older, more polluting vehicles. Just last year, we tightened the emission standards for new motorcycles to the latest Euro IV standards. These measures have made a difference. NEA's studies show that the amount of pollutants emitted by vehicles have fallen by between 20 to 35% over the last decade. However, we have still some way to go to meet our SSB targets.

16. I announced last year that my Ministry would conduct a review on the diesel vehicle landscape, given rising global concerns over the health and environmental impact of diesel emissions. Diesel vehicles are a major source of local air pollution, especially particulate matter (PM) and nitrogen oxides (NOx). Studies have found that PM can penetrate the lungs and contribute to heart attacks, strokes, and even dementia; while NOx becomes ground level ozone, which can result in respiratory problems. It is not surprising that many cities have taken drastic steps to limit diesel vehicles in their city centres.

17. Given these concerns, Er Dr Lee Bee Wah and Mr Chia Shi-Lu have asked for an update on our progress. As part of our review, we commissioned Assistant Professor Lynette Cheah from the Singapore University of Technology and Design (SUTD) to study the impact of diesel vehicles and the availability of alternative technologies. The study found that there are indeed cleaner alternatives for certain classes of vehicles. At the same time, we recognise these alternatives also have limitations and may require infrastructure that is not widely available today. Nevertheless, my Ministry will explore ways with other agencies to encourage the adoption of viable alternatives to diesel vehicles.

18. The volumetric diesel duty, which the Finance Minister introduced two weeks ago, is in line with our plans. A usage-based tax better accounts for the harmful effects of each litre of diesel fuel used. We hope that this will encourage individuals and companies to optimise their use of diesel fuel, and even switch to alternative technologies with lower emissions.

19. Apart from this, we will continue with our three-pronged approach in managing vehicular emissions. Firstly, we encourage the purchase of cleaner vehicles, such as low emission hybrid cars, which Mr Louis Ng spoke about. The Carbon Emissions-based Vehicle Scheme (CEVS) was first designed to nudge consumers towards vehicles with lower carbon emissions. This remains important, as vehicles contribute the second largest share of Singapore's greenhouse gas emissions after industries. However, we now need to revise the CEVS to include tailpipe emissions of harmful air pollutants on top of carbon dioxide. The revised CEVS will be renamed as the Vehicular Emissions Scheme (VES). To incentivise the purchase of car and

taxi models which are more environmentally friendly overall, the VES rebate or surcharge will be determined by the worst performing pollutant. This incentive framework has worked well in the past, and we will continue to review its effectiveness.

20. Secondly, we inspect vehicles already on the road to minimise harmful emissions from them. The in-use emission standard for diesel vehicles was already tightened in January 2014. We will now introduce new in-use emission standards for petrol vehicles and motorcycles, similar to those already in place in Europe and Japan. These standards are designed to be easily met by properly maintained vehicles. The new standards will take effect on 1 April 2018, and will help minimise excessive emissions due to vehicle defects or poor maintenance.

21. Thirdly, we encourage the removal of older and more polluting vehicles. To incentivise this, we will revise the Early Turnover Scheme (ETS). The ETS has been successful, with over 27,000 older diesel vehicles being replaced by newer ones, resulting in significant reductions in NOx and PM. We will extend the scheme for Euro II and III diesel commercial vehicles that turn over to Euro VI and equivalent models, for 2 years from August 2017. Given industry feedback, as well as the findings that Light Goods Vehicles (LGVs) remain a major contributor of diesel pollution due to their large population, the scheme will be enhanced by increasing the COE bonus for LGVs from 13% to 35%. We hope that through this, more diesel commercial vehicles and buses will switch to Euro VI models or cleaner electric hybrids or petrol alternatives.

TRANSBOUNDARY HAZE

22. As a small city-state, clean air is not just a local issue. Forest and peatland fires in the region can produce haze which affects us. Transboundary haze is not only detrimental to the social and economic wellbeing of South-east Asian nations, it represents a major setback to the global effort to fight climate change. A scientific study has shown that the 2015 fires in Indonesia released nearly 1 gigaton of greenhouse gases. Daily emissions during that haze period were even higher than that of the entire European Union.

23. Fortunately, the relatively wet Southwest Monsoon season in 2016 and active efforts by the Indonesian government have prevented a repeat of the 2015 haze. However, as we approach the next dry season, we appreciate the recent commitment by the Indonesian government to take action to prevent fires. In fact, as we speak, the Riau Province is under emergency alert for potential fires.

24. It is important that we continue to send a strong deterrent message to errant companies responsible for the fires, that they must change their ways. That is why we enacted the Transboundary Haze Pollution Act (THPA) in 2014. We will continue to take all steps necessary to enforce the THPA, while ensuring that we operate within the ambit of international law.

25. Businesses and the general public can play their part too. Large companies should especially ensure that sustainable practices extend throughout their entire supply chain. I am glad that last year, WWF-Singapore, together with Unilever, Danone, Ayam Brand, IKEA and Wildlife Reserves Singapore, launched the Singapore Alliance for Sustainable Palm Oil. This alliance aims to transform the palm oil industry by increasing the availability and usage of Certified Sustainable Palm Oil (CSPO) in the region. At the same time, the Singapore Environment Council has enhanced the criteria for the Singapore Green Label for pulp and paper products to take into account the companies' efforts to prevent fires on their plantations and manage their plantations on peatland. With the enhanced label, consumers will be better able to identify paper companies with sustainable business practices and make their choices accordingly.

26. As Mr Louis Ng has pointed out, regional cooperation remains essential to tackle the haze problem. Last year, ASEAN member states (AMS) came together to develop the Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control. This is a laudable development, and underscores the region's commitment to realise the vision of a Haze-free ASEAN by 2020. We also look forward to the completion of the ASEAN study on the social, health and economic impacts of the 2015 haze crisis, which will consolidate the case for AMS to strengthen efforts to prevent the recurrence of haze.

C. ADEQUATE, SUSTAINABLE AND RESILIENT WATER

UPDATE ON WATER INFRASTRUCTURE

27. I have laid out our plans to secure clean energy and clean air. Now let me turn to clean water. Firstly, I appreciate all who have given their comments on the water price revision over the past week and during the

COS, and the many Ministers who have responded. I would like to revisit our Water Story.

28. To do this, let me begin with a tale of two countries: the Netherlands and Singapore. Both our countries face acute water problems.

29. However, the Dutch have a different problem from us – that of too much water. They have plenty of water from rivers, but much of the country lies below sea level and is prone to flooding. The massive flood of 1953 in which thousands perished is etched in their national memory.

30. A few months ago, I visited the town of Zuidplaspolder, the lowest point in Netherlands and all of Europe. This marker shows that people in Zuidplaspolder live 7.8 metres below sea level and are hardly aware of it. Even so, people all over the Netherlands are always reminded that the rivers could overflow at any time, inundating their homes and destroying their livelihoods. Thus, to adapt, the Dutch have over time built a complex system of dykes, pumps and water storage capabilities across the country.

31. This was possible because each household contributed its share of water taxes, establishing the world's first and only Water Bank, which could finance large investments. In fact, this bank was instrumental in the recovery and aftermath of the 1953 floods.

32. Today, the Dutch continue to pour over 400 million euros into flood protection each year. Climate change threatens catastrophes if they do not. This capability has turned into a great advantage. They have attracted water-intensive industries to invest, and their expertise is exported globally. Even Singapore is now learning how to construct a polder at Pulau Tekong with their help.

33. We know that the Singapore story is on the other extreme. We don't have enough water. But we have taken the same determined approach as the Dutch. We have strived relentlessly to secure reliable and good quality water supply through innovation, sound management, and a national awareness of our unique situation. Our strategy involves not just long term planning, but also right-pricing, and water conservation measures. All these levers work in tandem.

34. Let me touch on planning. Planning and investing in water resources ahead of time is in our DNA. This is even more critical in the face of looming challenges of climate change to water security and this applies around the world. We have only to look at Linggiu Reservoir, which is about a third full now, and can dry up if current abstractions continue and prolonged dry weather returns unpredicted. It has always worried us, because a dry Linggiu Reservoir will be disastrous for both Singapore and Johor in many ways. The Dutch will recall that they did not pay heed to the 1928 and 1934 studies which repeatedly warned that their dykes were inadequate. Even when high water in 1943 breached the dykes, only simple repairs were made, because they were distracted even after World War II was over. The fact is, "nobody felt like spending a vast amount of money on raising the dykes". After all, there were no floods for years. So when the storm surge of 1953 occurred, water broke through the dykes and claimed 1,800 lives. For us, because we were adequately prepared in 2014, the prolonged dry weather in Singapore did not cost us dearly. But low rainfall continued to take a toll on Linggiu in 2015 and 2016 bringing it to its lowest level of 20 percent in October 2016.

35. For PUB, it's always about ensuring resilience in our water supply so that disruptions do not occur to our industries and no Singaporean will die of thirst. How have we done this? Last year, PUB completed its latest review of the Water Master Plan, a strategic blueprint for our water till 2060. The plan provides for the development of NEWater and desalination plants to meet up to 85% of our water demand by 2060, as well as new pipelines for drinking water and used water. We are making good progress on the plans. Singapore's 5th NEWater plant, located at Changi, officially opened in January this year. The 3rd desalination plant in Tuas will be completed this year, and the 4th and 5th desalination plants in Marina East and Jurong Island are underway. Phase 2 of the Deep Tunnel Sewerage System (DTSS), which includes the water reclamation plant and NEWater factory at Tuas, is on track for completion by 2025. All these have now become critical so that we have a resilient water supply when the weather does not favour us. The Dutch have taken a leaf from the lesson of history and likewise planned ahead and built storm barriers – one of which is the largest moving structures on Earth – to defend against exceptional storm surges under new climate predictions.

36. We also need to maintain and upgrade our existing water assets, as the Dutch have done with their dykes. As our infrastructure ages, PUB will accelerate renewal plans to minimise pipe leaks and supply interruptions. Our unaccounted-for-water losses, which include leaks from our supply network, are around 5%. This is among the lowest worldwide. In London, leakage is about one-fifth of water demand. We cannot afford that – it equates to losing all the water produced by two or three desalination plants.

WATER CONSERVATION

37. That brings me to water conservation, another key lever in our system, which Mr Gan spoke about. My Ministry and PUB have a suite of measures – in addition to right-pricing – to promote greater water savings for households and businesses.

38. In 2016, households used 148 litres of water per capita per day, down significantly from a decade ago. We still have some way to go to reach our SSB target of 140 litres by 2030, not to mention trying to achieve even lower levels as seen in cities like Amsterdam and Copenhagen. If each of us can save 10 litres of water per day, that is almost half a desalination plant.

39. Over the past weeks, I am inspired by the many stories of people who have gone the extra mile to conserve water. Some save the rinsed water discharged from washing machines for toilet flushing, while others use the water from washing rice to water their plants. HDB residents now are used to having their corridors washed once in four weeks rather than in two weeks. This is the right spirit. We should do more together.

40. To help with water saving initiatives, PUB will introduce several new measures. As part of our plans to phase out less water efficient products, PUB will raise the minimum standards to 2-tick rating for sales, supply and installation of water fittings from April 2019. PUB will also extend labelling requirements to dishwashers from October 2018.

41. PUB will also introduce two new water conservation programmes for households. First, PUB will roll out a community project for lower income households to replace their existing 9-litre water closets with more efficient ones. This can help them save up to 10% in their monthly water bills. Second, PUB will be installing smart shower devices for 10,000 new homes as a demonstration project. The smart shower device provides real-time information on water consumption during showers. An earlier small scale study found that a person could save up to 5 litres a day using these devices. If the positive effects are validated in the demo project, PUB may roll out the devices to more households.

42. As for businesses, we will continue to work with them to optimise water use. For large users, PUB has since 2015 required the submission of Water Efficiency Management Plans (WEMP), which help companies better understand and manage their water consumption. At a recent consultation, some companies, including SSMC, a wafer fabrication facility, said that they invest in water saving measures as a matter of principle, even though water formed only a small part of their costs. I am heartened that, for these companies, they are driven as much by water conservation DNA as company P&L. I hope many more businesses follow suit.

DRAINAGE AND ABC WATERS PROGRAMME

43. Let me now turn to drainage. As Er Dr Lee Bee Wah pointed out, climate change will pose challenges to flood management as well. PUB will continue with its island-wide programme to rehabilitate and upgrade our drains to higher design standards. This year, we will start work at another 27 locations. The Stamford Detention Tank will be ready this year, while the Stamford Diversion Canal and Bukit Timah First Diversion Canal will be completed in 2018. These works, when ready, will enhance flood protection for their catchments.

44. Our water bodies are critical assets, but we have made them accessible. Just over a decade ago, we launched the Active, Beautiful, Clean Waters (ABC Waters) Programme, to allow Singaporeans to own and enjoy our water resources. I am pleased to share that 34 ABC Waters projects have been opened to the community to date. This year, we can expect the opening of another 4 new ABC Waters projects across the island, including Pang Sua Pond and Siglap Canal which will be opened later this month. Another 4 projects at Sungei Tampines (Tampines Ave 7 to TPE), Chestnut Drive Outlet Drain, Sungei Simpang Kanan, and Alexandra Sub-drain A will commence construction this year. I hope this serves as a constant reminder of our precious assets.

SINGAPORE'S WATER STORY

45. Madam Chair, I have touched on our approach to water, to ensure we do not have too little, and to help us manage when there is too much. Many of us are familiar with the Singapore Water Story. Perhaps there is a risk of over-familiarity, a certain jadedness from one too many social studies lesson. Just like water

flowing from taps everywhere, it can become invisible, overlooked, undervalued. Just like the people in Zuidplas, who are not aware that they live 7.8 metres below sea level.

46. This month, we celebrate World Water Day, to highlight the importance of water sustainability. It is a timely reminder that even today, 663 million people around the world do not have access to clean water. It is in this context that we should re-live, and encounter afresh our Water Story, the story of what it takes for our people to remain free. Our Water Story is not concluded; it is not history. Instead, the Water Story is a living story, and continues to be written by all Singaporeans today, whether in producing it, or conserving it. Sometimes it is in the large things, such as in PUB's continuous investments for water supply and their unceasing effort to discover new technologies. Sometimes it is in the smaller things, like when we use a mug to brush our teeth, or when the coffee-shop downstairs installs automated cup washing machines that use less water. These are all stories that make up our Water Story.

D. CONCLUSION

47. Madam Chair, I hand over to Senior Minister of State Dr Amy Khor to address our other strategies to make Singapore a sustainable and liveable home.

Question by NMP Mr Kok Heng Leun:

To ask the Minister for the Environment and Water Resources in light of the permanent closure of the Sungei Road flea market (a) how many of the vendors have been offered assistance and what kind of assistance has been rendered; and (b) how many vendors are not receiving these assistance and why are they not receiving them.

Reply by Minister Masagos:

The site where the Sungei Road Hawking Zone (SRHZ) is located will be used for ground preparation works to facilitate future residential development and the last day of operation of the SRHZ will be 10 July 2017.

2. When the Government resettled street hawkers into markets and hawker centres in the early years, 31 rag-and-bone men were excluded from the resettlement due to their trade and were issued with permits to continue operating at the Sungei Road site. Of these 31 original permit holders, only 11 still operate at the SRHZ today.

3. My Ministry has offered the 11 original permit holders the option of operating lock-up stalls at selected hawker centres in the city area at subsidised rental rates after the closure of the SRHZ. Rental will be waived for the first year and a 50 per cent rebate off the subsidised rent will be given for the second year on a goodwill basis. Five of them have so far indicated interest to take up this offer.

4. The Social Service Offices (SSOs) and the Workforce Singapore (WSG) have also offered to facilitate financial assistance and provide employment services to the 11 original permit holders should they wish to exit the trade. So far, one of them has been granted financial assistance. Further engagements between the SSOs and some of the remaining permit holders are ongoing.

5. The Government will also reach out to the other users at the SRHZ who are not original permit holders in the coming months to share information on the financial and employment assistance available under existing Government schemes, as well as channels through which they can continue their trade should they wish to do so.

Question by Assoc Prof Randolph Tan:

To ask the Minister for the Environment and Water Resources whether there are schemes targeted for hawker stall operators and their workers to get temporary job placement or training when their hawker centres are closed for extended periods for repairs and renovation works.

Reply by Minister Masagos Zulkifli:

As part of the maintenance of hawker centres, cyclical repairs and redecorations (R&R) works are carried out by the National Environment Agency (NEA) or the respective Town Councils every five to seven years. During such works, the centres may be closed for up to three months.

2. Stall-holders who are unable to operate their stalls due to the closure of the centres are usually granted rental remission for the duration of the closure due to the R&R works. Stall-holders who wish to take the opportunity to attend training can apply for courses and training grants through the SkillsFuture Singapore. Those who wish to explore temporary employment may also visit the Workforce Singapore's career centres or its online job matching portal, Jobs Bank, for employment assistance.

3. NEA will set up a one-stop Information and Service Centre for hawkers in the second half of this year. The centre will, among other services, provide information on training courses on the hawker trade. Hawkers and their hawker assistants who are interested in attending such courses may visit the centre to obtain more information.

Question by Er Dr Lee Bee Wah:

To ask the Minister for the Environment and Water Resources (a) in the last three years, what percentage of companies in our industrial and commercial sectors are actively engaged in waste management and recycling; (b) what percentage of households are engaged in recycling; and (c) what measures are in place to improve the recycling rates for companies and households.

Reply by Minister:

The recycling performance of the domestic and non-domestic sectors are key indicators which are tracked by my Ministry. In 2016, the non-domestic sector (comprising industrial and commercial premises) recycled 76% of its waste while the domestic sector (comprising households and trade premises) recycled 21% of its waste.

2 We have set ambitious recycling targets to be achieved by 2030. In addition to an overall recycling rate of 70%, we aim to reach a non-domestic recycling rate of 81% and a domestic recycling rate of 30%.

3 The non-domestic sector has shown consistently higher recycling rates. The National Environment Agency (NEA) works closely with companies to implement waste reduction and recycling programmes. For example, under the mandatory waste reporting initiative, large hotels with more than 200 rooms and shopping malls with net lettable areas of more than 50,000 square feet are required to submit annual waste data and waste reduction plans. Based on the reports received, NEA engages the building managers of these premises on how to better manage their waste streams.

4 NEA also works with stakeholders to develop and update 3R guidebooks for different industry sectors. These step-by-step guidebooks are accessible on the NEA website. Regular engagement is also done with the industry to promote adoption of 3R practices.

5 Our domestic recycling rate has remained at around 20% in the last few years. Our approach to improve the recycling rate for households is to make recycling more convenient and to raise awareness on recycling. Currently, every HDB block and private landed property is provided with a recycling bin while condominiums are mandated to provide recycling receptacles. To further enhance the recycling infrastructure, all new HDB Build-to-Order flats launched since 2014 are installed with dual chutes for refuse and recyclables. As announced earlier, the provision of recycling chutes will be extended to private residential developments. Buildings taller than four storeys in all new non-landed private residential developments will be required to install dual chutes for refuse and recyclables from 1 April 2018. This will make recycling as convenient as refuse disposal for households.

6 However, infrastructure provision alone is not enough, and we need everyone to make recycling a habit. To raise awareness on recycling, NEA provides information on proper recycling habits on its website and the myENV mobile app. A '3R' video for households is also available on Youtube. NEA also works with schools and other community partners on public education programmes to promote recycling habits in households.

Question by Ms Sylvia Lim:

To ask the Minister for the Environment and Water Resources whether the Government will build a wet market and hawker centre at Upper Serangoon Crescent or its vicinity in view of the new housing developments in the area.

Reply by Minister:

The National Environment Agency (NEA) takes into account several factors in the siting of new hawker centres and markets, such as the location of existing facilities, the availability of suitable land for new sites, and the population of the town.

2 There are currently eating establishments and commercial facilities in the vicinity of Upper Serangoon Crescent. In particular, there are wet markets in Rivervale Plaza and market produce shops in Hougang Central. There are also 2 hawker centres with wet markets located at Block 209 Hougang Street 21 (Kovan Market and Food Centre) and Block 105 Hougang Ave 1, as well as a hawker centre located at 51 Hougang Ave 9 (Ci Yuan Hawker Centre) which was opened in 2015. There are no plans to build a hawker centre nor wet market in Upper Serangoon Crescent. Notwithstanding this, we review the need for new hawker centres to serve new housing developments regularly.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) since the list of non-smoking areas was extended to include common corridors, void decks, sheltered link ways and parks, how many smokers have been caught for violating the non-smoking law; (b) what are the penalties imposed; and (c) whether the Ministry is stepping up its enforcement action.

Answer by Minister Masagos Zulkifli:

My Ministry's long term goal is to prohibit smoking in all public places except at designated smoking areas. This is to protect non-smokers from the harmful health effects of second-hand tobacco smoke.

2 In 2013, the smoking prohibition was extended to sheltered walkways and linkways, and common areas within any residential premises or buildings, including common corridors, staircases and stairwells of HDB and private residential buildings. Last year, the smoking prohibition was extended to neighbourhood parks within residential estates and those under the purview of the Jurong Town Corporation. Those who are caught smoking in areas where smoking is prohibited are liable to a maximum court fine of \$1,000.

3 The National Environment Agency (NEA) conducts inspections and patrols to ensure compliance with the smoking prohibition. From 2013 to 2016, the NEA issued over 62,000 tickets for violations of the smoking prohibition at all prohibited places, with more than twice as many tickets issued in 2016 compared to 2013.

4 My Ministry will continue to take enforcement actions against those who are caught smoking in smoking prohibited areas. However, as smoking is currently prohibited in more than 32,000 premises, it is not possible for the NEA to watch over every location where smoking is prohibited. It is also unrealistic for NEA to respond immediately to a reported incident of smoking in a prohibited place, for example, before the smoker finishes his cigarette. Operators and managers of premises are required to do their part to stop patrons from smoking in smoking prohibited areas and request patrons who smoke to leave the premises.

5 I would like to urge all smokers to be considerate when smoking in public places and to smoke only in permitted areas so as not to cause disamenities to others.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) in the past two years, how many vehicles with smoky emissions have been booked; (b) how many of these vehicles are foreign-registered; and (c) how are smoky foreign vehicles checked and turned away at the Checkpoints.

Answer:

1 The National Environment Agency (NEA) conducts daily enforcement operations against smoky vehicles at both the Woodlands and Tuas checkpoints, as well as along major roads in Singapore. In 2015 and 2016, a total of 16,755 smoky vehicles were fined. Out of these, 6,339 smoky vehicles were foreign-registered.

2 Smoky foreign vehicles spotted entering Singapore will be stopped for a 'free acceleration' smoke test. Drivers of diesel vehicles that emit smoke exceeding 40 Hartridge Smoke Units (HSU) and petrol vehicles with visible exhaust will be fined. Beyond the fine, diesel vehicles that emit excessive smoke exceeding 70 HSU will be turned back. In 2015 and 2016, 390 smoky foreign vehicles were turned back at the Checkpoints.

3 Members of the public who spot smoky vehicles are encouraged to inform NEA via their hotline (1800-2255-632), online feedback form at the NEA website or the "myEnv" mobile application.

Question by Dr Tan Wu Meng: To ask the Minister for the Environment and Water Resources (a) over the past three years, whether there is an increasing trend of eateries that have been ordered to shut down or suspend operations due to violations of the Environmental Public Health Act; and (b) what are the preventive measures that NEA will put in place to improve the compliance level of eateries with the Act.

Question by Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources (a) what is the trend of food hygiene at food courts; (b) what are some of the contributing factors to poor food hygiene in these food courts; and (c) whether there are plans to tighten their general cleanliness and hygiene given the reports of cockroach and rat problems at some food courts.

Answer by SMS Dr Amy Khor:

The National Environment Agency (NEA) currently licenses more than 37,000 food retail establishments, including restaurants, food kiosks, caterers and food-stalls within hawker centres, coffeeshops and food courts, to ensure that the food sold is prepared hygienically and safe for consumption.

2. NEA conducts regular inspections of food retail establishments to ensure compliance with hygiene standards and takes enforcement actions against establishments that do not practise proper food hygiene. Common hygiene-related infringements include failing to register food-handlers, selling food that is unclean and failing to keep the premises clean or free of pest infestation. Licensees are liable for a maximum fine of \$2,000 upon conviction of such offences. They are also awarded demerit points for each offence committed and upon accumulating 12 demerit points within a 12-month period, their licences will be suspended for 2 weeks as an additional penalty. Recalcitrant licensees may have their licences cancelled.

3. In 2016, NEA carried out more than 148,000 inspections and over 3,200 enforcement actions were taken against food retail establishments, an increase from around 2,500 in 2013. About a third of the enforcement actions were taken against stalls in food courts, coffeeshops or canteens. Correspondingly, the number of licences that were suspended increased from 62 in 2013 to 132 in 2016. Of the 132 licences suspended in 2016, 60 involved stalls in food courts, coffeeshops and canteens, up from 14 in 2013. Meanwhile, the food poisoning incidence rate at food retail establishments had remained low, being consistently maintained at 3.2 food poisoning outbreaks per 1,000 food retail establishments or below since 2013. This means that 0.32% or less of the food retail establishments were implicated in food poisoning outbreaks each year. This suggests that the systems put in place were effective deterrents against poor food hygiene practices. Nonetheless, we cannot be complacent and must continue to maintain our strict stance on food safety.

4. NEA has implemented programmes such as the Food Hygiene Officer (FHO) Scheme for restaurants, food courts, school canteens and caterers and the Food Safety Management System (FSMS) for caterers. These programmes are aimed at ensuring that operators of food retail establishments put in place preventive measures to maintain a high standard of food and personal hygiene among food-handlers as well as to upkeep the cleanliness of the premises.

5. NEA officers educate operators on proper food hygiene practices during inspections. In addition, NEA carries out outreach and educational programmes, such as the “My Eatery Shines” programme in the South-West district and the “Good Refuse Management in Food Shops” and “CLEAN Food Everyday – Food Caterers” programmes in the North-West district. Through these programmes, NEA works with operators and stall owners to improve their cleaning and refuse management regimes, and partners the grassroots organisations to educate the public on keeping foodshops clean.

6. Members of the public can check the individual food retail establishments’ hygiene records and suspension records by visiting the NEA website, using the myENV mobile application or scanning the QR code on the licences displayed at the food retail establishments. Members of the public who come across poor hygiene practices in food retail establishments can contact the NEA’s 24-hour Call Centre to provide information for NEA’s investigation.

Question by Miss Cheryl Chan Wei Ling: To ask the Minister for the Environment and Water Resources (a) what is the rationale for NEA's requirement for cleaning of the compactor at bin centres to be set at once a month; (b) whether this cleaning frequency is sufficient especially for bin centres near hawker centres; and (c) whether the Ministry is introducing technology to assist cleaning contractors in managing the hygiene of the bin centres.

Answer by Minister Masagos Zulkifli:

- 1 The National Environment Agency (NEA) does not set specific requirements for the cleaning of compactors at bin centres. However, our public waste collectors send the compactors to their depots for maintenance and cleaning once a month to ensure that the equipment is in good working condition and maintained in a clean and presentable state.
- 2 In addition to the monthly cleaning of the compactors by the public waste collectors, all premises owners are responsible under the Environmental Public Health (Public Cleansing) Regulations for ensuring that their refuse bin centres are kept in a clean and sanitary condition and in good repair. For example, most Town Council cleaners practise daily cleaning of the external surfaces of the compactors. In addition, the cleaning contractors of all hawker centres owned by my Ministry are contractually required to clean the refuse bin centres daily. Similar arrangements are also adopted by the Town Councils for hawker centres owned by the Housing and Development Board.
- 3 To ensure better management of the hygiene of bin centres, the NEA is working with the cleaning industry to encourage greater use of technology to enhance the productivity and effectiveness of cleaners.

Question by Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources (a) what are the results of the tender called in August 2016 to study the life-cycle assessment and environmental impact of disposable food packaging; and (b) whether the quantity of disposable food packaging used has increased in the last three years.

Reply by Minister Masagos Zulkifli:

1 The National Environment Agency (NEA) awarded the study on how different types of disposable food packaging materials compare in terms of cost and environmental impact in September 2016. The study is expected to conclude in the second half of 2017.

2 Between 2014 and 2016, the amount of domestic waste disposed of in Singapore was around 1.7 million tonnes per year, of which about one-third was packaging waste. Packaging waste includes disposable food packaging. Though the amount of packaging waste disposed of has remained fairly constant over the past few years, the amount may increase with population and economic growth.

3 My Ministry manages the impact of plastic packaging on the environment through the safe incineration of waste rather than direct landfilling. However, it is important that we also continue to make progress on measures to reduce packaging waste.

4 While my Ministry recognises that plastic bags and disposable takeaway containers are frequently used out of convenience, we strongly encourage businesses to reduce excessive usage and consumers to use their own reusable bags and takeaway food carriers. Doing so would help conserve valuable resources and reduce the overall waste volume.

5 We will continue to work with manufacturers, retailers and environmental groups to encourage consumers to reduce the use of disposable food packaging. More recently, for new hawker centres such as at Our Tampines Hub, Pasir Ris and Yishun, we have taken the additional step of disallowing the use of disposables for dining in at these hawker centres. We will look into more ways to reduce the use of disposable food packaging based on the results of the ongoing study.

Question by Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources (a) what measures and regulations are in place to prevent pest control companies from placing and using hazardous bait, such as poison, in such a way that the safety of other wildlife and vulnerable members of public could be harmed; and (b) whether the Ministry can enforce stronger rules to prevent the indiscriminate use of pest poisons. 25

Reply by Minister Masagos Zulkifli:

- 1 Vector control operators are regulated by the National Environment Agency (NEA) under the Control of Vectors and Pesticides Act (CVPA). All personnel involved in vector control work have to undergo mandatory training in the safe handling and use of pesticides before they are licensed or certified by the NEA. For instance, vector control personnel are trained to only dispense rat bait in rat burrows or in tamper-proof bait stations which other animals cannot easily access.
- 2 Apart from regulating vector control operators, the NEA also regulates the use of pesticides to ensure that they do not pose any public health concerns. NEA's evaluation of pesticides is done in accordance with the World Health Organization Pesticide Evaluation Scheme (WHOPES) and only pesticides that are approved for use by the NEA can be sold in Singapore after they are registered, labelled and classified properly.
- 3 My Ministry takes a serious view of the indiscriminate use of pesticides and will take enforcement action against any vector control operator and vector control personnel who infringe the regulations. Any person caught conducting vector control work without a licence shall be liable for a court fine of up to \$20,000 or imprisonment for up to three months, or both. The NEA may also suspend or cancel the registration of any vector control operator or the licence of any vector control personnel in cases where there are serious breaches of its licensing conditions.
- 4 These penalties have proved to be a sufficient deterrence. Over the past five years, there have only been six incidents that required enforcement actions to be taken against vector control operators or personnel. Hence, there is no need to put in place stiffer penalties to prevent the indiscriminate use of pesticides.

Question by Mr Darryl David: To ask the Minister for the Environment and Water Resources what safeguards does the NEA have to ensure that recycling companies contracted to remove and treat recyclable waste actually adhere to the proper recycling protocols and procedures.

Reply by Minister Masagos Zulkifli:

1 Under the National Recycling Programme (NRP), public waste collectors (PWCs) are required to provide a blue co-mingled recycling bin at every HDB block and landed residential property.

2 The PWCs are contractually required by the National Environment Agency (NEA) to ensure that the recyclables in the blue bins are properly collected and sent for recycling. These requirements include the use of dedicated trucks to collect recyclables separately from general waste and marking these trucks accordingly.

3 The NEA monitors the recycling trucks to ensure that collected recyclables are sent to Materials Recovery Facilities, which sort the co-mingled recyclables for further processing. Each truck is equipped with a Global Positioning System (GPS), and Radio-Frequency Identification (RFID) technology is used to record collection from individual bins. As a further safeguard, these recycling trucks are prohibited from entering the incineration plants, where general refuse is disposed of.

4 The NEA imposes financial penalties on the PWCs if they fail to meet contractual requirements, including failing to collect recyclables according to schedule and failing to collect recyclables using a separate dedicated vehicle.

Question by Assoc Prof Fatimah Lateef: To ask the Minister for the Environment and Water Resources whether regulations for trade fairs and their licensing will be reviewed and updated.

Reply by Minister Masagos Zulkifli:

1 Under the Environmental Public Health Act (EPHA), no one is allowed to stage any temporary fair without first obtaining a permit from the National Environment Agency (NEA). This is to ensure that all fair operators put in place measures to address potential public disamenities and public health concerns such as cleanliness, food hygiene and waste management. For example, fair operators must have contracts with a licensed cleaning contractor to clean the fair site and a licensed waste collector to ensure adequate waste collection arrangements while proper supporting facilities such as washing facilities must be provided for food-stalls. The fair operator is also required to obtain written approvals from the relevant Government agencies and landowners. In addition, the fair operator is responsible for ensuring that the fair operates within the period that it is licensed and that the set-up of the stalls within the fair is in accordance with the approved layout.

2 Besides issuing permits to the fair operators, the NEA licenses the individual operators of the food-stalls in temporary fairs to ensure that the food sold is prepared hygienically and safe for consumption. All food-handlers need to be registered with NEA and pass the mandatory Basic Food Hygiene Course (BFHC).

3 NEA will take firm enforcement action, including the cancellation of food-stall licences, against anyone found in violation of the EPHA.

4 Our schemes and policies are regularly reviewed to ensure their relevance. I would like to assure the Member that we monitor the situation closely and will introduce regulatory changes, if need be, to safeguard the environment and ensure public health.

Question by Mr Kok Heng Leun: To ask the Minister for the Environment and Water Resources after the closure of the Sungei Road flea market, how will the Ministry engage and monitor the mental health of the elderly vendors who are displaced after losing their stalls and livelihood.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) whether the Government will reconsider its decision not to provide a replacement site for the Sungei Road Hawking Zone (SRHZ); and (b) whether an update can be provided on the help given to the vendors and whether any additional help will be given to vendors after the closure of the SRHZ.

Reply by SMS Dr Amy Khor:

1. Street hawking, or the peddling of goods on the streets, was common in Singapore several decades ago. If you look at old photos of street hawking, you can see the poor hygiene conditions, the pollution of waterways, the piles of waste that attracted pests, the potential fire hazards and the obstruction to traffic that resulted in disamenities to the residents at such localities. The Government thus undertook to relocate the street hawkers to purpose-built hawker centres and markets. Many street hawkers had made the transition well, making use of the sheltered facilities to sell their goods and going on to expand their offerings.
2. However, not all the street hawkers were resettled and 31 rag-and-bone men were given permits to continue their trade at the Sungei Road site in view of their chosen trade. In 2000, when their permits expired, the site was designated as the Sungei Road Hawking Zone (SRHZ). Only 11 of the 31 original permit holders still remain today.
3. Through the years, many others have taken the opportunity to peddle their goods for free at the SRHZ. However, the activities of the SRHZ have resulted in disamenities such as the obstruction of roads and the storage of goods in surrounding areas including the nearby drains and housing estate, posing risks to public health and incurring additional public resources for the upkeep of the public areas.
4. Despite this, we have continued to allow the SRHZ to remain in operation for as long as we could, even though the area has been zoned for residential use. In fact, when the Jalan Besar MRT station was being constructed in 2011, instead of removing the whole SRHZ, the size of the SRHZ was reduced as required, so that the SRHZ could continue to stay open.
5. We understand that the SRHZ holds memories for some Singaporeans. The National Heritage Board (NHB), therefore, conducted research and documentation to preserve the memories of the site for future generations. A virtual tour of the site as well as other resources are available on the NHB's heritage portal, roots.sg. Singaporeans have also contributed their personal stories, photographs and videos on social media.
6. Since 2012, we have informed the Association for the Recycling of Second Hand Goods that notice would be given to the users of the SRHZ to cease their operations once the development plans for the Sungei Road area are confirmed. This was also mentioned in this House in 2012. Now that the site where the SRHZ is located is required by the Ministry of National Development (MND) for ground preparation works to facilitate future public residential development, the last day of operations at the SRHZ will be 10 July 2017.
7. We note that there are calls, including a Petition presented earlier by the member, Mr Kok Heng Leun, for the SRHZ to be relocated. Indeed, SRHZ users who wish to continue their trade can do so at appropriate venues such as hawker centres, where there are better facilities and necessary amenities for users to conduct their businesses, or at existing flea markets, where these activities can be properly managed. This is similar to how street hawkers in the past have moved on to purpose-built hawker centres and markets.
8. Users may also take advantage of the opportunities that these new business locations present. For example, Mdm Tan Guo Mei, who was featured in the news recently, took the opportunity when she moved to a lock-up stall at a hawker centre to expand her offerings to include new goods which she can sell at all times and not be exposed to the weather elements. Other SRHZ users who have taken up such stalls have also indicated that they intend to move on to also sell new items such as shoes and accessories, beyond the second-hand items that they used to sell.

9. The National Environment Agency (NEA) has set aside more than 40 lock-up stalls at hawker centres for those SRHZ users who wish to carry on their trade. To assist them in their transition, we have offered the 11 original permit holders a 100 percent rental rebate for the first year and a 50 percent rental rebate for the 2nd year. For all other users, we have offered a 50 percent rental rebate for the first 2 years on a goodwill basis, provided they live in public housing and do not own more than one property. So far 29 SRHZ users have been allocated a lock-up stall. Many of these stalls are clustered at two popular hawker centres not too far from the SRHZ – the Chinatown Market and the Golden Mile Food Centre. The Hawkers' Associations at these two centres have invited the SRHZ users who have taken up stalls there to join them, which is an important step to help the users integrate into the local hawker centre community. To further assist these SRHZ users in their transition to the new business environment, the NEA will facilitate training for those interested in getting tips on merchandising and display of their items for sale. The NEA has also put out information on their new business locations so that the SRHZ users' clientele and those who wish to buy second-hand goods can go to these locations after the SRHZ closes.

10. Today, the sale of second hand goods in Singapore is not limited to the SRHZ. Nor does it have to be done solely in hawker centres. For example, in some existing flea markets such as at that at Kreta Ayer, which have been in existence for some 15 years, there have always been vendors who sell second hand goods. We also recognise that some of the users would prefer not to operate daily and wish to sell their goods at flea markets instead of operating a lock-up stall. To this end, the NEA has worked with the People's Association (PA) and the Central Singapore Community Development Council (CDC) to assist the SRHZ users to tap on existing flea markets. So far, 16 SRHZ users have applied for stalls at flea markets at various locations, including those near their homes. A majority of those who have chosen to continue their trade at flea markets have, in fact, moved to the Kreta Ayer flea market which is located between Block 4 Sago Lane and Chinatown Complex.

11. I note that there have also been calls for the Government to engage the users of the SRHZ more deeply. I would like to take this opportunity to share that we have indeed been doing so. Over the past few months, the NEA has been working with the Ministry of Social and Family Development (MSF), the Workforce Singapore (WSG) and Central Singapore CDC to proactively engage the SRHZ users on site, as well as off-site, to offer various forms of assistance after the closure of the site.

12. Besides assistance with getting stalls at hawker centres and flea markets, the WSG has been providing job placement assistance to the SRHZ users who wish to seek employment. The MSF and the Central Singapore CDC have also been actively helping those who require financial assistance to get financial help through the ComCare scheme and other schemes. So far, 18 out of 23 individuals who applied for financial assistance are assessed to be eligible and have received financial assistance. For example, one of them is a 61-year old man who is receiving assistance while he makes the transition to his new job as a cleaner at a primary school.

13. All in, the agencies have engaged about 200 users of the SRHZ, most of whom are between the ages of 40 and 65. All SRHZ users who are in need of help and have come forward are being assisted. More than 60 of them are now receiving some form of Government assistance including those who have been allocated stalls. Another 70 or so had earlier indicated interest to receive assistance. However, they have not yet come forward to apply as many of them have indicated that they will decide on their future plans only after the closure of the SRHZ. More than 80 SRHZ users, however, have told us that they do not require any assistance after the closure of the SRHZ. This is because they are able to support themselves, or their families can support them, or they have full-time jobs elsewhere. Some have shared that they have been plying their trade at the SRHZ as a hobby occasionally on the weekends and will discontinue doing that once the SRHZ closes.

14. Besides the assistance given by the Government agencies, many Grassroots Advisers and community leaders have also been visiting the SRHZ users residing in their constituencies on a one-on-one basis in their homes, to see if they require further community assistance. Those in need have been offered community support such as job referrals and financial help to tide them over the transitional period. Others have also been encouraged to join the health and wellness programmes organised by their Residents' Committee (RC) as a good way to stay active after the closure of the SRHZ.

15. We would like to thank all who have given their views and suggestions in support of the SRHZ users. I would like to assure members of the House that my ministry will continue to work with the relevant agencies to engage and support the SRHZ users through their transition, and ensure that necessary help is rendered

to them even after the closure of the SRHZ. We also encourage the community to continue to support the SRHZ users, for example by patronising their stalls in the hawker centres and the markets.

Question by Mr Gan Thiam Poh: To ask the Minister for the Environment and Water Resources (a) what is the current number of vacant hawker stalls managed by NEA; (b) what are the latest average, lowest and highest successful tender prices for NEA hawker stalls in the last 3 years; and (c) whether NEA can consider allocating hawker stalls based on the prevailing rental rate in a particular hawker centre/market managed by NEA to families receiving financial assistance and retrenched persons who are prepared to run their own business.

Reply by SMS Dr Amy Khor:

1 As of 1 May 2017, there were over 6,000 cooked food stalls in the hawker centres owned by the Government. About 97% of them were occupied; this is the consistent average occupancy rate for the past 5 years.

2 The average successful tender bid for our cooked food stalls over the last 3 years is \$1,370 per month. The lowest bid was \$1 while the highest bid was \$4,888. This excludes a recent exceptional case where there was a successful \$10,000 bid for a stall at the People's Park hawker centre but the bidder terminated his tenancy even before he started operations.

3 At my Ministry's Committee of Supply debate last year, I shared with the member Mr Gan Thiam Poh the background of our termination in 1990 of our previous policy of allocating available vacant hawker stalls to those in financial hardship. I explained at the time that the take-up rate had consistently been very low and, moreover, most of the applicants had rejected our offered stalls and preferred to wait for a vacancy in the more popular hawker centres.

4 There are, therefore, no grounds to reinstate this policy nor allocate hawker stalls at market rents to only those who are retrenched or require financial assistance. Like any other self-employed person, a hawker can sustain his business successfully if he is disciplined and has the required skills and not simply because he is in need of a job. Those who are genuinely interested in the hawker trade are welcome to bid for any of the vacant stalls which the National Environment Agency (NEA) puts out for tender every month. Those who are in need of financial or other types of employment assistance may wish to seek the assistance of the Ministry of Social and Family Development or the Workforce Singapore respectively.

Question by Mr Gan Thiam Poh: To ask the Minister for the Environment and Water Resources whether the Ministry will (i) consider further measures to ban smoking at open windows of residential properties and (ii) review and mandate the provision of closed smoking rooms in residential properties for smokers to smoke so as not to affect non-smoking residents.

Answer by Minister Masagos Zulkifli:

1. My Ministry's long-term goal is to prohibit smoking in all public areas except at designated smoking areas to protect non-smokers from the harmful health effects of second-hand tobacco smoke.

Over the years, my Ministry has progressively extended the smoking prohibition to more public areas. In 2013, the smoking prohibition was extended to the common areas in residential buildings, including common corridors, covered walkways, lift lobbies and stairwells.

2. Our regulatory ambit does not extend to prohibiting smoking within one's own residential property. At the Parliament sitting in August last year, we had informed the Member that smoking within one's residential property, which is a private space, is not prohibited and beyond the Government's jurisdiction. The Government has no plans to mandate the provision of closed smoking rooms in residential properties. In this respect, we encourage smokers to be socially responsible and considerate when smoking so that their neighbours living in close proximity would not be affected by the wafting of second-hand smoke.

3. Residents who are affected by the wafting of second-hand tobacco smoke from their neighbour's residences should try to reach out to them to resolve the issues amicably. Residents can also approach the Community Mediation Centre for assistance.

Question by Dr Lim Wee Kiak: To ask the Minister for the Environment and Water Resources (a) whether the Ministry has done any follow-up to verify reported sightings of crocodiles in Sembawang; (b) how many of such sightings have been confirmed by the Ministry over the past 12 months; and (c) when the sightings are verified, whether there are plans to trap and relocate these crocodiles.

Answer by Minister Masagos Zulkifli:

1. I thank Dr Lim Wee Kiak for his question regarding the crocodile sightings in Sembawang.
2. PUB was first alerted to a crocodile sighting in Sungei Sembawang, on 10 March 2017. Follow-up inspections at the reported location were conducted together with AVA to confirm the sightings. However, during the joint-inspections, AVA and PUB did not spot any crocodile in the area. There are safety railings and "do-not-enter" warning signs installed along Sungei Sembawang to deter people from entering the waterway. As an additional precaution, PUB is installing wire mesh at the lower rungs of the railings at the reported location to act as a physical barrier between the water and the footpath. This will be completed by end August.
3. Before this recent spate of sightings at Sungei Sembawang, there have been four confirmed sightings in our reservoirs over the past five years. Currently, the crocodile has stayed within the waterway. Nevertheless, we are monitoring the situation with AVA and we will take steps to trap and relocate it, should the reptile venture outside its inland habitat. Notwithstanding this, should members of the public encounter a crocodile, they should remain calm and keep a safe distance away from it. Public are reminded to not approach, provoke or feed the animal. They should also not enter the waterways at all times

Question by Dr Ang Hin Kee: To ask the Minister for the Environment and Water Resources whether the Ministry will consider requiring all public buses to be electric buses or to convert transport vehicles procured by the Government to run on electric energy.

Answer by Minister Masagos Zulkifli:

1. Vehicles are one of the key local sources of air pollutants including Particulate Matter (PM) and Nitrogen Oxides (NOx) which may cause lung cancer and chronic respiratory symptoms over the longer term. My Ministry commissioned a study last year to identify cleaner vehicular technologies suitable for Singapore, especially as alternatives to diesel vehicles. One of the findings of the study was that electrification was promising for many vehicle types, including buses. However, the study also surfaced the challenges including higher costs, reduced carrying capacity, long charging times, limited travel range and disposal of used batteries.
2. To assess the feasibility of larger-scale deployment of alternative energy buses in Singapore, the Land Transport Authority (LTA) will be conducting trials of 50 hybrid and 60 electric buses over the next two years.
3. Meanwhile, my Ministry is studying the feasibility of requiring Government agencies to use greener vehicles for their operations. We are currently evaluating the costs and the environmental impact of the different options available, including that of electric vehicles.

Question by Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources what percentage of food waste generated is due to the throwing away of surplus food and whether the Ministry will drive and fund sharing economy solutions, such as online platforms allowing businesses and institutions to better procure surplus food, to tackle our food waste problem.

Question by Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources whether a form of Good Samaritan Law for food can be introduced so as to reduce the 790,000 tonnes of food that goes to waste in Singapore each year.

Answer by Minister Masagos Zulkifli:

1. Food waste is a waste stream of concern to my Ministry. In 2016, food waste comprised 10% of total waste generated in Singapore. This includes both avoidable and unavoidable food waste, such as peels, bones and shells.
2. My Ministry is studying the various sources of our food waste to get a breakdown of this figure. In 2015, the National Environment Agency (NEA) launched a study on waste disposed of by households to better understand the mix of avoidable and unavoidable food waste. We are currently analysing the data that has been collected. A similar study on waste disposed of at commercial premises such as food manufacturers, hotels and malls will commence later this year.
3. One strategy to manage food waste is to encourage the redistribution of surplus food. The National Environment Agency (NEA) and the Agri-Food & Veterinary Authority (AVA) launched a guidebook last year to help food retail establishments develop food waste minimisation plans. The guidebook includes guidelines on the proper handling and re-distribution of excess food. Similar guidebooks will also be developed for food manufacturing establishments and supermarkets.
4. The private and people sectors have also developed initiatives which complement the Government's efforts. For example, the "11th Hour" App matches businesses with unsold food with consumers looking for last-minute deals. We are open to other ideas which could address unmet needs. Individuals or organisations with ideas can consider applying for funding under the NEA's Call for Ideas Fund.
5. My Ministry will study the possibility of Good Samaritan laws in Singapore with relevant agencies such as the Ministry of National Development and AVA. Such provisions which are present in countries such as the United States and Canada can provide greater clarity to potential donors of excess food.

6. At the same time, my Ministry is mindful of the need to ensure that any food donated is fit for consumption. We thus need to strike a balance to ensure that food donors and food distributors exercise due care and practise good hygiene when distributing donated food. We will continue to work closely with our partner agencies on relevant measures to better manage food waste.

Question by Ms Tin Pei Ling: To ask the Minister for the Environment and Water Resources (a) what is the frequency of sweeping and cleaning of public areas, including along the roads, highways and drains, that are under the charge of NEA; (b) whether the frequency can be increased; and (c) what are the challenges to be faced if the frequency cannot be increased.

Answer by Minister Masagos Zulkifli:

1. The National Environment Agency (NEA) oversees the cleanliness of public areas in Singapore. The frequency of cleaning depends on the cleaning needs of the area. Generally, the public areas including the roads and highways are cleaned by NEA's cleaning contractors at least three times a week. Public areas with high human traffic can be cleaned as frequently as every hour if necessary. All open drains are cleaned at the same frequency as the respective adjoining public areas.

2. The NEA has put in place a system of regular audit checks to monitor the performance of the cleaning contractors. Besides physically inspecting the work of the contractors, the NEA officers also use technology to assess the performance of the cleaning contractors such as through sensors or cameras mounted on cleaning vehicles. Where there are service lapses, the cleaning contractors will be issued demerit points that translate into financial penalties.

3. While the Government will continue to ensure the effectiveness of the cleaning services, it is not practical nor sustainable to constantly increase the number of cleaners or the cleaning frequency to keep public places clean. The NEA and the Public Hygiene Council, together with partners such as the Singapore Kindness Movement, have been working closely to encourage everyone to take greater ownership of our environment and establish social norms to keep our public spaces clean. Public cleanliness is a shared responsibility and it is only through our collective efforts that we can have a truly clean Singapore.

Question by Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) what are the reasons for the infestation of mayflies at certain blocks of flats in Nee Soon South; (b) how can NEA help to put a stop to it; and (c) how long will the eradication measures take to produce tangible results.

Answer by Minister Masagos Zulkifli:

1. Mayflies are a type of small flying insects that are found in freshwater streams, rivers and reservoirs. They are not vectors that is they neither bite nor transmit diseases. In fact, mayflies are universally recognised as indicators of good water quality. They are also key for a balanced ecosystem as they are food for a variety of animals who live in our reservoirs. Mayfly larvae can only live in clean and clear water and they emerge from the water when they are adults to mate for a very short period of time. While mayflies can be found in all our reservoirs, they have been particularly abundant in Lower Seletar Reservoir.
2. PUB receives a handful of feedback through the year (December-March and July-September) on the emergence of mayflies around the HDB blocks in Nee Soon South near Lower Seletar Reservoir. Their emergence is seasonal and lasts for a short period of time, about one to two weeks, as each adult can only live for a few days. While mayflies may be an occasional nuisance, they are harmless insects that occur naturally in areas around our reservoirs.
3. PUB has provided advice to residents who wish to take measures to prevent mayflies from entering their homes. These include switching off their lights when not in use as mayflies are attracted to light, installing insect screens at their windows or drawing their curtains, if needed. PUB has been carrying out regular checks around Lower Seletar Reservoir to monitor the counts of mayflies. Routine fogging for general pest control and mosquito control are carried out around the reservoir grounds and this routine fogging will also kill mayflies.
4. I would like to once again assure members and residents of Nee Soon South that mayflies are harmless insects and an essential part of our natural aquatic ecosystem. Therefore, we seek residents' understanding and tolerance, should they find these harmless mayflies in their homes.

Question by Ms Joan Pereira: To ask the Minister for the Environment and Water Resources (a) whether the Ministry conducts checks on hawkers in food centres and other public areas such as Lau Pa Sat on a regular basis to ensure that there is no touting; and (b) what are the consequences when hawkers and their assistants are found to be doing so.

Answer by Minister Mr Masagos Zulkifli:

1. The National Environment Agency (NEA) does not have the mandate to enforce against touting in privately-managed food centres such as Lau Pa Sat, coffee-shops or foodcourts in shopping malls.
2. However, in the 110 hawker centres owned and managed by the Government, touting is expressly disallowed and NEA officers will keep a lookout for touting activities during their inspections. Those hawkers and hawker assistants who are found touting and harassing customers could have their tenancies terminated. Members of the public who want to provide feedback on touting in these centres can do so via the NEA's website, the myENV mobile application and the NEA 24-hour Call Centre.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) what are the factors that influence the rental cost of hawker stalls; (b) aside from the tender amount, what other criteria determine the success of a tender applicant; (c) what is being done to keep monthly rentals of hawker stalls more affordable; and (d) why do Yishun Park Hawker Centre tenderers have to pay at least twice the average bid to get a stall.

Answer by Minister Masagos Zulkifli:

1. The Government lets out hawker stalls to interested Singaporeans and Permanent Residents through open tenders. A hawker stall is awarded based on the bid amount and the proposed food to be sold which, in turn, has to comply with the designated trade for that stall as indicated in the tender notice. For example, if a cooked food stall is designated as a “Halal Cooked Food” stall, a bidder who proposes to sell drinks would not be successful, regardless of the bid amount.
2. The amount that an applicant bids for a hawker stall would likely be influenced by factors such as the location and condition of the hawker centre, stall size, the applicant’s assessment of the potential business volume of the stall as well as previous successful bid amounts at the hawker centre.
3. To moderate stall rents, we have introduced key policy changes since 2012, such as disallowing stall assignment and subletting to prevent stall owners who have no intention of operating the stalls themselves from engaging in rent seeking behaviour. In addition, we removed the concept of reserve rent to allow the rentals to fully reflect the market demand for the stalls. Since the removal of the reserve rent in 2012, about 53% of the tendered cooked food stalls were awarded at below what the reserve rent would have been. On the whole, more than 85% of our hawkers pay less than \$1,500 per month in stall rent. This is generally lower than stall rents in coffee shops or food courts in comparable locations.
4. The Yishun Park Hawker Centre is a new hawker centre which will be managed by the Timbre+ Hawkers Pte Ltd on a not-for-profit basis. The managing agent was selected following the evaluation of the proposals received for the management of this centre. The evaluation was based on a matrix of price and qualitative criteria to deliver value to both patrons and hawkers. Among the qualitative evaluation criteria are the costs that potential stall-holders will pay as well as the ideas to keep food prices affordable and the productivity measures to help the stall holders manage their manpower costs.
5. The rents of the Yishun Park Hawker Centre are also comparable to other new hawker centres. Timbre will select the stall-holders based on a set of evaluation criteria, which are the stall applicant’s food type, the food taste and quality, the price of the food and their online presence.
6. The Government will continue to work closely with Timbre to ensure that the Yishun Park Hawker Centre meets the needs of the residents in providing affordable and hygienic food.

Question by Mr Kok Heng Leun: To ask the Minister for the Environment and Water Resources (a) whether he can provide an update on the number of Sungei Road flea market vendors who have received assistance from the Government or have moved into new stalls to date; (b) how many of the vendors who have been allocated new stalls are still in business; and (c) for those who have stopped operating at these new stalls, what are the reasons for the closure of the stalls.

Answer by Minister Masagos Zulkifli:

1. Prior to the closure of the Sungei Road Hawking Zone (SRHZ) on 10 July 2017, the National Environment Agency (NEA), Ministry of Social and Family Development (MSF), Workforce Singapore (WSG) and the Central Singapore Community Development Council (CSCDC) had engaged about 200 SRHZ users to offer them assistance so that they can either continue their trade at alternative venues or make a living through other means. To date, close to 80 SRHZ users are now receiving some form of assistance even as they make the necessary adjustments.

2. At the Parliament sitting on 3 Jul 2017, my Ministry shared that the NEA has set aside more than 40 lock-up stalls at our hawker centres for the SRHZ users who wished to carry on their trade. To date, more than 30 SRHZ users have taken up and commenced business at these lock-up stalls. To help them transit and succeed in their new environment, the NEA has provided rental subsidies and facilitated their participation in a course to teach them merchandise display skills and explore a new range of items for sale. The NEA has also helped to raise the awareness of the location of their stalls through banners, signage and social media posts.

3. For the 11 original permit holders, the NEA has offered them lock-up stalls at our hawker centres at subsidised rental with a full rental waiver for the 1st year and 50% subsidy off the subsidised rental for the 2nd year. Of the 11 original permit holders, 4 have taken up the offer to operate a lock-up stall at our hawker centres.

4. So far, of all the users who have taken up stalls from the NEA, only one has changed his mind and decided to give up his lock-up stall as he felt that his merchandise might be unsuitable for sale in a hawker centre.

5. In addition, the NEA has also worked with the People's Association (PA) and the CSCDC to assist SRHZ users who wish to operate in flea markets. So far, 27 SRHZ users have taken up stalls at existing flea markets around Singapore.

6. Besides the provision of lock-up stalls at our hawker centres and flea markets, the WSG has provided job placement assistance to SRHZ users who wish to seek employment. The MSF and the CSCDC have also actively helped those who require financial assistance through the ComCare and other schemes. So far, 28 SRHZ users have received either financial or job placement assistance.

7. The Government will continue to keep in contact with those SRHZ users who require assistance but have yet to accept our offers. Meanwhile, we are glad to know that a number of the SRHZ users have already started to operate stalls at trade fairs organised by private operators and that others have ventured into sales through online platforms. We hope the Member and the community will continue to lend their support to the SRHZ users at our lock-up stalls, flea markets, trade fairs or online platforms.

Question by Assoc Prof Fatimah Lateef: To ask the Minister for the Environment and Water Resources (a) in the last five years, how many construction companies have breached the rules on (i) noise levels at construction sites; (ii) dengue breeding at work sites; and (iii) causing disamenities by working on Sundays and public holidays, and (b) what proportion of these companies are recurrent offenders.

Answer:

- 1 The National Environment Agency (NEA) stipulates maximum permissible noise limits for construction sites. In September 2011, the NEA introduced the “no-work rule” whereby work activities are not permitted at construction sites located within 150 metres of residential premises and noise-sensitive premises such as hospitals and schools on Sundays and Public Holidays. In January 2017, the “no-work rule” was adjusted to permit a list of quieter works such as painting and wall plastering in such sites on Sundays and Public Holidays.
- 2 Between January 2013 and June 2017, the NEA penalised 411 construction companies for exceeding the noise limits at construction sites and 723 companies for breaching the “no-work rule”. Of these, about half were repeat offenders. The maximum penalty for violating the construction noise limits or the “no-work rule” is a court prosecution with a fine not exceeding \$40,000.
- 3 Besides enforcement, the NEA has set up a fund to encourage and incentivise the construction industry to control and reduce noise at source. The Quieter Construction Fund (QCF) provides subsidies to contractors who invest in quieter construction technologies, noise control equipment and other innovative solutions.
- 4 Construction sites with poor housekeeping are potential grounds for mosquito breeding. Over the last 5 years, the NEA carried out over 45,500 inspections of construction sites and issued more than 4,500 summonses to contractors for mosquito breeding. Over 420 court prosecutions have also been taken against errant contractors for repeat offences and more than 380 Stop Work Orders (SWOs) have been issued. The majority of these enforcement actions were taken after 2013 as a result of a tightened enforcement regime.
- 5 Notwithstanding the attention given to construction sites, many mosquito breeding sites are in fact found in homes. It is, therefore,

important for everyone, including businesses and home owners, to remain vigilant and play his part to prevent mosquito breeding.

Question by Miss Cheryl Chan Wei Ling: To ask the Minister for the Environment and Water Resources for the past three years, how effective has enforcement been in ensuring cat feeders abide with the two-hour rule of disposing any leftover cat food in public spaces.

Answer:

1. The National Environment Agency (NEA) oversees the cleanliness of public spaces in Singapore. Food left behind from the feeding of stray animals may attract pests such as cockroaches and rats and endanger public health. Containers with stagnant water also enable mosquitoes to breed.

2. Members of the public who feed stray animals without clearing the leftover food or food containers may be fined up to \$2,000 for the first offence under the Environmental Public Health Act.

3. Over the past 3 years, the NEA has received about 1,600 cases of feedback on the feeding of stray cats. In most cases, the cat feeders were compliant in clearing any leftover food within 2 hours. NEA had to proceed with enforcement action in only 2 cases where the cat feeders refused to comply with NEA's instructions to clean up after the feed.

4. NEA and the Agri-Food and Veterinary Authority of Singapore (AVA) also request Town Councils to dispose leftover food and litter to safeguard public hygiene and to put up advisories to remind their residents to clean up after feeding. In addition, both NEA and AVA will continue to work with animal welfare groups such as the Cat Welfare Society (CWS) to ensure proper stray animal feeding practices. AVA is also working with CWS to produce a community engagement handbook which includes information on responsible feeding practices. The handbook will be distributed to community cat carers and volunteers.

5. Everyone has a part to play in keeping our public spaces clean. We would like to urge all animal feeders to act responsibly and clear any leftover food or containers after feeding stray animals in our public spaces.

Question by Ms Sylvia Lim: To ask the Minister for the Environment and Water Resources what is the justification for requiring Traditional Chinese Medicine shops that sell herbal teas to obtain foodshop licences with effect from 1 October 2017.

Answer:

The National Environment Agency (NEA) regularly reviews its licensing regime as part of a continual process to improve the hygiene standards of food and drinks sold in Singapore. We recognise that many Traditional Chinese Medicine (TCM) shops have been preparing and selling herbal tea within their premises. Such food preparation activities, if not done hygienically, can pose risks to public health, such as giving rise to food poisoning. We have therefore engaged the Singapore Chinese Druggist Association and TCM shops on the proposal to license premises with on-site preparation of herbal tea and food so as to ensure the hygienic preparation of these products, strengthen food hygiene standards and give consumers greater assurance when purchasing such products.

2 The details of the enhancements to the food hygiene regime will be released in due course. The implementation date of the enhancements has not been decided and we will continue to engage the industry to ensure that the TCM shops have sufficient lead time to get ready.

Question by Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources (a) what is the outcome of the pilot installation of food waste digesters in schools; and (b) whether the Ministry will consider installing such food waste digesters in more schools and other places such as hawker centers and coffee shops to promote recycling.

Answer:

1 In April this year, the National Environment Agency (NEA) launched the 'Love Your Food @ Schools' Project to encourage schools to establish a culture of not wasting food. To complement this food waste reduction effort, NEA partnered ten schools to pilot the use of food waste digesters, and to involve them in a range of activities such as food waste segregation, educational talks on food waste, and learning journeys for neighbouring schools and community partners.

2 We have seen positive results in participating schools. For example, food waste has been reduced from 18kg to less than 10kg per day in Greendale Primary School, and from 24kg to 18kg per day in Admiralty Primary School. The pilot is expected to last two years. At the end of the pilot, we will evaluate the closed-loop food waste management programme and consider future plans for other schools.

3 My Ministry sees potential for greater use of food waste digesters. They could be deployed in hawker centres and coffee shops as the Member has suggested, or other premises such as shopping malls. However, we recognise that there are economic and practical constraints, such as the cost of the digesters and availability of space. Currently, we are conducting a pilot at Block 628 Ang Mo Kio Ave 4 Market to digest food waste generated by stallholders and patrons on-site. Under the contract for Public Waste Collection in the Pasir Ris – Bedok sector, on-site food waste treatment will be made available at two hawker centres - Block 58 New Upper Changi Road hawker centre and Block 16 Bedok South Road hawker centre. We will deploy food waste digesters at other hawker centres where suitable.

4 We hope to see more businesses implement food waste reduction initiatives and adopt on-site food waste treatment solutions. Businesses interested in installing on-site food waste digesters may also apply to the NEA 3R Fund for support.

Question by Dr Tan Wu Meng: To ask the Minister for the Environment and Water Resources given the ageing population and limited common void deck space available for funeral wakes in some newer HDB precincts (a) whether this has affected the Government's forecast for funeral parlour capacity requirements; and (b) how the Government will ensure adequate funeral parlour capacity in the years ahead.

Answer:

Today, funeral wakes in Singapore are mostly held at HDB void decks and precinct pavilions. A smaller proportion of wakes are held in places of worship, private home compounds and purpose-built funeral parlours. Overall, there are sufficient wake spaces available to those who need them.

2 The Housing and Development Board (HDB) has traditionally planned and designed new HDB precincts to ensure that they meet the needs of the community. The National Environment Agency (NEA) also works closely with other Government agencies such as the Ministry for National Development (MND), the Urban Redevelopment Authority (URA) and the HDB to ensure the provision of sufficient land for the development of funeral parlours.

3 My Ministry will continue to monitor the demand for funeral spaces and ensure that there are sufficient wake spaces even as Singapore's population grows and ages.

Question by Mr Murali Pillai: To ask the Minister for the Environment and Water Resources (a) what will be the location of the hawker centre to be built in Bukit Batok Town; and (b) what is the expected date of completion of the hawker centre.

Answer:

Bukit Batok is one of the towns identified to have a new hawker centre by 2027. My Ministry is at the early stages of planning for this centre and we will provide more details on the location and timeline when the plans are ready.

Question by Miss Cheryl Chan Wei Ling: To ask the Minister for the Environment and Water Resources for the past three years, how effective has enforcement been in ensuring cat feeders abide with the two-hour rule of disposing any leftover cat food in public spaces.

Answer:

1. The National Environment Agency (NEA) oversees the cleanliness of public spaces in Singapore. Food left behind from the feeding of stray animals may attract pests such as cockroaches and rats and endanger public health. Containers with stagnant water also enable mosquitoes to breed.

2. Members of the public who feed stray animals without clearing the leftover food or food containers may be fined up to \$2,000 for the first offence under the Environmental Public Health Act.

3. Over the past 3 years, the NEA has received about 1,600 cases of feedback on the feeding of stray cats. In most cases, the cat feeders were compliant in clearing any leftover food within 2 hours. NEA had to proceed with enforcement action in only 2 cases where the cat feeders refused to comply with NEA's instructions to clean up after the feed.

4. NEA and the Agri-Food and Veterinary Authority of Singapore (AVA) also request Town Councils to dispose leftover food and litter to safeguard public hygiene and to put up advisories to remind their residents to clean up after feeding. In addition, both NEA and AVA will continue to work with animal welfare groups such as the Cat Welfare Society (CWS) to ensure proper stray animal feeding practices. AVA is also working with CWS to produce a community engagement handbook which includes information on responsible feeding practices. The handbook will be distributed to community cat carers and volunteers.

5. Everyone has a part to play in keeping our public spaces clean. We would like to urge all animal feeders to act responsibly and clear any leftover food or containers after feeding stray animals in our public spaces.

Question by Ms Denise Phua Lay Peng: To ask the Minister for the Environment and Water Resources (a) what is the rationale for the policy of only penalising the management of food establishments when patrons flout the no-smoking regulation; and (b) why is there no accountability expected of those who intentionally commit smoking offences despite reminders by the food establishment staff, management and other patrons.

Answer:

My Ministry's long-term goal is to prohibit smoking in all public areas except at designated smoking areas. This is to protect non-smokers from the harmful health effects of second-hand tobacco smoke.

2. The National Environment Agency (NEA) actively conducts inspections and patrols to ensure compliance with smoking prohibition regulations. Persons caught smoking in areas where smoking is prohibited, such as in shopping malls and foodshops, are liable for a maximum fine of \$1,000. In 2016, about 19,000 tickets were issued to smokers for smoking in prohibited areas, including more than 2,600 tickets issued to those found smoking in food establishments.

3. As smoking is prohibited in more than 32,000 premises, it is not possible for the NEA to watch over every location. It is also not possible for our officers to respond immediately to every report of smoking in a prohibited place before the smoker finishes his cigarette. The operators and managers of smoke-free premises, therefore, have a legal duty to stop patrons from smoking or to request patrons to leave the premises if they refuse to stop smoking. In cases where the patrons do not stop smoking or leave the premises, the operator or manager of the premises could seek assistance from NEA. In 2016, NEA took about 400 enforcement actions against the operators and managers of premises who had not fulfilled their duty under the law.

4. While my Ministry will continue to enforce against any person who smokes in a smoking prohibited place, I would like to urge all

smokers to be considerate when smoking in public places and to smoke only in permitted areas so as not to cause disamenities to others.

Question by Mr Gan Thiam Poh:

To ask the Minister for the Environment and Water Resources in light of smoky chemical smells reported in parts of Singapore at end-September 2017 (a) what is the cause of the smell; (b) what are the standards and safety measures that operators of hazardous chemical installations including the transportation of such materials have to comply with to ensure that there are no lapses or leakages that may compromise public safety and health; and (c) whether other countries in Southeast Asia have similar standards and safety measures.

Question by Ms Joan Pereira:

To ask the Minister for the Environment and Water Resources with regard to the incident of a chemical stench from Pasir Gudang in September 2017 (a) what should Singaporeans do in the event of a similar incident; (b) how can they differentiate between gases which are toxic and non-toxic; (c) how can similar incidences be prevented; and (d) how well-prepared is Singapore to deal with a chemical gas attack by terrorists.

Question by Er Dr Lee Bee Wah:

To ask the Minister for the Environment and Water Resources (a) whether he can provide an update on the source and causes of the chemical odour and smoke detected in various parts of Singapore on 25 September 2017; (b) whether there is a long-term impact on public safety and health; (c) whether there have been previous similar incidents; and (d) what is the Ministry doing to safeguard our interests.

Question by Ms Sun Xueling:

To ask the Minister for the Environment and Water Resources with regard to the odour detected by many residents particularly those living in the northeastern part of Singapore on 25 September 2017 (a) whether the Ministry can provide more timely updates so that residents can take necessary precautions to protect themselves; (b) whether our current detection methods extend beyond smoke particles to dangerous chemicals; and (c) what advice can the Ministry give to Singaporeans to protect themselves in the event of dangerous chemicals in the air.

Answer:

NEA maintains a network of real-time air quality monitoring stations across Singapore to detect air pollution. A number of these stations can measure low levels of Volatile Organic Compounds (VOCs) in the air. VOCs are vapours which can come from both man-made and natural sources, and they can cause smells by themselves or when they react with other VOCs. NEA supplements the air monitoring stations by deploying officers to affected areas. These officers are equipped with portable instruments which can measure the levels of chemical compounds in the air. The SCDF is also equipped with portable sensors to detect and identify toxic gases, including chemical warfare agents, in the air.

2 In the late afternoon of 25 September 2017, members of the public reported smells in the Punggol and Sengkang areas. Similar reports were received from the northern and central parts of Singapore later in the evening, such as Ang Mo Kio, Toa Payoh and Bukit Timah.

3 Upon receipt of the public reports, officers from NEA and SCDF were immediately deployed to check that the air at the affected locations was safe. The officers also conducted investigations at nearby housing estates, factories and construction sites. Both the air monitoring sensors and the air samples collected showed an increase in the levels of some VOCs in the evening of 25 September, which likely caused the smell experienced. The smell could also have been intensified by the light wind conditions during the period, and only dissipated later that night when winds blowing from the south and south-east picked up strength. While there have been previous smell-related incidents, this episode was more widely spread across the island.

4 In their investigations, NEA and SCDF did not detect any build-up of harmful gases in the air or find any abnormal factory operations or incidents in Singapore that could have caused the smells. Despite the

increase, the levels of the VOCs detected were also well within international safety guidelines. Once this was established, the public was informed that the air was safe. At the same time, NEA informed its counterparts from the Malaysian Department of Environment in Johor of the incident and sought their assistance to locate the possible source of the smell.

5 Following NEA's request for assistance, the DOE in Johor deployed its assets to investigate the incident. The source of the smell was finally traced to a factory in Pasir Gudang. A stop work order was issued against the operator of that facility by the DOE and the operator was required to carry out a list of remedial actions. The Malaysia media reported on 6 October 2017 that the stop work order was lifted after the operator had completed the necessary remedial actions. Tracing the source of fugitive smell is not a straight-forward process but requires time and effort. After NEA reached out to DOE, the Malaysians reacted quickly to carry out site investigation, trace the source of the smell and take the necessary actions on the facility to rectify the problem. We appreciate their cooperation.

6 Industrial premises in Singapore must comply with strict regulations and guidelines on the storage and transportation of hazardous materials. For example, the Environmental Protection and Management Act (EPMA) imposes requirements on the storage, use and transport of hazardous substances. These include putting emergency plans in place and preparing adequate emergency response equipment. These control measures are similar to those adopted in other jurisdictions, with each country adapting them to local requirements.

7 Let me now address incidents involving terrorist attacks using chemical gases. Our agencies are prepared for such a scenario. The SCDF regularly conducts exercises simulating chemical agent attacks where responders are tested for their proficiency in detection, monitoring and mitigation operations. In incidents involving toxic gases, the response of the public is equally important. Those in the affected area may feel unwell or experience symptoms such as giddiness and shortness of breath. SCDF's advice is that they should quickly leave the affected area and, where possible, help evacuate others, before seeking medical attention. For those who are unable to leave the affected area, they should go to the nearest indoor area and adopt In-Place Protection Procedures (IPP) by shutting the doors, windows and ventilation systems (like fans and air conditioners) and sealing the gaps with masking tape to minimise the infiltration of hazardous vapours.

8 The SCDF will also send out alerts to notify the public to take the necessary precautionary measures. This alert will be sent out through all the public warning platforms including social media, the SGSecure app and all the free-to-air FM radio and TV channels. The "Important Message" signal of the Public Warning System may also be activated.

9 To learn more about how to respond in the event of an incident involving toxic gases, the public is encouraged to participate in the SCDF's Community Emergency Preparedness Programme (CEPP). The CEPP trains about 40,000 participants each year, and IPP is one of the advanced programme modules. Members of the public can learn to prepare an IPP kit, as well as how they can apply IPP against a chemical gas attack. More information on the IPP can be found in the Civil Defence Emergency Handbook, which can be downloaded from the SCDF website.

10 These are among the measures that NEA and SCDF have put in place to safeguard the health and safety of Singaporeans.

Supplementary Question by Er Dr Lee Bee Wah:

Thank you, Mr Speaker. I have one supplementary question. Just now, Minister mentioned that the test showed that the air was safe. I would like to ask whether the test was conducted as a result of feedback from residents or do we have a station that constantly monitors the volatile organic chemicals and PM2.5. In the northern part of Singapore like Yishun, we will be affected first if there is anything that comes from Malaysia.

Answer:

I thank the Member for the supplementary question. Yes, air is constantly monitored and tests are conducted for hazardous levels of VOCs to ensure that we are breathing air that will not be deleterious to our long-term health. Certainly, we have enough of these and if we find that we need to build more of such monitoring stations on the advice of consultants or otherwise, we will do so.

Supplementary Question by Ms Sun Xueling:

I thank the Minister for his reply. I understand that it takes time to trace the source of the noxious smell in the air, but I think our residents will appreciate a timely update on what chemicals are in the air, to aid their own assessment of what they can do to protect themselves. That is my first point. And my question is that, if there is any research done on long-term exposure to low levels of VOCs in the air. I asked this because residents in Punggol and Sengkang obviously live closer by to Pasir Gudang, and there are a lot of feedback or persistent concerns about such chemicals in the air. Even though at any one point in time, such VOC levels may be low and not cause immediate alarm, long-term exposure to VOCs may cause and endanger health.

Answer:

The safety threshold of most VOCs are available only for occupational exposure. That means, when you are working in a situation where there are a lot of these VOCs, and you will be exposed to at least around eight hours of hazardous levels. Those studies are available. Studies which are connected with low constant exposure to these VOCs are not yet available or have not been done, so we cannot rely on such reports to produce any guidelines for our authorities to implement.

Question by Mr Murali Pillai:

To ask the Minister for the Environment and Water Resources (a) what are the results of PUB's checks on the water pipes in Bukit Batok SMC; and (b) what are the steps it intends to take arising from its determination that the burst water pipe incidents occurring in Bukit Batok SMC in October 2017 were due to corrosion.

Answer:

The pipes in Bukit Batok were last checked in January this year and found to be in good condition then. They were next due for inspection in January 2018. Following the recent leaks in Bukit Batok, PUB brought forward and completed the inspection of all 100km of water pipes in the estate. We did not detect any additional leaks. Our engineers have also investigated and concluded that the leaks at Bukit Batok West Avenue 6 and Bukit Batok East Avenue 3 were unrelated. Both pipes were laid about 35 years ago in the proper manner and met the material specifications required by PUB. At the time that they leaked, they were well within their design lifespan of 70 years.

2 The leaks were determined by PUB engineers to have been caused by localised corrosion. This can occur in places where the soil condition is harsher to the pipe material and when the water table is particularly high, which accelerates corrosion. We have replaced the leaking section of the pipe at Bukit Batok West Avenue 6, and are replacing all 170m of water pipes at Bukit Batok East Avenue 3. We expect the work to be completed ahead of schedule, by end-November.

3 PUB operates a network of 5,500km of potable water pipes to deliver water to 1.4 million customer accounts. It continually monitors, inspects; and if need be, repairs or replaces pipes to minimise the loss of water due to leaks, and to ensure good water supply round the clock. Today, Singapore experiences about 6 leaks per 100km of pipes per year, which is among the lowest incidences in the world.

4 In addition to continuous monitoring using more than 300 sensors, all pipes in PUB's 5,500km network are checked physically for leaks at least once a year, or more frequently where necessary. However, as almost all our water pipes are buried between 1m to 40m underground, it is challenging to assess the condition of buried pipes and detect minute leaks. PUB is thus test-bedding new technology such as acoustic sensors to monitor the pipelines and identify those which are not in satisfactory condition. PUB is also using pipes that are externally coated with poly-urethane. These pipes are more corrosion-resistant than pipes laid in earlier years.

5 However, despite regular monitoring and inspection, leaks do occur, due largely to localised corrosion, uneven soil settlement or damage from construction work. Whenever pipes are found to be in unsatisfactory condition, they are either repaired or replaced under PUB's Pipe Renewal Programme. As I have announced earlier this year, PUB is increasing its pace of pipe replacement. We are on track to replace 30km of pipes this year and will be able to replace 50km a year from next year onwards, one year ahead of schedule.

6 While we aim to replace all faulty pipes before they fail, leaks like the ones which occurred in Bukit Batok will happen from time to time. PUB seeks to respond and fix the problem quickly, and most incidents are resolved within a few hours. Occasionally, due to the need to ensure that water supply to residents is not disrupted when leaking pipelines are isolated from the rest of the network, additional time is required to switch residents over to an alternate supply pipeline before the affected pipeline can be shut off.

7 Water is precious and everybody needs to do his or her part to conserve it. I would like to assure members and Singaporeans that PUB engineers will continue to put in their best effort to maintain Singapore's water supply network and ensure good water supply to customers round the clock.

Question by Mr Melvin Yong Yik Chye:

To ask the Minister for the Environment and Water Resources with regard to the increasing illegal hawking cases outside Lucky Plaza (a) what are the enforcement actions taken against the illegal hawkers; and (b) what plans does the Ministry have to stop such illegal hawking along Orchard Road.

Answer:

The National Environment Agency (NEA) takes action against illegal hawkers, particularly if there is sale of food, as it poses a risk to public health and causes public disamenities. Under the Environmental Public Health Act, those caught hawking illegally can be fined up to \$5,000 for the first offence, and \$10,000 for subsequent offences. Their goods may also be seized and disposed of.

2 Since January 2017, we have received 15 instances of feedback concerning illegal hawking activities at Lucky Plaza. The NEA has carried out several checks and taken enforcement actions against 9 offenders for illegal hawking activities.

3 My Ministry will continue to monitor the situation at Orchard Road closely. We will not hesitate to take enforcement action against anyone found hawking illegally. However, to better tackle the problem, we need the co-operation of members of the public not to patronise illegal hawkers and to report any illegal hawking activity through NEA's 24-hour call centre.

Question by Assoc Prof Daniel Goh Pei Siong:

To ask the Minister for the Environment and Water Resources (a) what is the rationale for NEA's calls for proposals to develop sensor systems to monitor emissions from diesel vehicles and to monitor odours generated through industrial activity; and (b) whether these sensors will provide the basis to act against polluters

Answer:

Vehicular and industrial emissions are significant sources of air pollution in Singapore. To enhance the National Environment Agency's (NEA) capabilities in addressing air pollution, the NEA is seeking technological solutions for remote real-time monitoring of emissions from diesel vehicles and industries.

2 Regarding vehicular emissions, studies have shown that the pollutive emissions from diesel vehicles on the roads, mainly Nitrogen Oxides and Particulate Matter, can be higher than those measured in laboratory emission tests. The real-time vehicle emission monitoring system will enable NEA to more efficiently and effectively assess the extent and impact of emissions from diesel vehicles. The system will also support the review and enhancement of air pollution control measures.

3 As for industrial emissions, NEA is seeking sensing devices and solutions to detect and monitor odours, characterize chemicals in the air and identify the sources of industrial odours. These will enhance NEA's current suite of sensors.

Question by Mr Pritam Singh:

To ask the Minister for the Environment and Water Resources (a) whether the Ministry has completed its study covering the life cycle assessment of the different types of single carrier plastic bags and common food and beverage takeaway containers in Singapore and, if not, when is this study expected to be completed; and (b) whether the Ministry has determined if emissions from bio-degradable plastic bags are lower than non-biodegradable ones.

Answer:

The National Environment Agency (NEA) is studying the life cycle assessment of single-use carrier bags and disposable food packaging materials commonly used in Singapore. The studies analyse the cost and environmental impact, including emissions, of these materials.

2 We will release the results of the study on single-use carrier bags by the end of this year. As for the study on disposable food packaging materials, we should complete it by end-2017 and release the results in the first half of 2018.

Question by Mr Leon Perera:

To ask the Minister for the Environment and Water Resources whether the Ministry will consider specifying the future date for banning all petrol and diesel-fuelled vehicles.

Answer:

Vehicle emissions are a source of air pollution locally. Pollutants in vehicle emissions affect our living environment and can harm our health. Combating vehicular pollution is a high priority for my Ministry and our partners across the Government and industry.

2 We currently have no plans to specify a date to ban petrol and diesel fuelled vehicles. Countries like the United Kingdom and France have adopted this approach, and we are closely monitoring developments. Singapore's vehicular emission policies are technology-neutral and we seek to ensure that our air quality targets can be met in cost-effective ways.

3 Our air quality targets are benchmarked against standards set by the World Health Organisation. We have policy measures to achieve these targets and these include incentives to encourage the purchase of newer and cleaner vehicles, investment in public transport, support for trials of electric and hybrid vehicles, as well as mandatory requirements such as tightened vehicular emission standards. We will continue to strengthen our policies while ensuring the availability of feasible vehicle models to meet our transport needs.

Question by Mr Chen Show Mao:

To ask the Minister for the Environment and Water Resources what is the total number of cases of enforcement action taken by the NEA that involved volunteers exercising their new enforcement powers conferred by the NEA (Miscellaneous Amendments) Act of 2016.

Answer:

The primary role of a Community Volunteer (CV) is to educate environmental offenders to stop the offending acts and encourage greater ownership of the environment.

2 To enable the CVs to perform their role more effectively, they are empowered to request the particulars of offenders who fail to heed their advice. The particulars are sent to the National Environment Agency (NEA) for follow-up action. Since 2016, our CVs have engaged more than 3,500 individuals for environmental offences such as littering in public spaces and smoking in prohibited areas. The vast majority responded positively such as by picking up their litter and hence no further action was taken. A small number of around 60 individuals were non-compliant and therefore subjected to enforcement action by NEA such as summonses and advisory letters.

Question by Ms Joan Pereira:

To ask the Minister for the Environment and Water Resources what measures are in place to ensure that the water supply from our reservoirs to the water tanks in each building is free from terrorist attacks and contamination.

Answer:

Mr Speaker, PUB takes the safety and security of our water supply very seriously.

2 PUB has stringent security measures to ensure that the water supply from our water treatment plants to the water tanks in each building is safe. All of PUB's water supply installations, such as the water treatment plants and service reservoirs, are designated as protected installations which are physically secured, with tight access control and surveillance.

3 Treated water from the water treatment plants and service reservoirs is conveyed through a network of buried and pressurised pipelines to customers' premises which prevents attempts to contaminate it. At the customers' end, PUB works with Town Councils, Management Corporation Strata Titles (MCSTs) and building owners to implement measures that ensure the security of their water service installations including water tanks. These include tight measures to secure water tank covers, as well as restricting water tank access to authorised personnel. PUB conducts regular spot checks on all buildings with water tanks to ensure compliance. Our checks showed that the vast majority of our tanks are properly secured. When we detect non-compliance, we take swift enforcement actions against the building management. To signal the seriousness, penalties amount to a fine not exceeding \$10,000 or imprisonment of not more than 12 months or both. From 2014 to 2017, there were 22 such cases and errant parties have since rectified the lapses.

4 To complement our security measures, PUB has a comprehensive water sampling and monitoring programme from source to tap. This will ensure that the water supply to customers is safe. Daily water samples are collected from reservoirs, waterworks, distribution systems and customers' taps. The samples are tested at laboratories to ensure no abnormality. Online sensors have been installed at our reservoirs, at each stage of the treatment process and also at strategic locations in the network to keep a close watch on water quality. Over 400,000 tests are conducted annually on physical, organic, inorganic, radiological, bacteriological and microbiological parameters. As an additional layer of checks, PUB submits their water safety and sampling plans to NEA's Drinking Water Unit (DWU) and is required, under the Environmental Public Health (Quality of Piped Drinking Water) Regulations to report any deviations in water quality to NEA's Director-General of Public Health.

5 Mr Speaker, PUB takes the issue of drinking water quality and safety very seriously and will continue to do their part to keep safe and secure our water supply, I call upon the public to help by being vigilant and to call the police, or provide feedback via the SGSecure app, if they suspect or observe anything suspicious with regard to our water.

Question by Mr Seah Kian Peng:

To ask the Minister for the Environment and Water Resources whether the Ministry is exploring options for burials by sea after death.

Reply by Dr Amy Khor:

1. Today, the deceased can either be cremated or buried on land. For those who are cremated, their Next-of-Kin can choose to place the remains in niches at columbaria, keep them at home or scatter them at sea.

2. Apart from the scattering of cremated remains at sea, the National Environment Agency (NEA) is studying the feasibility of designating sites for the scattering of cremated remains on land. This will expand the available options for the placement of cremated remains. The NEA does not have plans to introduce burials at sea.

Question by Mr Leon Perera:

To ask the Minister for the Environment and Water Resources what is the number of water pipe leaks each year for the past 10 years.

Reply by Dr Amy Khor:

1. Mr Deputy Speaker, PUB operates a 5,500km network of pipes to deliver water to 1.5 million customer accounts. Over the last 7 years, Singapore has experienced about 6 leaks per 100km of pipes per year. This is down from about 10 leaks per 100 km per year in 2003-2004 and among the lowest incidence in the world.
2. PUB has a stringent pipe laying regime to ensure that pipelines are well designed and implemented. PUB also constantly looks out for improved methods and materials, for example, the use of more corrosion resistant polyurethane coating.
3. However, despite the best design and implementation, leaks do occur mainly because of corrosion, uneven soil settlement or damage from construction work. Corrosion and soil settlement can impact all pipes, especially as they age.
4. PUB has a comprehensive leak detection process to pick up leaks as early as possible. PUB conducts physical checks of its entire pipe network at least once a year, or more frequently where necessary. Portable acoustic leak noise data loggers are used to aid leak detection. Beyond detecting leaks, PUB has a Pipe Renewal Programme to pro-actively replace older pipes or pipes which are more prone to leaks due to local conditions. The renewal rate has increased from 20 km per year in 2016 to 30 km per year in 2017 and will reach 50km per year in 2018.
5. For leaks due to construction damage, PUB takes tough action against errant parties, which could include the issue of a stop work notice to cease construction activities immediately and the imposition of financial penalties if pipes are damaged. Regulations were strengthened in 2017 to require companies to notify or seek approval from PUB before undertaking construction activities that may affect the pipe network and to ensure appropriate protection measures.
6. When leaks occur, PUB seeks to fix them quickly. Most incidents are resolved within a few hours. Occasionally, due to the need to ensure that water supply to residents is not disrupted when leaking pipelines are isolated from the rest of the network, more time is required to switch residents over to an alternative supply pipeline before the affected pipeline can be shut off.
7. Water is precious and everybody needs to do his or her part to conserve it. I would like to assure members and Singaporeans that PUB engineers will continue to do their best to maintain Singapore's water supply network and ensure good water supply to customers round the clock.

Question by Mr Seah Kian Peng:

To ask the Minister for the Environment and Water Resources what is the cost of the 320 sensors installed in Singapore's potable water supply pipelines to detect water leakages from the pipelines.

Reply by Dr Amy Khor:

1. Mr Deputy Speaker, PUB collaborated with the Centre for Environmental Sensing and Modelling under the Singapore-MIT Alliance for Research and Technology (SMART) to develop the sensor network system for real-time monitoring of our water supply distribution network. The system enables PUB to monitor relevant hydraulic and water quality parameters, through real-time alerts on irregular data patterns in water pressure, flow and water quality which may potentially affect supply to customers. The data analytics and simulation tools developed as part of the system are used to help plan operations and minimise water supply disruption. PUB will continue to improve the reliability and coverage of the sensor network system.

2. Leak detection is one function of the system. Nevertheless, the sensor network system is just one component of PUB's leak management programme. PUB conducts physical checks of its pipelines at least once a year and also deploys portable acoustic leak noise data loggers to aid leak detection. Together with our ongoing pipeline replacement programme, this results in Singapore experiencing only about 6 leaks per 100km of pipes per year, which is among the lowest incidence in the world.

3. The cost of developing the entire sensor network system, including the 320 sensor stations and the data analytics software, is around \$9 million. PUB envisages that the cost of further expanding the sensor network to more parts of Singapore will be lowered as sensing technology improves, and as the initial investment in software development is spread over a larger base of sensors.

4. PUB will continue to work closely with the industry to develop and improve sensing capabilities and leak detection technologies. Concurrently, PUB is actively looking at new ideas and innovations that will help minimise water losses due to leaks and ensure 24/7 supply of good water to customers.

Leak detection

Question by: Mr Zaqy Mohamad, Member of Parliament, Choa Chu Kang GRC

To ask the Minister for the Environment and Water Resources (a) whether there are any updates on the proposed location and timeline for the building of a new hawker centre in Choa Chu Kang; and (b) when will the Ministry complete its study and announce the timeline for all remaining hawker centres that are part of this initiative.

Reply by Dr Amy Khor:

The Government has committed to building 20 new hawker centres by 2027, focusing on new HDB towns such as Punggol, Bidadari, Sengkang and Choa Chu Kang. So far, announcements have been made for 17 of these new hawker centres, of which 7 have started operations.

2 The remaining hawker centres, which includes a new centre at Choa Chu Kang, are at various stages of planning and development. We will announce the location and development timelines for these centres as soon as they are ready.

Question by: Mr Kwek Hian Chuan Henry, Member of Parliament for Nee Soon GRC

To ask the Minister for the Environment and Water Resources (a) whether the flood prevention systems will be able to prevent flash floods similar to those that occurred on 8 January 2018 after the completion of the drainage upgrades in 2019; (b) what are the guiding principles used to determine the drainage capacity needed in an area; and (c) whether these include balancing the potential collateral damage versus the investment cost.

Question by: Miss Cheryl Chan Wei Ling, Member of Parliament for Fengshan SMC

To ask the Minister for the Environment and Water Resources with regard to the flash flood on 8 January 2018 at Bedok North Avenue 4 (a) whether the ongoing enhancement drainage works at Bedok Canal was one of the reasons that limits the water capacity that can be stored or discharged through the canal during heavy downpours and high tides; (b) if so, what are the interim measures to prevent potential flash floods at this area until enhancement works are completed in 2019; and (c) what measures are in place to ensure the public living and working near any canals are alerted before possible water overflow occurs.

Question by: Miss Cheng Li Hui, Member of Parliament for Tampines GRC

To ask the Minister for the Environment and Water Resources (a) what current mechanisms are in place to notify motorists of impending flash floods in order to redirect traffic from affected areas; and (b) whether such mechanisms can be further enhanced to achieve broader and more effective notifications.

Question by: Mr Dennis Tan Lip Fong, Non-Constituency Member of Parliament

To ask the Minister for the Environment and Water Resources (a) what caused the heavy flooding at the nine locations in the eastern part of Singapore on 8 January 2018; (b) whether each location has a history of flooding; (c) whether existing drainage works is a cause; (d) what measures have been taken to assist members of the public who were affected by the flooding; and (e) what measures will be taken to prevent similar flooding.

Question by: Mr Murali Pillai, Member of Parliament for Bukit Batok SMC

To ask the Minister for the Environment and Water Resources how does PUB ensure that existing drains and canals are kept free of debris that have potential to create constrictions or bottlenecks, so as to alleviate flooding.

Reply by Minister:

Flash Floods on 8 Jan 2018

1. On the morning of 8 January 2018, the prevailing Northeast Monsoon, aggravated by the development of a Sumatra squall gave rise to intense rainfall across several parts of Singapore. The highest recorded total rainfall that morning was 118.8mm. This means that about half of Singapore's average monthly rainfall in January fell over just four hours.
2. Eight of the nine locations that experienced flash floods that morning are low-lying and therefore susceptible to flash floods. Two of these, Tampines Road (opposite Jalan Teliti) and Arumugam Road, have a history of flash floods. PUB is already carrying out drainage improvement works in these eight locations to enable the drains there to discharge more water in a shorter time when completed. During drainage improvement works, PUB ensures that the drainage capacity of the area is maintained at the original level before works commence; drainage works did not cause the flash floods in these locations. For the ninth location at Tampines Avenue 12, apart from intense rainfall which exceeded the drain's design capacity, a temporary construction access road built by the contractor had obstructed the earth drain in an adjacent worksite. This aggravated the flash flood. PUB has worked with the developer to improve the drainage at the earth drain and this will help to improve the situation at Tampines Avenue 12 in an event of intense storm. The longer term measure is the permanent drainage system which will be built in tandem with the upcoming development project at the adjacent worksite.
3. The flash floods were caused by the intense rainfall temporarily exceeding the existing design capacity of the drains. Although the flood waters affected only certain stretches of the roads, and subsided within 15 to 60 minutes, we acknowledge that members of the public were inconvenienced and a number of cars were stalled. When flash floods occur, we urge members of the public to exercise caution and avoid traversing in submerged areas even if they appear safe. Flash floods are usually of short duration and it is better to wait for them to pass before continuing the journey. To aid the public, PUB, together with Traffic Police and LTA, will help divert vehicles at the earliest possible.

Drainage Design and Improvement Works

4. Let me go back to drain design. PUB takes into account terrain, the extent and type of developments in the area, catchment area served by the drain, as well as the design rainfall intensity over the catchment. This is standard international practice. However, with climate change, we can expect more intense rainfalls to be the norm in future. A study by the Potsdam Institute for Climate Impact Research found that flood risks from rainfall changes will increase in the next two to three decades, due to global warming from greenhouse gases already emitted into the atmosphere. The need for adaptation is significant, even in countries with good infrastructure such as Singapore.

5. To prepare for this, PUB has raised the drainage design standards since 2011, so that our drains can handle up to 45% higher rainfall intensities. These new standards were endorsed in 2012 by a Drainage Expert Panel comprising local and international specialists.

6. Since 2012, PUB has commenced and completed drainage improvement works at 327 locations. There are another 73 locations undergoing similar works, with 22 more planned this year. The Government has invested \$1.2 billion on these works, and has set aside another \$500 million for the next two to three years.

7. However, it is not feasible to build our drains to accommodate every extreme rainfall event as this would require massive land take and much higher costs. Bedok Canal, which serves some of the affected areas, is being widened at a cost of \$128 million from its existing width of 38 metres to 44 metres, wide enough to accommodate an expressway of 10 lanes, 5 lanes each way. Even with this widening, we cannot guarantee that there will be no floods in future, as rainfall events of even higher intensity could still occur that exceed the design capacity. This is especially so with climate change. To deal with the most extreme historical rainfall events, the Bedok Canal would need to be widened to at least 62 metres, displacing the Bedok Park Connector and community spaces adjacent to the Canal, and possibly even affecting the surrounding residential areas. This will look like a 16-lane expressway. Given competing needs for other land uses such as housing, parks and roads, we have to be practical in our drainage expansion in Singapore. We have to design with practical considerations and not for extreme conditions all the time for all places. Building our drains for extreme conditions would mean that much of the capacity would be extremely costly, but not needed most of the time. We will however ensure our critical infrastructure is well-protected from such extreme rainfalls. This is achieved through the “source-pathway-receptor” approach which was developed based on the recommendation of the Drainage Expert Panel to implement a holistic range of interventions.

Source-Pathway-Receptor Approach

8. Under this approach, other than improving the *pathways*, or drains, we also manage the *source*, which refers to where the rain falls. Measures include detention tanks to slow down surface runoff and reduce the amount of stormwater entering the drains during peak rainfall. For instance, the Stamford Detention Tank and the Stamford Diversion Canal are constructed to protect Orchard Road against floods. Built beneath a nursery and coach bay of the Tyersall Learning Forest, the Stamford Detention Tank will temporarily hold excess stormwater from the drains. After the rain subsides, the stormwater will be pumped back into the drains for subsequent discharge into Marina Reservoir.

9. For areas that are most at risk of flooding, PUB stipulates that buildings must have receptor features, such as higher platform levels, crest protection and flood barriers to prevent floodwaters from damaging them.

10. Apart from structural interventions, PUB places equal emphasis on non-structural measures such as the maintenance of drains. PUB and NEA's Department of Public Cleanliness carry out regular inspections to remove debris, litter and leaves from the drains. We encourage everyone to keep our environment litter-free. Any obstruction in the drain reduces its capacity and impedes water flow, which could lead to or aggravate a flash flood. We urge developers and contractors to ensure that the drains in and around their work sites function well. Members of the public are encouraged to provide feedback on drain conditions through PUB's MyWaters app or MSO's OneService App or call PUB 24-hour Call Centre.

Keeping the Public Prepared

11. As flash floods cannot be completely eliminated, PUB seeks to help members of the public better cope with a flash flood by warning them and providing alerts and timely situation updates. Members of the public can subscribe to NEA's and PUB's SMS alerts or mobile apps for updates on impending heavy rain and the water level in drains at designated locations. While PUB strives to give early warning to the public, the weather systems in our equatorial region pose a forecasting challenge. These weather systems comprise mainly convective thunderstorms which tend to be localised, develop rather suddenly, and are of short duration. This limits the lead time of our warnings of heavy rain and consequent flash floods.

12. During flash floods, members of the public can stay updated through radio broadcasts, PUB's Facebook and Twitter pages, mobile apps as well as LTA's Expressway Monitoring Advisory System, or EMAS.

13. Our approach to flood management is a comprehensive one that seeks to alleviate flood risks while minimising disruption to the public. We will continue to take all necessary steps to enhance flood resilience across Singapore, and keep the public informed of flash flood incidents.

Supplementary question by Mr Dennis Tan Lip Fong (Non-Constituency Member): I thank the Minister for his answer to the question. Just one supplementary question. In respect of the measures for the eight out of nine locations in the eastern part of Singapore that the Minister mentioned will be taken or undergoing, how soon will these measures be completed?

Minister: Before I answer that question, I would like Members to recognise that PUB must also manage extremities of weather in both directions. We have to take care of intense drought, prolonged drought, that challenges or may affect our water supply. At the same time, we have to take care of extreme weather such as rain of higher intensity and frequency which will bring about floods.

And therefore, when we talk about floods, we must also remember to ask questions about the other extreme. What should we do and how much resources do we have for both extremities?

Climate change actually has brought extreme weather conditions in many parts of the world. Many of us would have read that Paris has just experienced one of the worst floods because of the rising Seine River, prolonged rain for two weeks that recently has closed even the Louvre Museum. At the same time down south, Cape Town is experiencing drought condition for three years, just like us. But they were not ready. They did not put in the right things at the right time and now may run out of water within two to three months. Cape Town is now racing to look at solutions to solve their water problem.

Therefore, when we look at our problems, we have to look at conditions of what we need to do and how fast we can do what, and which we should put priorities on. We have 8,000 kilometres of drains, canals and rivers. If you put this end to end, from the surface of the earth, it will go through the centre of the earth with 2,000

kilometres to spare. That is how long our drains, canals and rivers are.

So, we have to be cautious about making commitments that everything will be settled quickly. We also have to ensure that drains are not the only ones that will solve the problem. We have to ensure at the source or the receptor of where this rainfall happens, the developers and the people who own this part of land, must also play their part.

So, it is not easy to answer. Just because the drains will be ready by this time, the flash floods will be gone. For example, right now, there are about 500 submissions for plans to do retention tanks for those developments above 0.2 hectares. Of this, only 158 have been completed. Now, together with the drain and the receptor, source and completion of all the projects there, we will have a better chance of avoiding the flash floods. But like I said, it is impossible to totally eliminate them because this will occur. It is more important for us to give as much timely warning as possible to our public, to ensure that they do not traverse these flash floods, which will usually go away within 50 to 60 minutes. Perhaps, take a detour.

Supplementary question by Mr Murali Pillai (Bukit Batok): I thank the Minister for his comprehensive response to my question. May I ask the Minister how does his Ministry propose to exercise oversight over the developers and the construction companies, so that their activities would not block the drains and canals and keep them free of debris?

Minister: Contractors, in preparing the site, have to submit to PUB their plans for diverting drains, for keeping the original drain design, for taking away the water from the site intact so that rain falls or the design capacity of the drain will not affect the surrounding areas. This has worked most of the time.

Where we have found flash floods occurring in areas where we know do not frequently occur or rarely occur, it is usually because the contractors have not implemented what they are supposed to do, or implemented something else in order to make their worksite either

accessible or easier to work on. When this happens, as in the recent case of Tampines Ave 12, we will take action against the contractor, bring them to court and fine them.

Question by: Mr Zainal Sapari, MP for Pasir Ris-Punggol GRC

To ask the Minister for the Environment and Water Resources (a) what is the current number of active individuals in the Community Volunteer Programme; (b) what is the support given to them should they be verbally or physically abused by members of the public while carrying out their duties; and (c) whether NEA can equip these volunteers with body cameras to record their interactions with the public.

Reply by Dr Amy Khor:

The National Environment Agency (NEA) launched the Community Volunteer (CV) Programme in 2013 to foster greater ownership of the environment. There are currently about 350 active individuals in the CV Programme.

2 The primary role of CVs is to educate environmental offenders to stop the offending acts and encourage greater ownership of the environment. To enable the CVs to perform their role more effectively, they are empowered to request the particulars of offenders who fail to heed their advice. The particulars are sent to the National Environment Agency (NEA) for follow-up action. Given that the vast majority of the offenders had responded positively to the advice of CVs such as by picking up their litter and no further action was taken against them, there are currently no plans to equip CVs with body-worn cameras. Nevertheless, the CVs are trained to disengage from any abusive offenders.

3 Under the law, our CVs are considered public servants when exercising powers of enforcement. This makes it an offence for anyone to exhibit any indecent, threatening, abusive or insulting behaviour towards a CV in the execution of his duty. It is also an offence for anyone to assault or use criminal force to prevent or deter a CV from discharging his duty. CVs who face verbal or physical abuse in the course of their duty should seek the assistance of the Police and inform NEA of the incident. Depending on the outcome of NEA's investigations, NEA may charge the offender in court for

obstruction of duty in addition to the principal offence to send a deterrent message that such behaviour will not be condoned.

Question by: Ms Joan Pereira, Member of Parliament for Tanjong Pagar GRC

To ask the Minister for the Environment and Water Resources (a) what is the cause of the water pipe leak at Somerset Road on 16 January 2018; (b) when was the pipe last checked as part of PUB's routine maintenance; and (c) what is the impact of continuous heavy rainfall on the underground soil where this water pipe is laid.

Reply by Minister:

1. The water pipe leak at Somerset Road on 16 January 2018 was due to stress to the pipe caused by uneven soil settlement. We have isolated the leaking section of the pipe and put the rest of the pipeline back in service. The affected stretch of pipeline is in the process of being replaced under PUB's Pipeline Renewal Programme.

2. As part of its operation and maintenance regime, PUB carries out checks for leaks on its entire pipe network at least once a year, or more frequently where necessary. The pipe at Somerset Road, which is made of cast iron and laid in 1973, was last checked for leaks in December 2017, with no leak found. We have not observed any correlation between rainfall and the number of leaks.

3. When leaks occur, PUB seeks to fix them in the shortest time possible as permitted by site conditions while minimising the disruption to customers and the public. PUB officers need time to identify the pipe and the valves that need to be shut so as to isolate the leak, identify the customers who are potentially affected, and set up the appropriate alternative supply provisions. For the leak at Somerset Road, temporary supply connections to these customers were set up in tandem with the repair works to limit the disruption to public. The repair works had to proceed carefully due to the need to minimise road closures and the presence of several other buried services belonging to the electrical and telecommunications companies near the site. PUB worked together with these companies to ensure that its repair works did not affect other critical services.

4. To reduce the risk of pipe leaks, including those caused by uneven soil settlement, PUB has been laying pipes made of more

resilient materials such as ductile iron and steel, and has adopted enhanced pipe-laying practices such as pipe bedding for better pipe support. Furthermore, we have put in place regulations to ensure that contractors take proper measures to prevent damage to our pipelines during construction activities.

5. Besides these measures, PUB proactively replaces older pipes or pipes which are in less satisfactory condition under its Pipeline Renewal Programme and is targeting to replace 50 km of such pipes this year, a 20 km increase from last year.

Mr Speaker, I would like to thank the Members who have spoken for their support and comments on this Bill.

Facilitating Entry into the New Licensing Scheme

2 Er Lee Bee Wah, Mr Gan Thiam Poh, Ms Joan Pereira and Mr Louis Ng have spoken on helping existing and would-be plumbers to continue to serve in this important trade and facilitating their entry into the new Licensed Plumber scheme. We share this important objective.

3 Let me first address the issue of providing sufficient time for transition to the new scheme.

4 PUB announced its intention to roll out the new licensing scheme some 10 months ago, in April last year. Even prior to the announcement of the scheme, PUB had engaged the Singapore Plumbing Society extensively. After the announcement via several media channels – newspaper, radio, TV, including in vernacular languages, as well as circulars – weekly public briefing sessions were held for 10 consecutive weeks to share details with interested stakeholders. All of PUB's Licensed Water Service Plumbers and members of the Singapore Plumbing Society were invited to the sessions. Other plumbers and members of public also attended the sessions.

5 To facilitate the transition to the new scheme, additional runs of BCA Academy's Builder Certificate course and PUB's short in-house conversion course were mounted. As noted in my opening speech, to date, over 96% of the 863 existing plumbers, who are either Licensed Water Service Plumbers or plumbers registered with the Singapore Plumbing Society have already obtained the qualifications to become Licensed Plumbers, when the legislation comes into effect.

6 In fact, among the 800-odd plumbers who have qualified to become LPs, more than 70%, are aged 50 and above, including some who are in their 80s.

7 Of the remaining plumbers, around 10 will complete the Builder Certificate course by the middle of this year and around 20 will need to successfully undergo PUB's 2 or 3 days' in-house conversion course.

8 Additionally, as noted in my speech earlier, another 25 who have the requisite experience but were neither licensed nor registered with SPS have completed the necessary courses and will be able to become LPs when the Act comes into effect. Essentially, these are new plumbers with requisite experience but did not have license, but will become licensed when the Act comes into effect.

9 During the 6-month transition period, water service plumbers and those currently or formerly registered as sanitary plumbers with the Singapore Plumbing Society may continue practising their respective trade pending their license.

10 For those who have not completed their licensing requirements by the end of the 6-month transition period from the effective date of the legislation, they can approach PUB who will assist them on a case-by-case basis.

11 While we encourage and help as many as possible to upgrade their skills and be certified, there continues to be a role for those who do not have the new license. First, they can carry out plumbing works as long as they are directly working under a Licensed Plumber who will manage and sign off on the works.

12 Second, they can carry out non-critical simple plumbing works for consumers on their own, such as clearing chokes and installing sinks, bathtubs and showers. There will continue to be a market for such work and a full list of unregulated works can be found on PUB's website.

Assistance for Plumbers

13 Ms Pereira, Mr Gan, Mr Png and Mr Ng expressed concern that some plumbers, especially the older ones, may have difficulties getting certified due to language requirements or financial difficulties.

14 Sir, in Mandarin please. [In Mandarin]

15 A minimum working proficiency of English is necessary, so that Licensed Plumbers can understand the regulatory requirements, read plans, and submit forms to PUB.

16 While courses are conducted in English, the instructors take a practical approach in helping participants understand the content.

17 To accommodate plumbers who cannot manage the written assessment of PUB's two or three-day conversion course, PUB facilitates oral assessment in other languages, such as Mandarin.

18 PUB has also worked with BCA Academy to recognise the "Workplace Literacy and Numeracy Level 4" certificate for entry to the Builder Certificate course.

19 So far the plumbers who have engaged PUB are willing to take this course.

20 Take the case of 50-year-old Mr Anthony Cheng Lai Swee.

21 He used to work for plumbing companies that carry out plumbing and sanitary work and is now doing freelance sanitary plumbing works.

22 When the Licensed Plumber Scheme was announced, he was initially concerned that he did not have the minimum proficiency in English to register for the Builder Certificate course.

23 Mr Cheng then decided to register for the Workplace Literacy and Numeracy Level 4” course, and passed the test, which allowed him to register for the Builder Certificate course.

24 He has since completed the theory part of the Builder Certificate course and will be taking the practical part in March 2018.

25 Mr Cheng was glad that Singapore Plumbing Society and PUB have been assisting and facilitating him to transit to the Licensed Plumber scheme.

26 [Sir, In English]. As for financial assistance, PUB waives the fees of its conversion course for all existing plumbers on their first attempt and beyond that on a case-by-case basis. For the Builder Certificate course, a variety of subsidies may be used to offset up to 85% of course fees, such as the SkillsFuture Mid-Career Enhanced Subsidy. Individuals can also use their SkillsFuture Credit.

27 Most plumbers whom PUB has engaged thus far have no issues with the course fees. Nonetheless, if plumbers face any difficulties, I encourage them to contact PUB, and we will see how to further assist them.

Foreign Unlicensed Plumbers and Sub-contracting to Unlicensed Plumbers

28 Er Lee and Mr Gan expressed concerns over unlicensed foreign plumbers operating in Singapore.

29 It is illegal for foreigners to work in Singapore without a valid work pass. Foreign plumbers with valid work passes that wish to practice in Singapore will need to be licensed. Let me emphasise that consumers who engage the services of unlicensed plumbers do so at their own risk. Plumbing systems have a significant impact on the quality of tap water and on public health. Enforcement action will be taken against the unlicensed plumber and the consumer. I urge consumers, when hiring plumbing services, to go to the register of Licensed Water Service Plumbers on PUB’s website, or call PUB’s 24-hour Call Centre at 1800-CALL-PUB, to find these Plumbers or verify their status. This register will be expanded to cover all Licensed Plumbers once the new scheme is implemented. Licensed Plumbers will also be required to carry an authorised license card from PUB for verification.

30 Er Lee also brought up Licensed Plumbers sub-contracting works to non-licensed plumbers. While Licensed Plumbers can do so, they must directly supervise and sign off on the works carried out by the unlicensed plumber.

31 Should there be any non-compliance with the requirements and standards stipulated by PUB, the Licensed Plumber who signed off on the works would be held responsible.

32 More importantly, even as we enhance the regulatory system, PUB will work with the Singapore Plumbing Society to enhance consumer education so that consumers will be aware of the importance of using Licensed Plumbers for critical plumbing works.

Types of Works Offered by Plumbers

33 Ms Pereira suggested encouraging Licensed Plumbers to develop specialised skills in specific fields of work. While the Licensed Plumber scheme requires plumbers to be proficient in both water and sanitary plumbing works, they are free to elect the field of work that they wish to practice in.

34 Currently, to help consumers make a better choice when engaging a plumber, the register of Licensed Water Service Plumbers on PUB's website also indicates the types of services that some plumbers are offering. When the new scheme takes effect, PUB will extend the listing of types of services offered for sanitary plumbing on the register of Licensed Plumbers on PUB's website as well.

Ensuring Continual Upgrading of the Plumbing Industry

35 Er Lee asked whether the courses offered at ITE are continually reviewed to keep pace with industry needs. The courses offered are in accordance with Singapore's current plumbing standards, and PUB will continue to work with educational institutions like ITE and BCA Academy to ensure their courses keep pace with industry needs. To answer Mr Ng, Licensed Plumbers are also required to attend PUB's refresher courses once every three years to be kept abreast of the latest industry standards.

Conclusion

36 To conclude, the amendments to this Bill are an important step forward to ensure that Singaporeans continue enjoying clean and safe water. Therefore, I call on Members of the House to give their support to this Bill. Thank you.

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

2 The key objectives of the Public Utilities (Amendment) Bill are to enhance the regulation of plumbing works and drinking water quality.

Clean and Safe Water for all

3 A vital part of any country's water supply management is ensuring water quality. Singaporeans enjoy the convenience of clean and wholesome water at the turn of a tap. This does not come easy, but is achieved through forward planning and careful implementation of sound policies and programmes.

4 The Bill before the House today seeks to ensure that the quality of the water supplied to Singaporeans remains uncompromised, even with changing conditions.

Licensing of Plumbers

5 Plumbing is essential for our access to potable water. While PUB ensures the safety and adequacy of the water it produces, owners of premises are responsible for the maintenance of their building's internal pipes and water tanks. Plumbing is also important for the protection of public health as a well-functioning sanitary system channels used water away effectively.

6 Currently, PUB regulates water service plumbers who carry out works on the potable water system, but not sanitary plumbers who carry out works on sanitary appliances and facilities, as the latter were deemed less complex.

7 While this regime has not caused issues thus far, our water and sanitary plumbing systems are becoming more integrated and complex, particularly in large-scale and high rise buildings, with concealed piping systems becoming more common. There is also increasing adoption of alternative water systems in commercial and industrial developments like NEWater and rainwater harvesting. All these systems must be built properly by competent plumbers to prevent cross-contamination between the potable water system and the non-potable or sanitary systems. While we have not experienced cases of cross-contamination, this has happened elsewhere, such as in Alameda City, California, where a cross-connection between the city's drinking water supply and a non-potable irrigation well rendered parts of the city's water supply undrinkable for days.

8 We will therefore strengthen the regulation of critical plumbing works and ensure that plumbers have the skills and knowledge to undertake complex works.

9 For instance, sanitary pipes need to be laid such that they are both air tight and water tight, otherwise public health may be affected. The Bill will expand

PUB's current licensing scheme for water service plumbers to include sanitary plumbers under the revised Licensed Plumber, or LP, scheme. PUB will specify eligibility requirements such as training and competency requirements for all LPs. Homeowners, consumers and developers will be assured of the quality of work carried out by these trained and licensed plumbers. The Bill will also provide for PUB to give directions to LPs as well as professional engineers to rectify works which contravene requirements.

10 To ease the change to the LP scheme for incumbent plumbers, the Bill provides for a 6-month transitional period from the effective date of the LP scheme. During the transitional period, eligible incumbent plumbers can continue to carry out their respective vocations pending receipt of the new LP licences.

11 Since the announcement of the proposed LP scheme in April last year, PUB has been working closely with the industry to facilitate the entry of plumbers into the LP scheme. To date, 96% of the 863 existing plumbers, who are either PUB's Licensed Water Service Plumbers or plumbers registered with the Singapore Plumbing Society, are already qualified to be LPs. The remaining plumbers are either undergoing BCA Academy's Builder Certificate Plumbing and Pipefitting Course and/or PUB's two or three-day conversion course. They will qualify as licensed plumbers after passing the requisite assessments.

12 Other than helping existing plumbers upgrade their skills, we also want to encourage new entrants to join the profession. Since the announcement of the scheme, 25 persons of varying backgrounds, ranging from those with 'O' level qualification to degree holders, have successfully completed the requisite courses by BCA Academy and PUB.

13 Among them is 55-year old Mr Lim Choon Sin, currently a Mechanical & Electrical contractor with 'O' level qualifications, and 36-year old Mr Tan Jixiang, an Engineering graduate, who will qualify as LPs when the scheme comes into effect.

14 We recognise that not all plumbing work needs to be regulated. PUB has drawn up a list of simple plumbing works which do not affect the integrity of the water supply or sanitary network. For instance, the changing of flushing mechanism within a flushing cistern and the changing of taps need not be carried out by an LP. Such excluded works will be set out in subsidiary legislation. Consumers can refer to the PUB website for the list of such works. For works that do require an LP, they will also be able to refer to the website for the online database of LPs when the new scheme takes effect.

Enhancing the Regulation of Drinking Water

15 Mr Speaker, I will next cover the regulation of drinking water.

16 It is crucial for public health and safety reasons for there to be regulatory oversight over the quality of drinking water. Regulation of water quality is currently the responsibility of NEA's Drinking Water Unit or DWU and PUB.

17 However, NEA's existing powers do not cover drinking water that is provided free of charge. The Bill seeks to close this gap by expanding the regulatory scope to cover all water suitable for drinking that is provided in the course of business, and to the public, except for water that is already regulated by other agencies. Besides this, DWU officers will be provided with powers, similar to those that PUB officers already have, to enter premises to conduct investigations of water quality incidents, which will enhance DWU officers' response time in dealing with such incidents.

18 As the public looks to PUB for any water quality-related matters, PUB remains the primary responder.

19 Upon receiving feedback from the public, PUB will first investigate, and if they determine that the issue is caused by a failure of the technical integrity of the water supply, PUB would then take action against the appropriate party. If the failure was the result of any other cause, then the matter will be referred to DWU.

20 DWU will also continue to have oversight over the quality of the drinking water provided by PUB. With these enhancements to our regulatory system, we can be assured that our drinking water will continue to be clean, wholesome and safe.

Other Amendments

21 Besides these, the Bill includes other amendments to improve operations and allow for the smooth functioning of PUB. For instance, the Bill provides PUB with the powers to regulate the transport of dangerous cargoes as well as board vessels to investigate offences so as to protect water quality in our reservoirs and waterways.

Conclusion

22 Mr Speaker, and members of the House, let me conclude. The proposed enhancements to the Public Utilities Act are forward-looking and aim to ensure that good and safe water continues to be conveyed and enjoyed by all Singaporeans. We have seen from water crises around the world how things can go from right to wrong very quickly, often with just one misstep in the long complex chain of supplying water. One example is the contamination case in Flint, Michigan in the United States where lead from aging pipes leached into the water supply. Once public confidence in their water supply is lost, it is hard to regain and affected communities take years to recover. We are determined never

to let this happen, and will continue to strengthen our water system so that Singaporeans will always have access to good, wholesome water.

23 Mr Speaker, I beg to move.

Question by: Mr Chong Kee Hiong, MP for Bishan–Toa Payoh GRC

To ask the Minister for the Environment and Water Resources whether the Ministry will consider building more smoking rooms in all buildings with public access so as to contain secondhand smoke.

Question by: Ms Joan Pereira, MP for Tanjong Pagar GRC

To ask the Minister for the Environment and Water Resources whether the Ministry will consider implementing restrictions against smokers who smoke whilst on the move, such as walking or cycling, as they leave behind residual secondhand smoke

Reply by SMS:

Smoking has been a significant and longstanding public health issue in Singapore. Over the last decade, the prevalence of smoking has hovered around 12-14%, and an average of six Singaporeans die prematurely from smoking-related diseases each day.

2 The Government has taken a multi-pronged approach to tackle tobacco addiction such as by curtailing access to cigarettes, sustaining public education and imposing taxes on tobacco products. Nonetheless, we recognise that smoking will continue in Singapore and throughout the world, and smokers need time to wean themselves off their habit. We must, therefore, continue to remind those who smoke of the health effects, and also to be considerate in their actions.

3 Smokers have generally observed the smoking prohibition in public places such as hospitals, clinics, sports complexes, office buildings and shopping malls. With smoking already disallowed in most buildings with public access, the Government has no plans to mandate the provision of smoking rooms in such premises.

4 Notwithstanding this, the Smoking (Prohibition in Certain Places) Act allows for the provision of indoor smoking rooms in certain types of publicly-accessible premises, such as in entertainment outlets, provided that the smoking room is independently ventilated and not required to be used by any person in the course of his work. The need for smoking rooms should be determined by the managers of these premises as they have a legal duty to uphold the smoking prohibition rule within their premises. Premises managers may also set up designated smoking areas (DSAs) in the outdoor areas of their premises, provided these are not places where smoking is prohibited.

5 To the member's question on imposing restrictions on those who smoke on the move, the Government has already taken steps in that direction. Since 2013,

smoking on pedestrian overhead bridges and under covered walkways has been prohibited. In the latter part of this year, the Orchard Road precinct will be gazetted as a smoke-free zone where smoking will no longer be allowed at all public areas, except at a number of DSAs. This means that smokers will not be able to light up while walking within the zone.

6 The issue of smoking is one that requires all sectors of society to play their part. Families and communities must come together to encourage smokers to quit and keep them on a smoke-free path. Premises managers must observe their legal obligation to help enforce the smoking prohibition within their premises in consideration of their non-smoking clients and staff. Smokers should also be considerate when smoking in public places, and smoke only in permitted areas so as not to adversely affect the health of others.

Supplementary question by Ms Joan Pereira (Tanjong Pagar): I thank the Senior Minister of State for the reply. I have one supplementary question. On the ground, many people are still walking or cycling and smoking, affecting those behind them. Will the Ministry consider holding a campaign to educate our smokers to be more gracious in public by exercising care to keep second-hand smoke from blowing towards others?

SMS: I want to thank the Member for her suggestion. We will look into this. Let me say that, in a way, we have already started this when we set up DSAs in Orchard Road last year to study the effectiveness of reducing smoking in publicly accessible areas, and to encourage the smokers to be considerate and smoke only in the designated smoking areas. We are evaluating the results of this study and the results will be taken into consideration when we decide on the future plans for designated smoking areas.

More importantly, beyond campaigns and to encourage smokers to be considerate, we hope that we can also help smokers to completely quit smoking. And in this regard, HPB has educational campaigns to raise awareness about the harmful effects of smoking. It also has a "I Quit" campaign that it administers to help smokers to quit in more easily adaptable steps by breaking them down to help them in their journey to quit.

Supplementary question by Mr Chong Kee Hiong (Bishan-Toa Payoh): Passers-by and pedestrians who currently walk past outdoor designated smoking areas will also breathe in second-hand smoke. If we could have some designated smoking areas within the buildings, it could reduce the harmful effects of second-hand smoke. At the same time, it will protect the smokers from the elements. While we are trying to do our best to reduce smoking, it takes time. And I think in the meanwhile, we should provide an avenue where both parties could co-exist but without affecting each other negatively.

SMS: As I have said, most of the buildings with public access are already smoke-free areas. We have no intention to mandate smoking rooms in these places. Notwithstanding this, the premises owner can designate smoking areas as long as these are not areas where smoking is prohibited. So, beyond 5m from the entrance or exit of a building which is a smoking-prohibited area, they could designate a designated smoking area (DSAs). This is actually being done, say, for instance in Orchard Road, where we have implemented DSAs.

With regard to having a smoking area within a building, the issue is that, if you have a smoking room in a building, it will reduce the level of exposure of environmental tobacco smoke (ETS), but not completely. This ETS could seep into other parts of the building and it could pose a health hazard and a health risk to persons in the enclosed space. That is the reason why under the Smoking (Prohibition in Certain Places) Act, we only allow smoking rooms in certain publicly accessible areas or premises such as at Changi Airport Terminals' transit area, as well as in pubs, discotheques and so on, and also in office premises, but subject to very strict requirements. Which is that these premises must have separate a ventilation system where the smoking room is, and it must not be an area where staff is required to be in, in the course of their work and so on. If these can be complied with, then the premises owner can designate a smoking room.

Supplementary question by Ms Sun Xueling (Pasir Ris-Punggol): A supplementary question: a common complaint from residents is of neighbours smoking in their balconies or out of the windows of their flats, leading to smoke wafting into the flats of residents. What would the Ministry recommend to residents who suffer from such second-hand smoke?

SMS: Smoking within residential premises, in the home, in private space is beyond the jurisdiction of the Government. We do not have smoking prohibition within the homes themselves. Our advice would be for the affected resident to have a discussion with the neighbour, to try and resolve this amicably. If not, the resident may get assistance from a Community Mediation Centre.

Let me also say that enforcement alone is not the panacea to curb inconsiderate smoking behaviour. At the end of the day, we need to urge and get the smokers to be socially responsible and to be considerate when smoking so as not to cause disamenities to others. Families and friends of the smokers as well as the public, in general, could help to reinforce the right social norms, through nudges and reminders, in order to be able to try and address such issues.

Supplementary question by Miss Cheryl Chan Wei Ling (Fengshan): I take the Senior Minister of State's note that enforcement is not the panacea and it probably cannot solve all the problems. But without enforcement, it will not be a proper deterrent for many of the smokers, because clearly, they are socially not

that responsible. I would like to ask the Senior Minister of State whether there would be considerations if the public can do more. For example, since there are not enough enforcers on the ground, if members of the public do have evidence of frequent smokers at the same location, can they submit that for NEA to take actions against those offenders?

SMS: Indeed. Even as enforcement alone is not the panacea, we will continue with our enforcement actions. We also work with the Town Councils as well as grassroots organisations to educate smokers and encourage them to be more considerate.

Having said that, if a resident has information or sees acts of errant smokers smoking in prohibited areas, they could provide the information to NEA. NEA will conduct investigations.

Supplementary question by Er Dr Lee Bee Wah (Nee Soon): Mr Speaker, Sir, I would like to ask two supplementary questions. First, why is the pilot project DSA set up in Orchard Road? Are we protecting the tourists or the residents? Secondly, I have quite a lot of residents asking whether the DSA will be set up in housing estates or not because that is where many of our residents have fed back that they had been affected by second-hand smoke.

SMS: We piloted the DSAs in Orchard Road last year because Orchard Road has a very high foot fall or pedestrian traffic. This is an area where many people may be subjected to second-hand smoke. That is a key reason why we have done it there. We are studying and evaluating the results, as I have said. We will take these into consideration in deciding on future plans for DSAs.

Indeed, we are exploring the feasibility of designating other areas as smoke-free zones in order to achieve the Government's long-term goal of prohibiting smoking in all public areas. We need to study the results of the DSA pilot in Orchard Road to determine how effective it is in reducing smoking in other public areas, getting smokers to be considerate to smoke only in the DSAs, as well as the location, design of DSAs and so on.

With regards to DSAs in residential areas, as I have said, we are looking into the feasibility of expanding designated non-smoking areas, but we will look at the study and see how we can scale this up.

Supplementary question by Mr Dennis Tan Lip Fong (Non-Constituency Member): Thank you, Speaker. There is still a lot of people who are still smoking in our public parks and park connectors; and a lot of people who smoke when they are walking to work or to the MRT stations. I would just like to ask the Senior Minister of State whether the Ministry would look into increasing the messaging in this concern.

SMS: I think this is quite similar to the questions posed by the other Members, including Ms Joan Pereira about having a campaign to educate smokers. First, we have extended smoking prohibition to common corridors, covered linkways, pedestrian overhead bridges. So, it is illegal to smoke in these places. If there are persons who are doing this, as I have said, we do carry out enforcement actions, particularly in hot spot areas. But beyond that, you can provide us with further information on such errant smokers.

Question by: Mr Louis Ng Kok Kwang, Member of Parliament for Nee Soon GRC

To ask the Minister for the Environment and Water Resources (a) whether he can provide an update on the Ministry's plans to enhance the mandatory waste reporting requirements by supermarkets; and (b) whether the Ministry plans to extend waste reporting to other premises that generate large amounts of waste including food waste.

Reply by Minister:

Under the mandatory waste reporting requirements, owners of certain premises which generate large amounts of waste must report their waste and recyclables tonnages, waste reduction plans, and waste reduction targets to the National Environment Agency (NEA). This is to encourage them to improve their waste management systems, by drawing attention to the amount of waste produced and the potential for improvement.

2. Currently, only shopping malls with a net lettable area of more than 4,600 square metres and hotels with more than 200 rooms are subject to these requirements. Supermarkets located in malls would have their waste data accounted for under the malls' tonnage. There are no plans to introduce mandatory waste reporting requirements specifically for supermarkets.

3. We will continue to monitor the waste generation of premises subjected to mandatory waste reporting. We will also consider extending the reporting requirements to other premises that generate large amounts of waste, such as industrial premises, bearing in mind the compliance costs.

Question by: Mr Louis Ng Kok Kwang, Member of Parliament for Nee Soon GRC

To ask the Minister for the Environment and Water Resources in each of the past three years (a) how much has been spent on the National Recycling Programme; and (b) how many tonnes of recyclables has the programme contributed to the total amount collected from Singapore's domestic recycling sector.

Reply by SMS:

Public waste collection (PWC) contracts cover both the collection of recyclables, under the National Recycling Programme (NRP), and the collection of waste. The public waste collectors charge a single fee for both waste and recycling collection, which is paid by households as the monthly refuse collection fee.

2 The NRP was started in 2001 to provide households with a convenient channel to recycle. It is complemented by other available recycling channels provided by the private and people sectors, such as charity donation drives, community recycling drives and door-to-door collection of recyclables.

3 In 2016, the public waste collectors collected about 44,200 tonnes of recyclables. This was an increase from 2014 and 2015, when about 31,000 and 37,000 tonnes of recyclables were collected respectively.

4 My Ministry continues to look at how we can improve recycling rates in the domestic sector, where the recycling rate has been hovering around 20% since 2012. In recent years, we have been enhancing recycling infrastructure to make it even easier for Singaporeans to recycle. For example, from 1 April this year, all new non-landed private residential developments above four storeys will need to provide dual chutes for refuse and recyclables. These dual chutes have already been introduced in new HDB Build-to-Order flats since January 2014. All existing condominiums will also have to provide one recycling bin per block from 1 August this year. We will also use regulatory measures to complement the new recycling infrastructure. For example, we will introduce a new framework to make it easier for Singaporeans to recycle their e-waste.

5 Ultimately, active participation in recycling by all Singaporeans will be key to improving our domestic recycling rates. The NEA promotes the 3Rs, that is, "reduce, reuse and recycle", via social media posts and educational materials distributed at community and school events. Information on the proper use of recycling bins, location of collection points and 3R tips are also available on NEA's website and NEA's myENV mobile app. We will continue to encourage every Singaporean to play their part to reduce, reuse and recycle.

6 At the same time, Singaporeans should not misuse the recycling bins. A little less-known fact is we can no longer use the recyclables once they are contaminated, such as by food waste. Let us all be gracious and not waste the efforts of our fellow Singaporeans who want to do their part for the environment.

Supplementary question by Mr Louis Ng Kok Kwang: I thank the Senior Minister of State for the reply, but I have also asked how much has been spent on the NRP for each year in the last three years. Can I also clarify that the figure that the Senior Minister of

State gave of 44,200 tonnes, is that the total amount collected from the Singapore domestic recycling sector or is that the figure that was collected by the NRP?

SMS: Regarding the question of how much we spent, we do not specifically track the amount spent on outreach programmes and campaigns for the NRP because this is actually done in-house by the NEA together with other outreach campaigns such as the Clean and Green Singapore, Keep Singapore Clean and Do the Mozzie Wipeout campaigns.

In addition, NEA does outreach and educational efforts to engage and educate residents on the 3Rs, including NRP through, as I have said, social media posts, as well as on our websites and on our myENV mobile app.

Regarding the 44,200 tonnes collected in 2016, it is just the collection of recyclables under the NRP carried out by the public waste collectors. This is about 10% of the total amount of recyclables we collect for the domestic sector.

Supplementary question by Mr Louis Ng Kok Kwang: I thank the Senior Minister of State. Just one last supplementary question. I know that NEA uses surveys to track the proportion of residents who recycle but I do not think it gives a very accurate picture. So, would NEA be conducting more in-depth reviews to evaluate the effectiveness of our recycling programme?

SMS: The survey that the Member has referred to is, I think, the PWC Customer Satisfaction Survey. That was last done for the period 2015/2016. We had more than 8,500 respondents who participated in this customer satisfaction survey. It is done by a consultant using established survey methodologies, so, we think that this is reflective of the level of public participation in recycling. But we welcome any further suggestions to improve the accuracy of this survey.

Question by MP Louis Ng Kok Kwang:

To ask the Minister for the Environment and Water Resources (a) for each year in the past three years, what is the number of plastic bags used in Singapore; and (b) if such data is not available, whether the Ministry intends to collect such data so as to measure the effectiveness of the current retailer schemes.

Answer by Minister Masagos Zulkifli:

The National Environment Agency (NEA) currently does not monitor the number of plastic bags used in Singapore. Based on NEA's waste characterisation study, it is estimated that plastic bags constitute a fifth of the plastic waste disposed of by weight. This trend has remained fairly constant, with the weight of the plastic waste disposed of in 2015, 2016 and 2017 estimated to be 766,800, 762,700 and 763,400 tonnes respectively.

2. Under the mandatory reporting framework for packaging waste, which will be implemented by 2021, businesses will be required to report the type and amount of packaging they put on the market and their packaging waste reduction plans. The number of single-use plastic bags used may be included under the framework. NEA will start industry consultations on the framework this year.

3. We will also continue to support initiatives by the private sector and non-governmental organisations (NGOs), and step up engagement with stakeholders to reduce the excessive use of plastic bags. For example, NEA will work with retailers to explore initiatives such as training cashiers to ask customers at payment counters if plastic bags are needed, and putting up visual cues in stores to serve as reminders.

Mr Deputy Speaker, I would like to thank Members for their support and comments on the Carbon Pricing Bill.

2 Last week, The Business Times published an article entitled "A powerful, effective strategy to combat climate change" which featured the views of top executives of companies and professional associations on the carbon tax.

3 I was heartened by their strong support for the carbon tax. Many executives recognised that pursuing environmental sustainability and economic growth are not a matter of trade-offs, but a strategy to stay competitive; they can do good and do well at the same time.

4 Mr Paul Henaghan, Vice President from Dell DMC, noted, and I quote, "Industries need to look beyond the perceived economic loss from taxation and recognise that it ultimately contributes to the long-term prosperity of companies". Mr Damien Dhellemmes, Country President of Schneider Electric Singapore said, and I quote, "Going green can in fact lead to greater economic growth in the longer term. We strongly believe that sustainability is the end game of any company in today's world".

5 This is why we are introducing the carbon tax. As our companies are nudged towards more carbon efficient and greener practices, they will strengthen their competitive edge and thrive in a low-carbon global future.

6 Let me first address Members' questions on the carbon tax framework.

7 Er Dr Lee Bee Wah asked whether our proposed carbon tax rate of S\$5 per tonne of greenhouse gas (GHG) emissions will affect our ability to meet our goals.

8 I would like to assure the House that the carbon tax rate of S\$5 per tonne of GHG emissions was decided very carefully, taking into account both economic competitiveness and environmental considerations.

9 To Asst Prof Madhev Mohan's query, the carbon tax should not be viewed in isolation. It works in tandem with the comprehensive mitigation measures that we have developed to reduce emissions and meet our obligations under the Paris Agreement. This package has been carefully designed, taking into consideration our international competitiveness as well as our pledge, and will be reviewed regularly.

10 Our initial carbon tax level of S\$5 per tonne cannot be directly compared with that of other jurisdictions. While they may have higher headline carbon prices, they often give significant exemptions to particular sectors and companies. These effectively pay a lower carbon price than the published rate.

11 Rather than imposing differing tax levels on different sectors and companies, we have opted for a simple and transparent carbon tax with no exemptions. This maintains a fair and consistent price signal to incentivise emissions reduction across the entire economy.

12 I also want to assure the House that we are mindful of our international competitiveness when introducing this tax, given that we are an export-oriented economy as highlighted by Mr Henry Kwek and Ms K Thanalethimi.

13 Together with MTI, EDB and the National Climate Change Secretariat (NCCS), my Ministry and NEA have consulted companies extensively over the past year on the design of our carbon tax framework. Whilst companies understood the need to price carbon, they asked for a transition period to adjust to the impact of the tax. This is why we are starting with S\$5 per tonne for the first five years; companies will have time to adjust, for example, by upgrading to more energy-efficient equipment.

14 In response to Mr Gan Thiam Poh, the Minister for Finance has said that we will in fact review the carbon tax rate by 2023. We intend to increase the level to S\$10 to S\$15 per tonne of GHG emissions by 2030. Our review will take into account international climate change developments, our progress towards our climate pledge and our economic competitiveness.

15 As highlighted by Mr Kwek and Ms Rahayu Mahzam, we are mindful of the need to manage compliance costs, which was also a key feedback from companies. We have done the following.

16 Firstly, we have built on existing measurement, reporting and verification (MRV) requirements that are set out in the Energy Conservation Act (ECA) which companies are already familiar with. These

requirements take reference from international standards like the ISO and GHG Protocols, which are used by many companies for corporate sustainability reporting. This approach streamlines requirements and aligns with international practices.

17 Second, we have identified a list of excluded emissions so that companies need not incur disproportionately high costs to measure and report these small emissions sources.

18 Third, NEA is actively growing the pool of third-party verifiers in Singapore to ensure that companies can access competitive offerings.

19 NEA has been organising briefings to familiarise companies with the new MRV requirements and carbon tax obligations, and will continue to help companies build up their capability. The detailed MRV requirements will be made publicly available.

20 Ms Rahayu also asked if there is a plan to move towards an emissions trading scheme (ETS) in the future. For a small domestic market like Singapore, a carbon tax could achieve the same objective as an ETS in a simpler way. It provides greater price certainty and stability.

21 Nonetheless, we recognise that there may be benefits in linking our market with other jurisdictions in the longer term. It is a complex endeavour, as Ms Rahayu has pointed out, and we are still studying the feasibility. We will need to build up key capabilities both in Government and companies. We therefore decided to introduce the Fixed-Price Credit-Based, or FPCB, system as this will put in place the key building blocks should we decide to link our market to other jurisdictions in the longer term. We will continue to monitor international developments, and consult companies.

22 Mr Louis Ng asked about the FPCB mechanism. Companies can buy credits from NEA at a fixed price throughout the year, but must surrender credits equivalent to their preceding year's tax liability by 30 September.

23 There is no expiry date on the credits in this initial phase. Nevertheless, companies have told us that they are likely to buy the required credits only after they receive the notice of tax assessment, so as not to tie up their liquidity. Hence, the scenario whereby companies operate their plants in a less efficient manner in order to, as Mr Louis has stated, "use up unused credits", is highly unlikely.

24 Er Dr Lee and Mr Leon Perera also asked if the Government will share the data from the emissions reports, and Ms Thanaletchimi asked about the measures we have to ensure data security. As the emissions reports contain commercially-sensitive information, they will not be shared publicly. We have strict provisions in the Bill to ensure the confidentiality and security of the data reported.

25 That said, I note that the Members are concerned about tracking the effectiveness of our policies in lowering our energy consumption and efficiency, and emissions. I would like to clarify that we already track and publish the improvements in energy consumption per dollar GDP from 2005 levels in the Budget Book. We also regularly report our emissions to the United Nations Framework Convention on Climate Change (UNFCCC), and will continue to do so. And these are all publicly available.

26 Er Dr Lee and Mr Kwek spoke about the impact of the carbon tax on households. This is expected to be small, at about 1% of total electricity and gas expenses on average.

27 As the Minister for Finance announced at Budget 2018, eligible HDB households will receive additional U-Save rebates of S\$20 per year, from 2019 to 2021. On average, the additional U-Save rebates will cover the expected increase in electricity and gas expenses arising from the carbon tax. This will help HDB households to adjust to the carbon tax, as they reduce their utilities consumption over time. We will assess the impact of the carbon tax at a later stage and review the need to extend these rebates.

28 More importantly, we want to encourage energy saving habits among households on a sustained basis. We are working with the community on a Lamp Replacement Programme to assist one and two-room HDB households to replace their lamps with more energy efficient LED ones. NEA will also be organising an Energy Savings Challenge this year to raise awareness on energy conservation.

29 I would also like to assure Ms Thanaletchimi and Ms Rahayu that Government agencies will work closely with the Consumer Association of Singapore (CASE) and Competition Commission of Singapore to monitor

the market for unfair pricing and coordinated price hikes which are anti-competitive. CASE will look into feedback of any alleged profiteering.

30 As Members have highlighted, a key reason for the carbon tax is to encourage our companies to transform and ready themselves for the low-carbon economy. To achieve this, I agree with Er Dr Lee that we must be more ambitious and bolder in improving energy efficiency (EE). Many developed countries are achieving an EE improvement rate of 1% to 2% per year. We must do just as well.

31 The industrial sector, which accounts for about 60% of Singapore's GHG emissions, has been a key focus of our efforts. Last year, we amended the ECA to enhance the frameworks and tools to support companies' EE improvement. One new requirement is for new industrial facilities and major expansion projects to undergo reviews at the design phase to identify and incorporate EE opportunities at the start of the project; thereby avoiding more expensive retrofitting and operational disruption later on.

32 This year, we are moving the Carbon Pricing Bill to provide the added motivation – the motor fuel if you like – to spur companies to actively pursue emissions reduction. The Government has been providing support to continue to improve EE and many have forged ahead. Let me just share two stories.

33 Globalfoundries, a semiconductor company, has been innovating and investing in new technologies to improve EE and reduce emissions. For example, it redesigned the combustion chamber in its thermal abatement units and reduced its Liquefied Petroleum Gas consumption by 31%. This resulted in annual cost savings of about S\$260,000 and an annual carbon abatement of about 640 tonnes.

34 With further support from the Government, Globalfoundries is working to replace a process chamber cleaning gas that has high global warming potential, with one that has no global warming potential. This will reduce their emissions significantly by more than 400,000 tonnes, when completed in 2019.

35 Another role model is Chevron Oronite Pte Ltd which has consistently achieved EE improvement rates above the industry average. To improve EE, it installed a boiler system to recover waste heat from its thermal-oxidiser for steam generation. It also installed a mechanical vapour recompression system to lower the energy use of its new manufacturing unit. These projects have resulted in energy savings of S\$1.8 million and carbon abatement of 4,800 tonnes each year.

36 Members have asked what the Government is doing to support companies in this transition to a low-carbon future. The Government is prepared to spend more than the estimated S\$1 billion in carbon tax revenue that will be collected in the first five years, on worthwhile carbon abatement projects.

37 Existing EE incentive schemes, such as the Productivity Grant for Energy Efficiency, or PG (EE), and the Energy Efficiency Fund (E2F) will be enhanced.

38 This enhanced support will also be extended to SMEs, to encourage them to improve their EE, including basic measures such as upgrading to more efficient lighting. More support will go to projects that achieve greater emissions abatement, beyond basic enhancements.

39 Mr Perera has asked whether part of the revenue from the carbon tax will be used to provide loans to companies. The EDB has been piloting an EE Financing Programme whereby companies that are not able to afford the upfront costs of EE projects can apply for loans through a third-party financier.

40 The potential benefits of such a programme are that industrial facilities will not have to pay for the upfront costs of these projects, but can still enjoy part of the energy savings. Part of the risk is transferred to the third-party financier.

41 Beyond financial support, the Government will also grow the wider industrial EE ecosystem in Singapore to develop greater expertise in the energy services sector. Initiatives include engaging Institutes of Higher Learning to train and up-skill energy services professionals, and working with professional bodies, such as the Institution of Engineers Singapore to develop Chartered Engineer certification for EE professionals. At the same time, NEA officers have been, and will continue to engage the companies to help them to identify areas for EE improvements.

42 Besides driving energy efficiency improvement, the carbon tax will help spur investment in and take-up of low-carbon solutions. Ms Thanalethimi asked if the Government can provide incentives for companies to adopt renewable energy sources. The Government's policy is to ensure that energy, regardless of source of

generation, is correctly priced to fully reflect the cost of generation, and let the market work out the equilibrium. Instead of providing subsidies, what we have done is to invest in the R&D of renewable, clean energy technologies.

43 We set up the Solar Energy Research Institute of Singapore (SERIS) in 2008 to conduct R&D on solar technologies. One of its projects is a collaboration with the REC Group to develop high-performance solar cells, which I understand is among the world's highest-performing solar cells.

44 We are also studying the deployment of solar panels beyond our rooftops onto our water bodies. In 2016, PUB launched the largest test-bed at Tengeh Reservoir.

45 Addressing intermittency issues and ensuring grid stability are important as we increase solar deployment. The Energy Market Authority (EMA) and Singapore Power launched the Energy Storage System test-bed in 2016 to better understand the feasibility of deploying grid-level energy storage technologies locally.

46 Last October, EMA also awarded a S\$6.2 million research grant to develop our solar forecasting capabilities. I assure Mr Louis Ng that the Government will continue to support and invest in such R&D efforts.

47 Er Dr Lee asked about the impact to the refining sector in Singapore. In my interactions with our refinery companies, I have been impressed by their bold and transformational moves.

48 Since 2000, ExxonMobil has spent about US\$8 billion to develop low-carbon technologies and are a global leader in carbon capture and storage technology. In Singapore, I officiated the opening of their third co-generation plant which improved the refinery's energy efficiency by 4% to 5% and reduces their carbon emissions by 265,000 tonnes.

49 Similarly, Shell has been reaching into the next energy frontier with renewables and hydrogen. They intend to increase their spending in their new energies business arm to about US\$1 billion to US\$2 billion per year until 2020. These oil giants are showing us the way by taking destiny in their own hands and transforming earlier, rather than later, to stay competitive and maintain their lead in the low-carbon global economy.

50 Mr Perera asked whether we regularly measure our climate change resilience. We do. To ensure that Singapore is well-prepared for climate change, we have set up an inter-agency Resilience Working Group (RWG) that is responsible for studying and monitoring Singapore's vulnerabilities to the effects of climate change, such as sea level rise, and developing appropriate response measures.

51 Our climate scientists are also plugged into relevant global scientific forums that develop climate change projections. Our adaptation measures are reviewed whenever there are new findings.

52 Lastly, Asst Prof Mahdev also asked about our position in the development of the Paris Rulebook given the positions taken by the EU and China. As one would expect in a multilateral framework, negotiations are complex. Publicised positions may be transitional and do not reflect the landing points. Singapore participates actively in these negotiations to get countries to focus on a fair and consistent implementation of their Nationally Determined Contributions (NDCs), what they commit to reduce and mitigate GHG emissions.

53 At the end of the day, for the Paris Agreement to work, all countries must meet their commitments that they have committed. We will continue to participate actively to this end.

54 Indeed, Singapore's active involvement in previous rounds had been impactful. Singapore was the advocate for the very concept of the NDC and worked with other like-minded countries to get it adopted by UNFCCC under the Paris Agreement. We must continue to be active and impactful because climate change is an existential issue for Singapore.

55 Mr Deputy Speaker, let me conclude. The carbon tax has been deliberated carefully and extensively within the Government. We have also made a concerted effort to consult and engage the industry.

56 The Bill is an important step forward, not only in encouraging industry to do their part for the climate, but also in readying our economy and strengthening our competitiveness as the world transitions to a low-

carbon economy. Companies ignore these realities at their peril. Therefore, I call on Members of the House to give their support to this Bill. Thank you.

Mr Speaker, Sir, I beg to move, that the Bill be now read a second time.

2 The Carbon Pricing (CP) Bill seeks to impose a carbon tax on certain greenhouse gas emissions (GHG emissions) of business facilities, measured from 2019 onwards. The Bill also imposes obligations concerning the reporting of GHG emissions of business facilities, in place of the obligations currently in the Energy Conservation Act (ECA).

3 I have spoken in this House about how climate change poses existential challenges for Singapore. We are already experiencing its impacts – changing weather patterns, more intense rainfall and rising sea levels. Singapore is thus an active advocate and contributor to global climate action, as this is the only way to preserve a habitable planet for our children.

4 This is also why we are rallying Singaporeans in this Year of Climate Action. Since launching in January, about 50,000 individuals, organisations and educational institutions have taken the climate action pledge. Our Climate Action video has been viewed more than a quarter million times. We are encouraged by the passion and activism of our fellow Singaporeans and businesses, doing their part for climate action.

5 Our 2016 Climate Action Plan outlines the climate adaptation measures we are taking to build Singapore's resilience to climate change, as well as the climate mitigation measures to reduce greenhouse gas emissions in every sector through driving energy efficiency, robust transport policies around what we call "Car-lite Singapore" and waste management policies aiming for a "Zero Waste Nation".

6 The carbon tax is thus an integral part of this suite of mitigation measures to nudge our industries towards a low carbon footprint. Put together, it will enable Singapore to meet our commitments under the Paris Agreement.

7 But climate change also presents new opportunities for our companies. 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. Investors are moving in this direction.

8 Under the Climate Action 100+ Initiative, 256 investors managing US\$28 trillion in assets have committed to work with companies to reduce emissions. Companies that adopt greener technologies and climate-friendly practices will find it easier to operate and thrive. China has already made a strategic choice and stated its ambition to transform its economic development and shift towards a low-carbon economy. Globally, many companies are following suit.

9 To maintain our competitive edge, Singapore companies must also transform. Consumers all over the world will soon demand products and services that use the smallest carbon footprint. We must move early. The Government will help. The Minister for Finance has clearly stated that we are prepared to spend more than what we collect in carbon taxes over the next five years to help our companies, including SMEs, improve their carbon efficiency and shift to the low-carbon economy.

10 Our companies reported an energy efficiency (EE) improvement rate of 0.4% in 2014 and 0.6% in 2015. I am happy that our EE improvement rates continue to rise and for 2016, we have achieved an EE improvement rate of 0.8%. This means reduced carbon emissions from industry. However, we still have some way to go, as leading jurisdictions such as Belgium and the Netherlands achieve annual improvement rates of 1% to 2%.

11 The carbon tax will incentivise companies to improve energy and carbon efficiency, while giving them the flexibility to take action where it makes business sense. My Ministry held a consultation session recently with industry and NGO participants. Many participants agreed on the need for climate action and supported pricing carbon.

12 This is consistent with the views expressed by business leaders worldwide. For example, Chairman and CEO of ExxonMobil, Darren Woods blogged that, I quote, "A uniform price of carbon applied consistently across the economy is a sensible approach to emissions reduction. This would 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".

13 Since the Finance Minister announced the carbon tax at Budget 2017, we have been consulting stakeholders closely on implementation. To manage compliance costs for companies, the Bill builds on the existing requirements in the ECA. Similar to the ECA, the Carbon Pricing Act will be administered by the National Environment Agency or NEA.

14 Keeping in mind companies' compliance costs and our international competitiveness, we studied the laws in other carbon pricing jurisdictions, such as the European Union, California and South Korea, to ensure that our requirements are appropriately calibrated, and aligned to international practices. We also took reference from the requirements and associated penalties in relevant domestic legislation, including the ECA, as well as the Income Tax Act and the Goods and Services Tax Act. We have also transferred all the GHG emissions reporting requirements from the ECA to the CP Bill.

15 Through many rounds of consultations with potentially affected companies, NGOs and the general public since early 2017, we have received constructive and useful feedback to refine the Bill. I would like to thank everyone who participated.

16 Mr Speaker, allow me to go through the key components of the Bill which are contained in Parts 3 to 5.

Coverage and Definition of Facility

17 Part 3 of the Bill identifies the persons and business facilities that must be registered under the Bill. Facilities from the manufacturing, power generation, water supply and waste management sectors will be covered.

18 We have made refinements to how the ECA defines a "business facility" to provide greater clarity to companies and to align our definition with international practices. A business facility is a single site where a business activity that involves the emission of greenhouse gases and forms a single undertaking or enterprise is carried out.

19 The person, which can be a company or other legal person, having operational control over the facility must be registered under the Bill, and will be responsible for fulfilling the obligations under the Bill.

20 A business activity can be an activity or a series of activities. The Bill allows for business activities that are carried out at two or more parcels of land separated from one another to be treated as carried out at a single site in certain instances, including if the activities are under the operational control of the same person and are carried out in an integrated manner with clear dependencies between the activities.

21 Other jurisdictions have similar practices, where separate installations with technical connections or in physical contact, can form a single facility. This was also requested by the industry. We hope that this exception will encourage companies to consider the synergies across plants in order to reap greater emissions reduction and improve resource efficiency. It will also lower compliance costs as only one emissions report needs to be submitted for a single business facility spanning multiple premises.

22 The Bill imposes obligations in relation to two types of facilities – taxable facilities and reportable facilities.

23 Taxable facilities are those that emit 25,000 metric tonnes of carbon dioxide-equivalent (tCO₂e) and above of GHG emissions annually. This threshold does not include the GHG emissions listed in Part 2 of the Second Schedule which I will elaborate on later.

24 These facilities will have to undertake more rigorous measurement, reporting and verification processes, or MRV in short, and will have a carbon tax imposed on their GHG emissions. Together, the facilities that cross this threshold account for about 80% of Singapore's GHG emissions.

25 We took reference from key jurisdictions, such as the EU and South Korea, in deciding on the threshold level of 25,000 tonnes. We aim to strike a balance between maximising our emissions coverage while managing the compliance cost for smaller emitters.

26 Nevertheless, we still want to encourage smaller emitters to monitor and reduce their emissions. Hence, the second category called reportable facilities – those that emit at least 2,000 tonnes but less than 25,000 tonnes – must have their GHG emissions measured and reported, but will not be taxed.

Measurement, Reporting and Verification (MRV)

27 A robust MRV regime forms the foundation of an effective carbon pricing scheme. For reportable facilities, the measurement and reporting requirements will be similar to their existing ECA reporting practices, whereas taxable facilities will adhere to a more stringent set of MRV requirements.

28 Emissions reports for taxable facilities must be submitted annually based on a monitoring plan. The monitoring plan sets out data management practices to ensure that GHG emissions data is measured and reported accurately and robustly. The registered person having operational control of a taxable facility will also be required to engage a qualified independent third party, accredited by NEA, to verify the emissions reports. This provides an independent review of the measurements and reporting of a facility's GHG emissions, akin to a company engaging an external auditor to audit its financial statements.

Tax and Mechanism

29 The details of the carbon tax can be found in Part 5 of the Bill. As announced by the Finance Minister in the 2018 Budget, the carbon tax rate will start at S\$5 per tonne of GHG emissions, which the Government intends to raise to between S\$10 to S\$15 by 2030. The initial rate of S\$5 per tonne has been specified in the Third Schedule and can only be amended by an Act of Parliament.

30 Our carbon tax will be applied uniformly without exemptions. It will take the form of a fixed-price credits-based mechanism. This means registered persons will pay the carbon tax by surrendering carbon credits equivalent to their carbon tax liability. These carbon credits can only be bought from NEA at a fixed price.

31 We have designed our carbon tax this way to give us the flexibility to introduce international credits or link to other emissions trading systems, if and when there are opportunities to do so. However, in the initial phase, international credits or offsets will not be allowed as we want our companies to focus on reducing their emissions. That said, we recognise that companies welcome the potential use of international credits. We are monitoring the global discussions on the use of and accounting of international credits and will continue to study this issue.

First and Second Schedule – Coverage of Greenhouse Gas Emissions

32 The carbon tax will be levied on the direct emissions of six types of greenhouse gases – namely, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride. These are the six gases that Singapore is required to report under the United Nations Framework Convention on Climate Change or UNFCCC.

33 To reduce compliance costs, there will be a list of GHG emissions that are excluded from the carbon tax, similar to the practice in other carbon pricing jurisdictions. The list comprises small sources of emissions which have a disproportionately high cost to measure and report compared to the amount of carbon tax collected. These sources of emissions are typically from ancillary processes and are insignificant compared to a facility's total GHG emissions.

34 The list of excluded emissions is specified in Part 2 of the Second Schedule. It includes GHGs emitted from fire extinguishers, and HFC and PFC emissions from air-conditioning equipment used for non-manufacturing purposes, such as in office buildings.

35 The list also includes GHG emissions that, in line with international GHG reporting protocols, are not counted towards a company's emissions, such as the carbon dioxide emissions from biofuels. Furthermore, we will exclude emissions arising from the use of petrol, diesel and compressed natural gas (CNG). As highlighted by the Finance Minister in his recent Budget speech, excise duties have been levied on these fuels, which already encourage reduction of their use and therefore reduce GHG emissions; and hence, no additional carbon tax will be levied.

36 Although the excluded emissions are not taxed, registered persons will still be required to measure and report most of this data, using simpler methods to estimate such emissions. This data will enable us to track whether these emissions have grown over time and review the list of excluded emissions, if necessary.

Penalties and Appeal Mechanism

37 Let me now touch on penalties and appeal mechanism. Given that we are imposing a tax on GHG emissions, for parity, the penalties on taxable facilities relating to reporting and tax payment have been pegged to the equivalent penalties for fraud and tax evasion in the Income Tax Act.

38 The Bill also provides an avenue for a registered person to appeal to the Minister against NEA's decision pertaining to the deregistration of taxable facilities, approval of verified emissions reports or monitoring plans, or tax assessments and refunds. These disputes may involve highly technical and specialised industrial processes. Hence, the Bill allows the Minister to delegate the appeal to a Panel that must comprise at least one person with the requisite technical expertise.

Conclusion

39 Mr Speaker, to conclude, the carbon tax is a key part of our measures to achieve Singapore's climate pledge and enhance the competitiveness of our companies and economy. It will provide a price signal to incentivise energy and carbon efficiency improvement across the economy, and encourage investment in clean, sustainable solutions.

40 It is a significant step to bring us closer to a liveable and sustainable Singapore, where thriving businesses have low carbon footprints and where climate action is a way of life for all. Through this transformation, our companies will be able to remain internationally competitive and capture opportunities in the low-carbon economy of the future. Sir, I beg to move.

Question by MP Dr Intan Azura Mokhtar:

To ask the Minister for the Environment and Water Resources (a) whether he can provide an update on how many households, companies and businesses currently practise recycling of recyclable items respectively; and (b) how extensively are recycling bins used within our housing estates and public places.

Reply by SMS Dr Amy Khor:

Every HDB block, condominium and private apartment development, and landed property is served by recycling bins or a centralised chute for recyclables (CCR).

2 Based on an NEA survey conducted over 2015 and 2016, about 83% of households practised recycling. Of those who practised recycling, 91% indicated that they did so via the recycling bins provided by our public waste collectors. Based on NEA's data on the commercial sector, 94% of large hotels and shopping malls have implemented recycling programmes for their premises. As a whole, the non-domestic sector had a recycling rate of 76% in 2017.

3 Besides the recycling bins in residential estates, there are about 125 sets of recycling bins deployed in public places with high human traffic in the Central-South region of Singapore. And 40.8 tonnes of recyclables were collected through these recycling bins in 2017.

4 While the recycling rate for the non-domestic sector has been high, our domestic recycling rate has grown only gradually, to 21% in 2017. This is higher than the figure cited in recent media reports, which only covers the National Recycling Programme (NRP). The NRP, which provides recycling bins and CCRs to make it convenient for households to recycle daily, is only one means by which domestic recyclables are collected. Other means include door-to-door collection by the informal sector and collection drives at community events.

5 We are making it easier for residents to recycle in order to increase the domestic recycling rate to 30% by 2030, which is one of the targets of our Sustainable Singapore Blueprint. For example, from 1 April this year, all new non-landed private residential developments above four storeys will need to provide dual chutes for refuse and recyclables. These dual chutes have already been introduced in new HDB Build-to-Order flats since January 2014. All existing condominiums will also have to provide one recycling bin per block from 1 August this year. We also recently announced plans to implement an e-waste management system through the Extended Producer Responsibility approach by 2021.

6 Ultimately, active participation in recycling by all Singaporeans is key to improving our domestic recycling rates. NEA will continue to engage Singaporeans and NGOs via social media posts, educational materials distributed at community and school events, and providing information on NEA's website and NEA's myENV mobile app. We hope that through these initiatives, more will be encouraged to do their part for the environment.

Supplementary Question by MP Dr Intan Azura Mokhtar:

I thank the Senior Minister of State for the answers. I am wondering, what is the impact on the recycling process when items are all mixed together, because there are some recycling bins that allow you to separate items but there are some which allow you to mix the items together. For the buildings that have dual chutes – one for rubbish and one for recyclable items, I wonder whether it is effective, because for example, glass bottles that can be recycled, when they are thrown from height, the moment they reach the ground floor, they shatter into shards. How would that impact the recycling process and can better education be carried out for residents who may confuse the two chutes, thinking that they can just throw rubbish into either one of them?

Reply by SMS Dr Amy Khor:

I thank the Member for her supplementary questions. Regarding the commingled recycling bin, our approach to encourage recycling by households is to try and make it as convenient as possible for them to recycle and of course to raise awareness about recycling.

2 The blue commingled recycling bin is placed at every HDB block and provided to every private landed residential home. That is really for ease of access. First of all, they do not need to invest extra effort

and time in segregating the different recyclables. They also do not need to make space at home for the different recyclables because they can just deposit the recyclables in the blue bins anytime.

3 These recyclables will be taken to the materials recovery facility (MRF) where the recyclables will be segregated and brought to the relevant recycling plants for processing. Regarding the contamination of recyclables that the Member alluded to for the blue commingled recycling bin, yes, there is contamination of recyclables if they deposit food waste or non-recyclables in the bin. The contamination rate is about 40% on average.

4 In this area, what we want to do is to appeal to the public to be gracious and not deposit the non-recyclables in the bins, particularly if it is food waste. When it contaminates the recyclables, you waste people's effort in wanting to do their part for the environment. What we will also do is to work with stakeholders on the ground, for instance, the town councils to make sure that there are sufficient waste bins around.

5 We are also looking into putting up more prominent labels on the blue recycling bins to tell them "no food and liquid waste" in the recycling bins and we hope that Singaporeans will be more gracious.

6 With regard to dual chutes, HDB's study in 2012 showed that blocks with dual chutes system – that means one for waste and one for recyclables – actually contribute up to three times more recyclables than the blocks without those chutes. Because of this, HDB has implemented the dual chutes system for all the BTO flats, launched from 2014 and we are requiring private non-landed residential developments above four storeys to also have this dual chute system from 1 April.

7 You are right that if you throw recyclables into the chute, depending on where they land, glass bottles, for instance, might be broken. But this will not affect the recovery of the other commingled recyclables at the MRF. Actually even for glass pieces, particularly for the larger pieces, they can be recovered for recycling.

MINISTRY OF THE ENVIRONMENT AND WATER RESOURCES

ADDENDUM TO THE PRESIDENT'S ADDRESS

MR MASAGOS ZULKIFLI MINISTER FOR THE ENVIRONMENT AND WATER RESOURCES

A Smart, Green, and Liveable Singapore

1 Since independence, we have pursued our vision of a liveable and sustainable Singapore, balancing environmental protection and economic growth. Today, we enjoy a clean environment, flowing taps, and vibrant green and blue spaces. The Ministry of the Environment and Water Resources (MEWR) will build on the legacy of our pioneers and stay true to their spirit of innovation, as we tackle the effects of climate change and current environmental challenges.

Planning for a Resilient Future

2 Climate change is a global concern. As a low-lying island state, Singapore is especially vulnerable to its impact. We will continue to advocate for and contribute to global climate action. We will undertake our Voluntary National Review of the Sustainable Development Goals at the United Nations in July 2018. To rally the region, we will organise the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and Expanded SAMCA (E-SAMCA) in July 2018.

3 The 2016 Climate Action Plan set out our adaptation measures to build Singapore's resilience to climate change, and our mitigation measures to reduce greenhouse gas emissions in every sector. The carbon tax which takes effect from 2019 will provide an economy-wide price signal to spur emissions reduction. In this Year of Climate Action and beyond, we will encourage and support businesses and communities to reduce our carbon footprint and promote sustainable living and working.

4 We will continue to invest in climate-resilient infrastructure, such as enhancing stormwater management systems and diversifying our water supply with more desalination and NEWater plants. In tandem, we are pursuing better management of our water demand. We will also deepen our local research capabilities on climate science and weather through the Centre for Climate Research Singapore.

Realising a Zero Waste Culture

5 Using resources efficiently is critical to reducing emissions, limiting pollution, and strengthening Singapore's economic resilience. We will strive to become a Zero Waste nation and extract greater value from waste as a resource, so as to achieve our vision of a circular economy. Just as we have closed the water loop by recycling water endlessly, we should similarly strive towards closing the waste loop.

6 The Government will take the lead by developing infrastructure and frameworks, such as the Extended Producer Responsibility framework to enhance recycling and manage electrical and electronic waste. We are implementing mandatory reporting of packaging data and packaging waste reduction plans by 2021, and supporting the wider use of on-site food waste digesters at commercial premises and hawker centres. We are working towards the reuse of incineration bottom ash to extend the lifespan of Semakau Landfill.

7 At the same time, we need to kindle in Singaporeans a national consciousness towards the environment, where everyone takes individual and collective responsibility and plays a part through practising sustainable consumption and recycling at home.

Achieving Smart and Green Growth

8 As our population and economy grow, the demands on our infrastructure will increase, even as our manpower and resource constraints tighten. We must transform our environmental services industry and workforce through technology and innovation, to support our move towards greater carbon and resource efficiency.

9 The upcoming Tuas Water Reclamation Plant and the Integrated Waste Management Facility, the first in the world, will be our signature innovation platform to reap synergies from the water-energy-waste nexus. Effluent water from wastewater treatment will be used for cooling waste incineration equipment; food waste will be codigested with used water sludge to enhance biogas production to increase the overall plant thermal efficiency. Integrating the facilities will reduce carbon emissions by more than 200,000 tonnes annually.

10 We are stepping up research and development and improving resource efficiency. For instance, the Waste-to-Energy Research Facility, the first of its kind in Singapore, will enable the transition of emerging technologies (such as turning waste and biomass into synthetic gas) from research into demonstration and test-bedding projects. To enhance energy efficiency in water treatment, we are leading research in technologies such as anaerobic membrane bioreactors for used water treatment, and electro-deionisation and biomimicry for desalinated water. To expand the use of solar energy, we are tapping reservoir surface space and piloting a floating solar system at Tengeh Reservoir.

11 To better serve the public, we are leveraging smart technologies such as sensors and other digital technologies. As part of our Smart Water Grid, we have set up 320 sensor stations island-wide to monitor 5,500km of water distribution pipe network real-time. We are conducting trials on the Automated Meter Reading system to provide timely water consumption data to help households save water.

12 We will provide opportunities for technology collaboration and adaptation across the environmental services industry. As part of the Environmental Services Industry Transformation Map to ensure a vibrant, sustainable, and professional cleaning and waste management industry, we are embracing the use of automation, robotics, and data analytics to enhance productivity in the industry. Besides new public housing estates, the pneumatic waste conveyance systems are being implemented in new private residential developments with at least 500 dwelling units. Increasingly, we will use technology to remotely manage waste collection, and robotics to sort recyclables at materials recovery facilities. The use of autonomous cleaning equipment will free workers to focus on higher value work. The future of delivering environmental services will provide an exciting array of green jobs for our people.

Building a Green and Liveable Home

13 As we strive to build a liveable and sustainable Singapore, we will continue to integrate and transform our blue and green spaces. Through the Active, Beautiful, Clean (ABC) Waters programme, we will continue to turn concrete drains, canals, and reservoirs into vibrant and beautiful rivers, streams, and lakes. Over the next few years, ABC Waters projects at locations such as the Jurong Lake and Sungei Whampoa will be completed.

14 While the Government will continue to strengthen our regulatory regime to safeguard our environment and public health, creating a liveable and endearing home ultimately depends on everyone taking ownership of our environment. Through the Sustainable Singapore movement, we will continue to rally Singaporeans, the larger community, and industry partners to realise this shared vision.

15 Our hawker centres are an important hub for social interaction and an integral part of our daily life and national identity. Beyond providing affordable and good food, our hawker centres are important community spaces that bring together people from all walks of life, and help to strengthen the bonds of our multi-racial society. In 2015, we announced that we would build 20 new hawker centres by 2027. Since then, seven new modern hawker centres have opened. Our Hawker Centre 3.0 initiatives are aimed at ensuring the viability, vitality, and continuity of the hawker trade. We are extending productivity initiatives such as the automated tray return systems and centralised dishwashing services to more hawker centres. We will continue to invest in developing and enhancing our hawker centres to ensure that future generations continue to enjoy our unique and vibrant hawker culture.

Conclusion

16 Our pioneers have laid a solid foundation and left us this wonderful City in a Garden. We will work together to build on their precious legacy, and leave our children with a smart, green, and liveable home.

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Speech For Debate On President's Address 2018

Speech By Mr Masagos Zulkifli,

Minister For The Environment And Water Resources And Minister-In-Charge Of Muslim Affairs

On

Forging The Singapore Brand Of Meritocracy And Building An Exceptional Malay/Muslim Community

Introduction

1. Deputy Speaker, sir, thank you for the opportunity to participate in the debate. I support the motion.
2. We are living in exciting times, in a region full of challenges. I am confident that Singapore will be able to handle these challenges, harness the rich opportunities, and thrive. Or, as the President has put it, Singapore will remain exceptional — in the same way we became exceptional at dealing with our water challenges, through perseverance and innovation, even creating new jobs and exporting solutions abroad.

Meritocracy – Opportunities for All

3. As we forge ahead, we must hold on to the sound principles that have guided us in our journey thus far. One of these is meritocracy – which I believe is important for us to revisit once in a while. In fact, it would not be wrong to say this was one of the values upon which independent Singapore was founded – a powerful ideal which Mr Lee Kuan Yew and our Pioneer leaders believed in.
4. What is meritocracy? At its core, meritocracy is a principle of allocation — allocation of resources; allocation of opportunities; and allocation of rewards. A society founded on meritocracy makes these allocations based on capability and effort — not on race, not on gender, not on your family connections. When working properly, it's the fairest allocation system imaginable.
5. But meritocracy is not a perfect system and does not always work properly, especially when it's a narrow and brittle one — one which only focuses on outcome or engenders ruthless competition at the expense of co-operation; or one where those who have more at the starting line monopolises success over generations.
6. Over time, this will increase inequality and polarise society into the “haves” and “have-nots” — distinct groups living different lives in different worlds. Over time, the marginalised will lose trust in institutions and with others in the community. At the root of it is this: it just gets harder for them to succeed, and eventually, it becomes impossible. Slowly and quietly, society will break up from within. When that happens, we will not be able to overcome together, to face challenges that call for national unity.
7. Indeed, we have seen worrying consequences of rising social inequality overseas. “Drain the swamp” was a key slogan in the last US election, as Americans found social mobility hindered. The American Dream – to be middle-income, to own a home and to raise a family – was no longer within grasp for some. It consequently saw the US retreat from free trade in a bid to revive the American Dream – an economic nuclear option which does not address the domestic causes of the problem. Some in Europe are turning towards extreme right-wing parties amidst anxieties over immigration – at a time when the struggling masses feel the squeeze for resources and space, and their lack of progress. Asian countries have not been spared either. The same could easily happen in Singapore.
8. That is why we must grow a Singapore brand of meritocracy. We must balance our economic and social policies. We cannot drive our economic policies on fierce pursuit of economic gains; but neither can we design our social policies with bleeding hearts. Singapore's brand of meritocracy is characterised by three ingredients: First, the successful giving back to society; Second, common spaces and experiences for all Singaporeans; and Third, support from the Government.

The Singapore brand of Meritocracy

The Successful Giving Back To Society

9. Mr Deputy Speaker, meritocracy can only be moral when those who take the most from the system also put back the most.

10. I quote from an address entitled 'The Ten Suggestions' at Princeton University in 2013 by then-US Federal Reserve Chairman Ben Bernanke, I quote: "A meritocracy is a system in which the people who are the luckiest in their health and genetic endowment; luckiest in terms of family support, encouragement and probably income; luckiest in their educational and career opportunities; and luckiest in so many other ways difficult to enumerate – these are the folks who reap the largest rewards."

11. It is tempting for those who have succeeded to attribute their success solely to their own capabilities and efforts. There is even a term in psychology for this – "Attribution Bias". However, if we are successful, we should realise how lucky we are. And not forget that support society has given us – a good education, a safe and secure environment, and the mental and emotional support. Remember to give back.

12. In our meritocratic society, we must ensure that the spirit of giving back is most apparent in the successful. This starts at home. I read in a Dads-for-Life article where Mr. Gerard Ee related how his father, the late Dr. Ee Peng Liang and Singapore's father of charity, 'transmitted good values through word and action'. The Ee family lived in a lower-income neighbourhood at Geylang Lor 13, and Senior Ee organised annual toy-giveaways at his home for children in the neighbourhood. Junior Ee and his brothers were in charge of packing the toys. And while this happened 50 years ago, Gerard still remembers how the children so looked forward to receiving the toys. Gerard continues his father's spirit of giving back. He served as Chairman of the National Kidney Foundation (NKF) from 2005 to 2012, having responded to a call to help NKF get back to its feet. This was even after he had retired from active volunteering to take a deserved break. This spirit also lives on in Mr Mohamed Abdul Jaleel, who recently launched the S.M. Jaleel Foundation. And in the philanthropic families of the late Dr Lee Kong Chian and Syed Omar Aljunied.

13. We too are successful in our own ways. Share our time, talents and treasures with those in need. As employers, uplift wages of our employees. As colleagues, support those with caregiving responsibilities. Everybody can join the SGCares movement to play a part and give back. Be kind to our fellow Singaporeans in our daily lives.

14. The question is: will the new generation in Singapore, some of whom will become very wealthy in record time in new areas such as tech, have the same spirit of giving as our pioneers? And will the children of our new well-heeled, who have access to the best education in the world, still give time to help uplift the rest of us?

15. What is clear though, is that only when the successful give back, will society accept, rather than envy, their success. And that is because success that benefits others is success which we all can be grateful for.

16. This is how meritocracy can be moral, and not just a method of allocating resources: when the successful demonstrate a sense of duty to society; when the successful share the fruits of success with others, instead of hoarding the gains for themselves.

17. This is indeed why our Public Service model succeeds. Our most capable are awarded with prestigious scholarships – no small sums from public coffers – to pursue education at the best universities all over the world. Because they dedicate their best to public service, everyone in society benefits. We are fortunate to have good people who decided on a public service career, rather than more lucrative fields, because the public service offers them greater meaning. And society has been the better for it. Because the best of our civil servants know, as President Bush Senior put it (and I quote), "that there is but one just use of power, and it is to serve people".

18. Whether the outcome of our meritocracy is the accumulation of wealth or authority, it will only function morally when those who are rewarded find ways to benefit others and help others succeed too. This is how we can narrow our social distance, even as we improve the GINI coefficient. It is as Bernanke puts it: "The only way for even a putative meritocracy to hope to pass ethical muster, to be considered fair, is if those who are the luckiest in all of those respects also have the greatest responsibility to work hard, to contribute to the betterment of the world, and to share their luck with others."

Essential Common Spaces And Experiences For All

19. Mr Deputy Speaker, let me now talk about common spaces and experiences as one feature of Singapore's brand of meritocracy. No other country or city shares common spaces like Singapore. We live together in shared neighbourhoods, eat at the same hawker centres, exercise in the same parks and waterways, and bring our children to the same libraries to read. This is special. We must preserve this to ensure that every Singaporean has a stake in and a shared ownership of Singapore.

20. We do this so that there are places and spaces where our community can come together regardless of race, language or religion, to enable daily interactions in as many ways as possible. But these common spaces are even more meaningful because they guarantee common access to quality public facilities and infrastructure for all; to everyone.

21. Our most basic rental housing must therefore continue to provide tenants with a decent home. That is also why as the Government shapes our future urban landscape, it must distribute rental housing across the island, and mix public and private housing more deliberately. This will ensure that the most needy among us, who have not done well yet in our meritocracy, are not deprived of access to good quality public facilities. The successful and yet-to-be successful will live equally far or near to new nodes of economic activity in Jurong and Punggol, to hawker centres, eldercare facilities and schools. Every Singaporean must play our role. Resist the Not In My Back Yard tendency to shove critical but undesirable facilities like funeral parlours behind rental blocks.

22. Another quality common space is schools. We must continue to provide the best teachers and educational resources to our heartland schools and maintain our motto of "Every School a Good School". Members may smirk at the mention of this motto. But it is a serious matter to remind ourselves to be thankful that we do not have a bifurcation where the elites send their children to expensive private schools and the rest to poorly resourced ones. In fact, many of our best students in national examinations come from our heartland schools.

23. Our education policies must enable every Singaporean to pursue their aspirations and realize their potential, regardless of their family background — including those with special needs. Since independence, our policies have attempted to equalise the opportunities for each generation — even as we know we can never equalise outcomes. Indeed, we are one of the few cities in the world where parents have no qualms putting their children through preschools and primary and secondary schools, where they live. That is part of our brand of meritocracy. Investing in quality education is our way of ensuring a fair and good start to our childrens' journey, whatever their background. While some have the means to go overseas for studies, every Singaporean has the chance to receive a quality education at home. Everyone knows that their degrees and diplomas from our local institutions carry with them a world class reputation.

24. Mr Deputy Speaker, my work at Singtel and in public service has taken me across the world. In every city, there are areas where the rich and successful live, with schools where only the wealthy and connected can afford to send their children to. And then there are the areas which visitors are advised to avoid — typically where the low-income or new immigrants gather. Even when rich and poor neighbourhoods can exist side by side, their inhabitants never cross paths. I am not talking of developing nations but of rich and wealthy ones. That's a failure of meritocracy that we have avoided and must never allow to take shape in our future.

Government Policies As Enablers

25. Let me move on to the third ingredient. The Singapore brand of meritocracy must ensure that nobody is left behind. How can Government policies achieve this? First, Government policies have to act as enablers, as ladders and bridges, to provide a fair chance for everyone to move up in society — not only across families of jobs, but also over time. The Government must therefore not allow meritocracy to reward narrowly, and instead broaden and make alternative routes available. As DPM Tharman once put it — 'multiple peaks of excellence'. And if I may add, 'many chances of success'.

26. Second, our policies must enable self-reliance by supporting and encouraging work. We must provide all Singaporeans with the opportunity to work, and do well for themselves and their families — regardless of

where they are within our system of meritocracy at that point of time. This empowers individuals and families, and strengthens dignity and purpose.

27. But the Government cannot stop there. It has already recognised that the workforce must be ready for future opportunities, as their current skills could become redundant. We are investing in SkillsFuture to support the lifelong development of skills and knowledge, and Industry Transformation Maps to enable our workforce to seize opportunities in the future economy — a future that, as former Minister Lim Swee Say quipped, will see workers transit “from one job in one career” to “many jobs in many careers”. This will also ensure that our meritocracy does not become a static snapshot, but a dynamic one where everyone has the opportunity to reap success throughout his life journey. This recognises that potential is not just realised in school, and provides the opportunity for late bloomers to realise new dreams at different stages of their lives. Ultimately, it is trust between citizens and institutions that will strengthen the Singapore brand of meritocracy. To kindle this virtuous cycle, the Government must deliver on our policies, and continue to actively and openly engage except in matters that are sensitive involving issues of security or commerce.

28. Mr Deputy Speaker, allow me to continue in Malay.

Kemajuan masyarakat Melayu/Islam sejauh ini

29. Tuan Deputy Speaker, izinkan saya merakamkan setinggi terima kasih kepada Dr Yaacob Ibrahim, atas jasa cemerlangnya sebagai Menteri Bertanggungjawab bagi Ehwat Masyarakat Islam selama 16 tahun. Banyak sekali manfaat dari kepimpinan beliau selama beliau bertugas. Tuan Deputy Speaker, meritokrasi banyak memahat identiti masyarakat Melayu/Islam di Singapura. Walaupun masyarakat kita telah dapat mengekalkan pegangan agama dan mempertahankan nilai adab kesopanan orang Melayu, meritokrasi yang memberikan ciri-ciri khas kepada kita.

30. Kesan utama asakkan meritokrasi ialah kita telah beralih dari masyarakat feodal yang menitik beratkan pangkat, gelaran dan harta yang boleh diwariskan – kepada masyarakat yang menilai seseorang dari pencapaian pendidikan dan kerjayanya. Kita menjadi masyarakat yang membina impian dan harapan pada masa hadapan kerana ia memungkinkan kehidupan yang lebih baik. Kita tidak lagi pasrah kepada nasib semata-mata.

31. Setelah 50 tahun merdeka, sistem meritokrasi ala Singapura telah menghasilkan pencapaian masyarakat kita yang membanggakan. Buktinya: pada 1980, hanya 2.3 peratus penduduk Melayu mencapai pendidikan pos menengah ke atas. Namun jumlah tersebut telah meningkat secara mantap hingga mencapai hampir 40 peratus penduduk Melayu pada 2015. Ini dari jumlah keseluruhan merangkumi mereka yang tua dan muda.

32. Kalau dilihat kohort hari ini pula, hanya 1 peratus anak Melayu yang tidak habis bersekolah 10 tahun dan 94 peratus dari mereka meraih pendidikan pos menengah. Di peringkat universiti, kita lihat lebih ramai anak Melayu yang meraih kepujian kelas pertama setiap tahun. Ini sangat membanggakan. Mereka aset masyarakat kita yang terkini dan akan menjadi batu loncatan masa depan kita yang terus cerah.

33. Dalam pasaran pekerjaan pula, kita lihat lebih ramai orang Melayu memegang jawatan pentadbiran, pengurusan, profesional dan teknikal (PMET). Ini merupakan peningkatan daripada lebih 7 peratus jumlah penduduk pada 1980 kepada lebih 32 peratus pada 2015. Pendapatan bulanan isi rumah masyarakat Melayu juga meningkat sebanyak enam kali ganda dalam tempoh 35 tahun – dari 1980 hingga 2015.

34. Mungkin masih ada yang sering mencemuh akan pencapaian tersebut kerana dilihat masih terbelakang dibandingkan dengan kaum yang lain. Tetapi saya pula merasa bangga, kerana pencapaian kita hari ini adalah bukti bahawa kita boleh berjaya dengan berusaha dan tidak bergantung pada nasib atau bercandu kepada pertolongan. Apalagi kalau kita lihat pada potensi kohort terkini. Kita adalah hasil asakkan sistem meritokrasi yang tidak pilih kasih kerana bangsa atau kedudukan. Justeru bagi mereka yang berjaya dan mendapat keyakinan semua, kejayaan kita tulen. Malah kepakaran orang Melayu Singapura diiktiraf di mana sahaja kita bekerja – kerana pasport kita dipandang sama merah, sama nilainya.

35. Tuan Speaker, kita tidak mampu hanya berbangga dengan pencapaian hari ini dan berhenti di sini. Ini kerana ada tiga gejala luaran yang perlu kita tangani. Jika tidak, ia akan menghambat kemajuan kaum kita pada masa mendatang.

Cabaran elemen luar jejas kehidupan beragama di sini

36. Yang pertama, elemen luar yang cuba merubah dan mempengaruhi cara sesetengah daripada kita menjalani kehidupan beragama di sini. Ia juga sedikit sebanyak berjaya menghakis ciri dan nilai kebudayaan kita sebagai orang Melayu/Islam di Nusantara ini dan juga warisan Melayu yang sepatutnya harus kita banggakan. Ia juga boleh memecah-belahkan antara anggota masyarakat kita malah antara ahli keluarga kita.

37. Di sini peranan yang dimainkan oleh Majlis Ugama Islam Singapura (MUIS) sebagai penyokong kehidupan sosio-agama masyarakat Islam setempat dan dalam berinteraksi dengan masyarakat berbilang agama, adalah sangat penting. Kami akan berusaha memastikan guru-guru agama setempat kita setaraf dan sebaik dengan pendidik agama asing yang lain yang mungkin lebih glamor. Ini kerana mesej agama harus berkesan dan relevan untuk kehidupan di Singapura dan bukan hanya setakat menarik. Oleh itu, kita harus memastikan Skim Pengiktirafan Asatizah atau ARS terus berkembang dengan dorongan Pejabat Mufti dan sokongan para asatizah, untuk mentauliahkan para asatizah agar menyebarkan ajaran yang sejajar dengan kehidupan dan konteks Singapura tanpa mengkompromikan nilai-nilai asas Islam.

Gegaran ekonomi di rantau Asia

38. Cabaran kedua adalah gegaran ekonomi yang sangat ketara. Dunia sedang menghadapi pelbagai ketidakpastian dari segi sosial, ekonomi dan politik. Ia berlaku dekat dan jauh. Cabaran timbul dengan berkembangnya ekonomi Asia dan rantau kita. Kedudukan mapan kita dan negara-negara serantau berubah dan kita dicabar hingga menjadi pesaing sangat sengit. Gangguan teknologi baru akan lebih pesat dan menggegarkan – samada dari kecerdasan buatan atau Artificial Intelligence (AI), robotik dan ekonomi digital. Penduduk kita juga semakin menua. Pekerjaan cepat pupus dan kemahiran semalam tidak diperlukan hari esok.

39. Di sini pula, Yayasan Mendaki boleh memainkan peranan penting dengan membuat penyesuaian pada program-programnya. Pada golongan pelajar, Mendaki akan terus memastikan mereka memiliki pendidikan asas dan memperkasakan yang berpotensi, seawal di bangku prasekolah. Justeru, Mendaki perlu bekerjasama dengan agensi-agensy pemerintah dan badan-badan Melayu/Islam yang lain untuk memberi perhatian kepada faktor-faktor yang menyebabkan pendidikan anak-anak kita tergendala terutama apabila kehidupan berkeluarga mereka terganggu. Ini kerana bukan sahaja keluarga pincang menyebabkan potensi anak-anak kita tidak tercapai, malah mereka juga berisiko tinggi terjerumus ke dalam kancan jenayah dan penyalahgunaan dadah.

40. Oleh kerana gangguan ekonomi akan membuat segulung ijazah tidak bernilai atau kemahiran tidak dihargai dengan sekelip mata, Mendaki sudah juga bergiat memikirkan bagaimana masyarakat kita dapat segera membudayakan pendidikan sepanjang hayat dan siap berubah dalam meningkatkan kemahiran untuk ekonomi baru, serta meraih peluang yang bakal wujud.

Kesan pengaruh ekstremisme luar

41. Masalah ketiga ialah kesan ekstremisme dari pengaruh agama yang asing. Ia tidak terbatas kepada penganasan semata-mata kerana sikap ekstrim mula ada kaitan dengan sikap eksklusif yang boleh menyebabkan masyarakat Islam memencilkan diri dari masyarakat umum. Sedikit sebanyak ia sudah pun menghambat deras integrasi dengan kaum lain.

42. Dalam menghadapi semua cabaran-cabaran tersebut, MESRA pula memainkan peranan penting supaya masyarakat kita diurus nasional. MESRA akan memainkan peranan proaktif supaya masyarakat kita banyak peluang berinteraksi dengan semua kaum dalam kehidupan seharian kita, dan tidak terbatas di waktu sekolah atau di kerja. Inilah caranya Singapura membangun masyarakat mesra dan harmoni kerana banyak berinteraksi antara satu sama lain meskipun berbeza agama dan budaya. Pada masa yang sama kita peka hak dan tanggungjawab kewargaan tidak berbeza. Inilah menjadikan kita masyarakat yang bersatu.

43. Oleh itu, MESRA perlu meluaskan jangkauannya supaya tidak hanya menumpukan kepada segmen masyarakat bahasa dan budaya sahaja. Saya ingin MESRA diperkasakan lagi untuk mencapai dua matlamat besar.

44. Pertama, agar akar umbi sukarelawan Melayu berusaha menjalin hubungan masyarakat Melayu lebih meluas dan mendalam. Tidak lama lagi, MESRA bakal mempunyai pusat masyarakat di Wisma Geylang Serai (WGS) di bawah pimpinan SMS Dr Maliki untuk dilestarikan demi maslahat masyarakat. Para penasihat MESRA yang lain pula – SPS Dr Faishal, SPS Amrin dan Cik Rahayu telah pun memulakan pelbagai program percubaan yang inovatif melibatkan karyawan di bidang-bidang baru seperti kesihatan, guaman dan pendidikan. Ia jelas terbukti menarik kepada segmen-segmen baru masyarakat kita. Kita akan memperbanyakkan lagi program tersebut dan menyelaraskannya di lebih banyak kawasan perumahan serta di Pusat MESRA di WGS.

45. Kedua, kita perlu menguatkan lapisan kepimpinan yang berkaliber di MESRA. Saya bersyukur kerana beberapa karyawan yang cemerlang dalam bidang-bidang masing-masing, telah menyahut seruan kami untuk sama-sama membantu masyarakat kita untuk terus bangkit. Dengan ini, saya gembira mengumumkan penubuhan Majlis Penasihat Persatuan Rakyat MESRA yang melibatkan tujuh anggota penasihat, Exco tertinggi MESRA dan anggota-anggota karyawan tersebut. Kami akan bekerjasama untuk melibatkan lebih ramai lagi karyawan demi memberi layanan dan sumbangan terbaik kepada masyarakat dalam kegiatan MESRA. Inilah hasil meritokrasi yang terbaik di masyarakat Melayu/Islam Singapura, iaitu karyawan ulung kita yang telah berjaya, kembali berjasa kepada masyarakat.

Mendaki – MUIS – MESRA: Kuasa 3M

46. Tuan Deputy Speaker, memandangkan ke hadapan, tiga teras utama akan dititikberatkan dalam usaha terus memperkasakan masyarakat kita. Pertama, kita akan terus memperkuat MUIS, MENDAKI dan MESRA – atau kuasa 3M – dengan kakitangan dan kepiawaian terbaik. Ketiga-tiga institusi ini adalah aset masyarakat yang sangat bernilai dan adalah tunjang masyarakat Melayu/Islam Singapura. Meskipun 3M adalah institusi berbeza – MUIS sebagai badan berkanun, Mendaki berbentuk badan bantu diri dan MESRA sebagai sebahagian daripada Persatuan Rakyat. Sistem meritokrasi membolehkan kita menguatkan 3M dengan pegawai yang terbaik. Sistem meritokrasi juga memastikan pembaharuan jika ada yang tidak menyerlah.

47. Tambahan, karyawan di 3M harus mampu dan tahu bekerja bersinergi dan bersepadu, dengan satu sama lain. 3M harus memacu sehaluan dan seiring ke arah kemajuan masyarakat Melayu/Islam.

48. Kedua, kerana tugas menggerakkan 3M ini dalam mengatasi cabaran masyarakat adalah berat, kami AP-AP yang menjawat jawatan – saya, SMS Dr Maliki, MOS Zaqy, SPS Dr Faishal dan SPS Amrin, akan bekerjasama sebagai satu pasukan bersepadu. Saya akan menugaskan mereka menerajui pelbagai inisiatif dan menggembelng tenaga rakan-rakan lain. Sebagai langkah pertama, saya akan melantik MOS Zaqy sebagai Naib Pengerusi di Mendaki. Kami akan berusaha sehaluan. Seperti pepatah Afrika, kami sedar jika ingin lari pantas, larilah sendirian. Tetapi jika ingin berlari jauh, marilah lari bersama.

49. Ketiga, 3M akan menguatkan lagi jaringan ikatan masing-masing. Banyak sekali program inovatif yang diusahakan badan-badan 3M. Namun satu kekurangan yang harus diatasi adalah masalah penyampaian program tersebut atau yang disebut 'last mile service delivery'. Kisah berikut ini adalah satu contoh yang ketara.

50. Cik S adalah seorang penduduk di kawasan undi saya. Keluarganya menghadapi kesusahan apabila suaminya ditahan kerana dadah. Mereka baru sahaja menjual rumah. Maka secara peraturan mereka tidak dapat atau dibenarkan menyewa rumah atau membeli flat baru kerana CPF di dalam simpanan suaminya. Oleh kerana anggota akar umbi mengetahui keadaan beliau, kami berkeinginan mendapatkan bantuan untuknya. Jelas banyak sekali program yang tersedia. Yang utama ialah mendapatkan perhatian dari Pejabat Khidmat Sosial (SSO) dan HDB. Pusat Khidmat Keluarga Singapore Buddhist Lodge Vision pula memberi kaunseling kerana beliau mula murung. Mereka merujuk beliau kepada peluang menjalani latihan dan dengan sokongan tersebut beliau mula bekerja, walaupun tidak pernah bekerja sebelum ini. Cik S dan anak-anaknya juga dibantu Persatuan Derma Amanah Muslimin (MTFA), Dana Pendidikan Harun Ghani dan Skim Tuisyen Hujung Minggu Mendaki. Azam beliau kuat untuk berdikari, ada kalanya beliau sanggup membuat beberapa pekerjaan.

51. Perjalanan beliau jelas penuh ranjau tetapi keluarganya tetap utuh. Sekarang suaminya telah dibebaskan dan kembali bersama keluarga. Suaminya kini seorang pemandu dan mereka telah berpindah ke rumah flat 3-bilik. Apa yang sangat menggembirakan ialah ketiga-tiga anak beliau sedang menuntut di

politeknik. Kerana sukarelawan akar umbi telah menghubungi Cik S seawal-awalnya dan masyarakat cepat menghulurkan sokongan serta bersamanya dalam perjalanan beliau yang sukar, keluarganya dapat bangkit semula.

52. Tuan Deputy Speaker, begitulah pentingnya 'last-mile service delivery' kerana itu ia perlu dibina dan diperkasakan. Saya rasa tidak kurang program-program yang dihasilkan di institusi-institusi 3M dan badan-badan kerabat mereka untuk membantu dan memajukan masyarakat, termasuk program-program dari pemerintah. Oleh itu, kami ingin 3M membina dan menguatkan jaringan masing-masing menjadi 'last-mile' yang efektif – MUIS dengan masjid-masjid, madrasah dan ulama kita, MENDAKI dengan badan-badan kerabat Melayu/Islam, dan MESRA dengan para karyawan serta masyarakat umum.

53 Setelah itu pula, kesemua institusi dan jaringan mereka harus wujud sebagai satu ekologi: iaitu ketiga-tiga institusi bukan sahaja berinovatif melakar program untuk masyarakat, tetapi saling bantu-membantu menyampaikan program institusi lain dan juga program pemerintah melalui jaringan mereka di mana ia bermanfaat. Jika kita dapat mengatasi sikap 'Not Invented Here' atau tidak menyokong inisiatif orang lain dan 'Guarding Turf' atau khawatir pengaruh kita tergugat – masyarakat kita akan membuat peningkatan yang ketara.

54. Kita perlu menggerakkan semua potensi masyarakat kita. Kita sudah dikagumi pelawat-pelawat Singapura sebagai masyarakat minoriti contoh yang berjaya kerana diperkasakan oleh sistem meritokrasi Singapura. Tapi sayang sekiranya kita hanya menghasilkan masyarakat yang lebih berada dari kemewahannya. Mari kita dengar sedikit lirik lagu Papa Rock Ramli Sarip, berjudul 'Ku Cari Damai Abadi' dalam albumnya, Sadaqa. Saya tak akan menyanyikannya. Nyanyian beliau:

Aku cari bukan harta bertimbun-timbun

Untuk hidup kaya

Aku cari bukan wang berjuta-juta

Untuk hidup bergaya

Aku cari bukan kawan-kawan

Untuk hidup berfoya-foya

55. Kemewahan kita juga harus menjadikan kita masyarakat bersyukur hingga terpanggil jiwa rahmah. Jiwa rahmahlah pula mendorong tanggungjawab kita membangun masyarakat dengan semangat bergotong-royong bersama. Itu juga pesanan saya kepada para pelajar pengajian tinggi baru-baru ini di Berita Harian supaya setelah berjaya nanti, menyumbang kembali dan mendampingi masyarakat. Sekurang-kurangnya menjadi inspirasi kepada yang lain untuk berjaya. Ini sejajar dengan apa saya kata tadi, jika meritokrasi setakat menjadikan kita berjaya, ia adalah sistem yang pincang kerana tidak menanam azam untuk kembali berjasa kepada masyarakat. Sesuai dengan Ramadan yang akan menjelang, mari kita memperbaharui azam mencurahkan rahmah kepada semua. Dengan itu akan tercapai tujuan hidup sesuai seruan lagu Bang Ramli tadi, "supaya hidup damai abadi".

56. Tuan Deputy Speaker, seruan Presiden supaya kita melahirkan negara luarbiasa. Gandingan kita bersama akan meningkatkan martabat masyarakat Melayu/Islam Singapura daripada masyarakat minoriti contoh, kepada masyarakat minoriti yang luarbiasa. Sebagaimana kaum Gurkha – mereka masyhur dengan keberanian di medan perang dan merupakan masyarakat minoriti Nepal yang luarbiasa. Ayuh kita bina tukikan masyarakat Melayu/Islam Singapura yang luarbiasa di Nusatenggara.

Conclusion

57. Mr Deputy Speaker, let me conclude: we are at a key juncture in our nation's journey. In this journey, we will preserve our place in the world; Singapore must remain exceptional.

58. And we must do so with the Singapore brand of meritocracy — one that is not merely a way to allocate resources but to also do so fairly and effectively. The Singapore brand of meritocracy must remain the means to build a good society, not just one to build a richer society. With the aim to ensure that Singapore remains a home for all — not just for the rich and successful. A Singapore where nobody is left behind, and a Singapore which continues to provide opportunities for everyone to realise his dreams.

59. Thank you.

Translation of Malay Text

THE PROGRESS OF THE MALAY/MUSLIM COMMUNITY THUS FAR

29. Mr Deputy Speaker, allow me to put on record my highest thanks to Dr Yaacob Ibrahim, for his excellent contributions as Minister-in-charge of Muslim Affairs for 16 years. In the span of his service, there have been many benefits from his leadership. Mr Deputy Speaker, meritocracy has, to a large extent, helped form the identity of the Malay/Muslims in Singapore. Although the community is able to maintain its religious beliefs and uphold Malay values, it is meritocracy that has given us some unique characteristics.

30. The main impact of meritocracy is that we have transformed from a feudal society that gives importance to rank, titles and wealth that can be inherited – to a community that measures an individual based on his educational and career achievements. We have become a community that builds dreams and hopes for the future because this will help build a better life. We no longer resign ourselves to fate.

31. After 50 years of independence, Singapore's meritocratic system has helped the Malays to achieve progress that we can be proud of. For example: In 1980 only 2.3 percent of the Malay population attained post-secondary education and above. This percentage has increased steadily to almost 40 percent in 2015. This includes the young and old in the Malay community.

32. Today, only 1 percent of Malays do not complete 10 years of education, and 94 percent of them now have a post-secondary education. Every year, we see more Malays who graduate from university with first class honours. This is extremely heartening. They are now our community assets who will serve as stepping stones for us to achieve greater success and a brighter future.

33. More Malays are now holding management, professional, executive and technical (PMET) positions in the workforce. In 1980, Malays made up only slightly more than 7 percent of PMETs but in 2015, the percentage has increased to more than 32 percent. The monthly household income of Malays has also increased sixfold in a span of 35 years – from 1980 to 2015.

34. There are some who may still think lowly of this achievement because they feel that Malays are still lagging as compared to the other communities. But I feel proud because our achievement today proves that we can succeed with hard work and not submit to fate or be overly dependent on assistance, what more when we see the potential of the latest cohorts. We are products of the meritocratic system that does not give favours to anyone based on race or status. Thus, the achievement of those who have succeeded and gained the confidence of others is genuine. In fact, the expertise of the Singaporean Malays are recognised in all fields that they are in. In fact, their expertise is equally valued like that of other Singaporeans.

35. Mr Speaker, Sir, we cannot afford to rest on our laurels. This is because there are three external elements that we must tackle. Failing to do so will hinder our community's progress in the future.

THE CHALLENGE OF EXTERNAL ELEMENTS THAT AFFECT OUR RELIGIOUS LIFE IN SINGAPORE

36. First, external elements have tried to change and influence the way some of us lead our religious life in Singapore. It has also, to some extent, succeeded in eroding our cultural values as Malay/Muslims in the region, and also our Malay heritage that we should uphold. It can also divide our community, even among our family members.

37. The role of the Islamic Religious Council of Singapore (MUIS) in supporting local Muslims in their socio-religious life and their interaction with Singapore's multireligious community is very important. We will continue to strive to ensure that local religious teachers are on par and as good as foreign religious educators who may be seen as more glamorous. This is because the religious messages must not only be attractive, but more importantly effective and relevant to life in Singapore. Therefore, we must ensure that the Asatizah Recognition Scheme or ARS continues to be improved with guidance from the Office of the Mufti and support from religious teachers. The scheme will authorise the religious teachers to spread Islamic teachings in line with the way of life and context in Singapore, without compromising the basic tenets of Islam.

ECONOMIC SHIFT IN ASIA

38. The second challenge is the distinct shift in the economy. The world is facing social, economic and political uncertainties. It is happening in countries near and far. This challenge has emerged as the economies in Asia and our region grow. Our strong position is being challenged and countries in the region have become our fierce competitors. New technologies will come faster and be more disruptive – be it Artificial Intelligence (AI), robotics or the digital economy. Our population is also ageing. Jobs are becoming obsolete and yesterday's skills are no longer needed tomorrow.

39. Mendaki can play an important role by making adjustments to its programmes. Mendaki will continue to ensure that students possess basic education and empower those who have the potential, as early as preschool. Hence, Mendaki must also working with government agencies and other Malay/Muslim organisations to focus on addressing factors that may hinder our children's education, particularly when there are troubled families. This is because children from troubled families are not only unable to realise their full potential, but also face the risk of falling into the pitfalls of crimes and drug abuse.

40. Since economic disruptions will make a degree obsolete or skills redundant overnight, Mendaki has also thought of how our community can quickly embrace the culture of lifelong learning and be ready to upskill for the new economy, as well as grabbing opportunities that will be become available.

EFFECTS OF FOREIGN EXTREMIST INFLUENCE

41. The third problem is the effect of the influence of foreign religious extremism. This is not limited to terrorism, because extremist attitudes encourage one to be exclusive, which can cause the Muslim community to isolate itself from other communities. To some extent, it has already hindered the integration with different communities.

42. In facing these challenges, People's Association (PA) Malay Activity Executive Committees Council (MESRA) also plays an important role so that our community is in the national mainstream. MESRA will play a proactive role so that our community will have more opportunities to interact with all other communities in our daily lives, not only in schools or at work. This is how Singapore develops a friendly and harmonious society because there is great interaction between one another regardless of race, religion and culture. At the same time, we are sensitive to our equal rights and responsibilities as citizens. This is what makes our society united.

43. Therefore, MESRA needs to expand its reach so that it does not only focus its attention to the language and cultural segments of the community. MESRA should be further empowered to achieve two big objectives.

44. First, Malay grassroots volunteers should work towards building wider and deeper relationships within the Malay community. Soon, MESRA will have a centre at Wisma Geylang Serai (WGS), under the leadership of Dr Maliki, to be utilised for the benefit of the community. Other MESRA advisors – SPS Dr Faishal, SPS Amrin and Rahayu have already started various innovative programmes involving professionals in new sectors such as health, law and education. They were proven to be a hit in the new

segments in our community. We will widen these programmes and coordinate it in more estates as well as at the MESRA Centre at WGS.

45. Second, we must strengthen a calibre leadership in MESRA. I am grateful because several professionals who have excelled in their respective fields, have accepted our invitation to work with us in assisting the community to progress further. With this, I am pleased to announce the setting up of PA's MESRA Advisory Council, which comprises seven advisors, MESRA's top Exco members and the professionals. We will work together to involve more professionals so as to provide the best service and contribution to the community in MESRA's activities. This is the greatest product of meritocracy in Singapore's Malay/Muslim community, in which our outstanding professionals who have achieved success, return to serve the community.

THE COLLECTIVE STRENGTH OF THE 3M: MENDAKI – MUIS – MESRA

46. Moving forward, three main thrusts will be prioritised in the ongoing efforts to empower our community. First, we will continue to strengthen MUIS, MENDAKI and MESRA – or the 3M – by ensuring they are equipped with the most qualified staff and meet the highest standards. These three institutions are community assets that are highly valued and are the pivot of the Malay/Muslim community in Singapore. This, despite the fact that 3M comprises three different institutions – MUIS is a statutory board, Mendaki is a self-help group while MESRA is part of the PA. The meritocratic system has enabled us to strengthen 3M with the most qualified officers. The system also ensures that a renewal process will take place should any of them underperform.

47. In addition, professionals in 3M must be able and know how to work in synergy and unity with one another. 3M must work in tandem to help the Malay/Muslim community to achieve progress.

48. Second, because setting 3M in motion to tackle the challenges facing the community is a heavy task, us political office holders – SMS Dr Maliki, MOS Zaqy, SPS Dr Faishal, SPS Amrin and I – will work together as a team. I will task them to helm various initiatives and mobilise other partners. As a first step, I will appoint MOS Zaqy as Deputy Chairman of Mendaki. We will work in tandem. As the African proverb goes, “if you want to go fast, go alone. But if you want to go far, go together.”

49. Third, the 3M will strengthen their respective networks. The 3M institutions have developed many innovative programmes. However, one weakness that they must overcome are issues in 'last-mile service delivery'. The following story is one clear example.

50. Ms S is a resident in my constituency. Her family faced difficulties when her husband was arrested for drug abuse. They had just sold their house. Thus under the regulations, they were not allowed to rent out their house or buy a new flat because the CPF monies were tied up in her husband's savings account. Thus when the grassroots members got to know of her situation, we promptly helped her get the assistance she needed. Clearly, there are many programmes out there. The most important was to get the attention of the Social Service Office (SSO) and HDB. Meanwhile, the Singapore Buddhist Lodge Vision Family Service Centre provided counselling as she began to suffer from depression. They referred her to training opportunities, and with that support, she started working, even though she had never worked before this. Ms S and her children also received assistance from the Muslim Trust Fund Association (MFTA), the Harun Ghani Education fund, and the Mendaki Tuition Scheme. Due to her strong determination to stand on her own feet, at times, she was even willing to hold several jobs.

51. Her journey was full of challenges but her family remained intact. Her husband has been released from prison and is back with the family. He is currently working as a driver and they have moved to a 3-room flat. What is most heartening is that all three of her children are now studying in polytechnic. With the help of the grassroots volunteers who managed to get in touch with Ms S early, and the community which swiftly provided support and stood by her throughout her difficult journey, her family managed to pull through and pick themselves up.

52. Mr Speaker, Sir, this shows how crucial 'last-mile service delivery' is, and hence, it has to be built up and strengthened. I think we are not lacking in programmes developed by the 3M institutions and their partner organisations to help the community to progress, and this includes programmes from the Government. Thus, we want 3M to continue building up and strengthening their respective networks to provide 'last-mile service

delivery' effectively – MUIS with the mosques, our madrasahs and our Islamic scholars, MENDAKI with Malay/Muslim partner organisations, and MESRA with professionals and the community at large.

53. All institutions and their networks must then exist as a single ecology: that is, all three institutions must not only be innovative in developing community programmes, but they must also help deliver programmes by other institutions and the Government through their networks, wherever it is beneficial. If we can overcome the 'Not Invented Here' culture of not supporting others' initiatives and the 'Guarding Turf' culture of ensuring one's influence is not threatened, our community will make significant progress.

54. We must fully mobilise our community's potentials. Empowered by Singapore's meritocratic system, we have progressed as a minority group that is a good example to others. However, it would be unfortunate if we build a community that is merely rich in material wealth. Let us listen to some of the lyrics of Papa Rock Ramli Sarip's song, titled 'Ku Cari Damai Abadi' or 'I Seek Eternal Peace', from his album, 'Sadaqa'. I will not sing it. He says:

Aku cari bukan harta bertimbun-timbun

Untuk hidup kaya

Aku cari bukan wang berjuta-juta

Untuk hidup bergaya

Aku cari bukan kawan-kawan

Untuk hidup berfoya-foya

(I do not seek bountiful riches

To live a wealthy life

I do not seek millions of dollars

To live a glamorous life

I do not seek friendships

Merely to live a frivolous life)

55. The material wealth that we possess as a community should help embody the spirit of 'rahmah' or mercy. This spirit will spur us on to work together to helm the responsibility of uplifting our community. Recently, at Berita Harian, I urged a group of tertiary students to give back and engage the community, especially when they have become successful. Their success can be an inspiration to others. As I said earlier, if meritocracy merely made us successful, without inspiring us to give back to society, it would be a flawed system. In time for the upcoming Muslim holy month of Ramadan, let us renew our resolution to spread blessings to all. With that, we will have fulfilled the purpose of life, just as Brother Ramli's song called upon us to lead a meaningful life.

56. Mr Deputy Speaker, the President has called on us to build an exceptional nation. Our collective efforts will raise the standing of the Malay/Muslim community in Singapore, from an exemplary minority group to an exceptional minority group. Just like the Gurkha community – they are famed for their bravery in the battlefield and are an exceptional minority group in Nepal. Let us be an extraordinary Singapore Malay/Muslim community in the larger region.

Question by Ms Joan Pereira: To ask the Minister for the Environment and Water Resources following the fires at Pulau Busing and Kranji in March 2018 (a) whether these fires have affected the air quality in the vicinity; and (b) what is the procedure for activation of the NEA team to monitor air or water quality following a major fire involving hazardous products.

Reply:

1. NEA monitors air quality in Singapore through a network of real-time monitoring stations. Besides monitoring key air pollutants such as sulphur dioxide and fine particulate matter (PM2.5), these stations also monitor Volatile Organic Compounds (VOCs). VOCs are often associated with the handling and combustion of fuel oil.

2. In the event of major fires, in addition to SCDF being activated, NEA officers will be deployed to monitor air and water quality in the vicinity of the affected premises during and after the incident.

3. In the case of the Pulau Busing fire on 20 March 2018, the fire occurred at an oil storage tank operated by M/s PB Tankers Ltd. NEA officers monitored the ambient air quality and meteorological conditions while SCDF and the Company's Emergency Response Team (CERT) were fighting the fire. The prevailing winds then were blowing from the northeast and the air quality was in the "Good to Moderate" range, with no spikes in the PM2.5, sulphur dioxide, VOCs, and other air pollutant levels. The firefighting water was contained within the bund of the affected oil storage tank and the coastal water quality around Pulau Busing was not affected.

4. As for the fire incident that occurred at No.11 Kranji Crescent on 22 March 2018, NEA officers monitored air and water quality near the affected premises during and after the incident, and did not detect any spikes in the air or water pollutant levels.

Question by Mr Gan Thiam Poh: To ask the Minister for the Environment and Water Resources what can the Ministry do to ensure that the food prices at hawker centres and coffee shops in new estates such as Sengkang, Tampines and Sembawang are comparable to those in matured estates as shown in the Makan Index.

Reply:

The Makan Index, developed by the Institute of Policy Studies, is based on the average prices of five food types observed at selected hawker centres, food courts and coffee shops. The Government does not regulate the prices of food sold in coffee shops, food courts or hawker centres.

2. Nevertheless, my Ministry ensures that affordable food options are available at all our hawker centres, including those in new estates. To moderate stall rentals and prevent rent-seeking behaviour, my Ministry has disallowed the subletting of stalls. We have also removed the reserve rent in our monthly stall tender exercises. This means that even if the bidding price for these vacant stalls is below market price, the National Environment Agency (NEA) will allocate the vacant stall to the highest bidder as long as there are competitive bids. About 40% of cooked food stalls have been awarded at bids that are below 85% of the assessed market rent.

3. To assist stall holders with rising manpower costs, we are deploying productivity measures, such as centralised dishwashing, automated tray return, e-payment options, and kitchen automation in our hawker centres. These initiatives will reduce the workload of the hawkers and allow them to focus on food preparation and cooking, especially during peak hours. In addition, NEA has approved more than a hundred applications (worth about \$214,000) since the Hawkers' Productivity Grant was launched in October 2017 to assist hawkers adopt stall-level productivity measures. Those who have benefited from the grant have given feedback that the equipment helps to reduce food preparation time significantly.

4. The availability of numerous stalls allows consumers to compare food prices and take into account affordability in their purchase decisions at hawker centres. This also helps to moderate the increase in food prices.

5. We are committed to upholding the role of hawker centres as community dining rooms in both mature and new estates so that Singaporeans from all walks of life can enjoy food at affordable prices. We announced in 2015 that 20 new hawker centres with approximately 800 stalls will be built by 2027. Some of these new hawker centres will be located in new towns such as Sengkang, Tampines and Sembawang. The managing agents appointed to run these new

centres will be required to provide affordable food options. An example is Hawker Centre @ Our Tampines Hub (OTH), where hawkers selling local food offer at least one meal option priced at \$2.80 or less.

Question by MP Mr Zainal Sapari: To ask the Minister for the Environment and Water Resources whether all motorcycles registered before 2003 and of at least 35 years old by 2028 will be allowed to continue under LTA's Classic Vehicle Scheme.

Reply:

1 All motorcycles registered before 1 July 2003 will no longer be allowed for use on Singapore's roads after 30 June 2028. Motorcycles on the Classic, Vintage (Restricted) and Revised Vintage Vehicle Schemes are exempted due to their limited usage on the road. Motorcycles registered in Singapore before 1 July 2003 and which are at least 35 years old on or before 30 June 2028 are eligible for conversion to the Classic Vehicle Scheme if they meet the relevant requirements like those pertaining to vehicle inspection and motor insurance coverage, as specified by the Land Transport Authority (LTA).

Question by MP Mr Ang Hin Kee: To ask the Minister for the Environment and Water Resources (a) whether the deployment of recycling bins to HDB blocks under the enhanced National Recycling Programme has been effective since it was implemented in 2011; (b) whether the Ministry enforces checks to ensure that the bins are returned to their designated spots after the waste have been collected; and (c) whether technology such as geo-fencing can be deployed to ensure that these bins are not inevitably moved or relocated.

Reply:

The National Recycling Programme (NRP) was launched in 2001 to complement the efforts of the informal recycling sector. Since then, the National Environment Agency (NEA) has enhanced the NRP to make it more convenient for residents to recycle. For example, from 2011, one blue recycling bin is provided for every HDB block, an increase from one for every five blocks.

2 These efforts have contributed to an increase in the recyclables collected under the NRP, from 25,300 tonnes in 2011 to 44,400 tonnes in 2017. A survey conducted in 2015/2016 also showed that among residents who recycle, 9 in 10 use the NRP blue bins. While we have made progress on this front, we can do more to make recycling a part of daily living for all Singaporeans. Our recycling rates have not caught up with our increased consumption and purchasing habits, with Singapore's domestic recycling rate hovering at around 20 percent since 2012. We encourage Singaporeans to recycle more and make sustainable living choices so as to lower our carbon footprint.

3 The Government will continue to facilitate recycling. For example, all new HDB developments will provide dual chutes for refuse and recyclables, to make it more convenient for residents to recycle. From 1 April 2018, new non-landed private residential developments taller than four storeys are similarly required to be equipped with dual chutes. We will also require existing condominiums to provide one recycling bin per block from 1 August 2018. Everyone must also play their part to segregate their waste and utilise the recycling facilities provided. More importantly, let us all be gracious and not waste the efforts of our fellow Singaporeans by contaminating recycling bins with food or liquid waste.

4 Public Waste Collectors (PWCs) are required to return recycling bins to their designated locations after collection. NEA conducts spot-checks to ensure that recycling bins are at their designated locations. From the second half of 2018, starting with the public waste collection contract for the Pasir Ris-Bedok sector, NEA will introduce a new requirement for PWCs to mark the locations of the recycling bins on the floor. Members of the public who find recycling bins

outside the demarcated area should inform NEA, which will then conduct investigations and penalise the respective PWC if they are found liable for the breach.

5 NEA is also conducting a trial using side-loader trucks which have mechanised arms that will empty recycling bins to load recyclables in the truck. As part of this trial, the existing blue recycling bins will be replaced with new bins which are larger and more difficult to move. This will reduce the likelihood of unauthorised movement of the bins.

6 We will continue to monitor the effectiveness of these measures, before deciding if further measures, such as geo-fencing, are necessary.

Question by MP Mr Yee Chia Hsing: To ask the Minister for the Environment and Water Resources whether the Ministry will consider increasing the penalties for pollution of our water resources with toxic industrial waste, especially for recalcitrant offenders.

Reply:

1. My Ministry takes any pollution of our water resources very seriously as it directly affects the environment as well as the quality of our water sources. Two-thirds of Singapore is water catchment area and raw water collected there is meant to be treated into potable water. Meanwhile, the used water collected in our public sewerage system is largely treated and reclaimed for NEWater.

2. To safeguard our water resources and the environment, both PUB and the National Environment Agency (NEA) require Written Approvals or Written Permissions to be obtained prior to the discharge of trade effluent into public sewerage systems, or into watercourses and onto land, respectively. As part of the Written Approvals or Written Permissions, companies must comply with the relevant provisions under the Sewerage and Drainage Act (SDA) or Environment Protection and Management Act (EPMA) and their respective regulations when they discharge their trade effluent. These include the requirement to install pre-treatment facilities, to provide sampling test points as well as to comply strictly with the discharge limits for specified substances.

3. Under the SDA and EPMA, where trade effluent is discharged into the public sewers without a Written Approval or into drains or land without a Written Permission, the offender could be fined up to \$20,000 with a further fine not exceeding \$1,000 per day if the offence continues after conviction. Similar penalties apply if the discharge is not in accordance with the conditions of the Written Approval or Permission. Under the SDA, if the trade effluent discharged into the public sewers contains dangerous or hazardous substances, a fine of up to \$50,000 or imprisonment for a term not exceeding 12 months or both can be imposed on first-time offenders. For repeat offenders, the maximum fine will be doubled to \$100,000. The maximum penalties are further increased to \$200,000 or to a jail term not exceeding 2 years should the illegal discharge cause injury or death to any person or disrupt the water reclamation processes. Similarly, under the EPMA, any person who discharges any toxic or hazardous substance into inland water so as to be likely to cause pollution of the environment would be liable to a fine of up to \$50,000 or to imprisonment for a term up to 12 months or to both. The EPMA also provides for heavier penalties for repeat offenders.

4. Both PUB and NEA also have the powers to require an offender to immediately cease any process or work that produces toxic, dangerous or hazardous substance or trade effluent that contains such substances. The

offender may also be ordered by the Court to restore the public sewerage system to its original condition, or ordered by NEA to remove and clean up the toxic substance from the drain or land.

5. We take a serious view of keeping the watercourses and sewers free from pollution and will not hesitate to take enforcement action. We will continue to monitor the effectiveness of our regulatory regimes in safeguarding our water resources and review the penalties, if necessary.

Question by MP Mr Patrick Tay Teck Guan: To ask the Minister for the Environment and Water Resources whether he can provide an update on the 2016 pilot study of releasing bacteria-carrying mosquitoes into the environment.

Reply:

The National Environment Agency (NEA) is evaluating the use of male *Wolbachia*-carrying *Aedes aegypti* mosquitoes (*Wolbachia-Aedes*) to further suppress the *Aedes aegypti* mosquitoes in the community. Phase 1 field study was conducted at three selected sites at Braddell Heights, Tampines West and Nee Soon East from October 2016 to December 2017. The study had met its objectives and demonstrated that the released male *Wolbachia-Aedes* mosquitoes had successfully competed with urban male mosquitoes and mated with some female mosquitoes. The releases led to 50% suppression of the urban *Aedes aegypti* mosquito population at the study sites.

2 The field study surfaced two challenges posed by Singapore's high-density and high-rise landscape. First, NEA discovered that mosquitoes moved from surrounding areas into the study sites, thus reducing the impact of *Wolbachia-Aedes* in the sites. Second, NEA found higher *Aedes aegypti* mosquito densities at high floors of some blocks, as insufficient numbers of male *Wolbachia-Aedes* mosquitoes had reached those floors.

3 To address the high-density and high-rise challenges, NEA is carrying out Phase 2 field study from April 2018 to January 2019. Phase 2 field study will improve the release methodologies to distribute the male *Wolbachia-Aedes* mosquitoes to where they are needed. NEA will release *Wolbachia-Aedes* mosquitoes at same Phase 1 study sites at Tampines West and Nee Soon East and their extended areas. Phase 2 field study is an important and necessary step for NEA to refine the release methodologies and address the unique challenges faced due to our urban landscape, in preparation for the subsequent suppression trial.

4 NEA will continue to engage residents and stakeholders. The co-operation and support from residents and local stakeholders were crucial in ensuring the success of Phase 1 study. Residents and local stakeholders are encouraged to continue supporting NEA in Phase 2 field study. Residents are also encouraged to continue carrying out mosquito control procedures and the 5-step Mozzie Wipeout.

Question by Mr Saktiandi Supaat:

To ask the Minister for the Environment and Water Resources (a) for the past five years, what has been the average annual electricity consumption for commercial buildings; (b) what is the standard air-conditioned temperature in these buildings; and (c) whether the Ministry will consider having a campaign to encourage companies to turn up the temperature to reduce electricity consumption and reduce carbon footprint.

Reply by Minister Masagos Zulkifli:

The average annual electricity consumption of commercial buildings from 2012 to 2016 was around 6,276 GWh per year. The energy use intensity (EUI), which is the total annual electricity consumption per unit floor area, for commercial buildings improved by 7% from 2012 to 2016.

Users of air-conditioning are encouraged to set their indoor temperatures at around 25 degrees Celsius. The Building and Construction Authority's (BCA) Green Mark scheme, which certifies environmentally sustainable buildings, awards points for buildings whose indoor temperature is set at 24 to 26 degrees Celsius and relative humidity at <65%, for the comfort of occupants.

Buildings contribute up to a quarter of Singapore's carbon emissions. The "greening" of buildings is necessary if Singapore is to continue developing sustainably and meet our international climate change commitments. BCA leads the government's climate change mitigation efforts for the building sector, and their third Green Building Masterplan is focused on changing the way building tenants and occupants consume energy.

As part of our efforts in the Year of Climate Action, my Ministry will work with BCA on programmes to encourage owners and tenants of commercial buildings to reduce energy consumption and lower their carbon footprint.

Mr Leon Perera: To ask the Minister for the Environment and Water Resources (a) whether other alternative sites to Tanah Merah for sea burials will be considered and studied before making a final decision on the location of the sea burial facility proposed at the shoreline of Tanah Merah; and (b) whether the findings of the environmental impact study on this proposal will be published prior to a decision being made

Reply:

The National Environment Agency (NEA) has been working with the relevant authorities to identify a suitable site on mainland Singapore for the conduct of post-death rites prior to the scattering of cremated remains at sea. The provision of such a facility is in response to public feedback, to preserve the dignity and decorum of post-death proceedings and to ensure adequate provision of after-death care facilities to meet the needs of the various communities in Singapore.

2 The site at Tanah Merah was proposed in consultation with the relevant authorities and with careful deliberation over competing needs. In addition, NEA has commissioned an Environmental Impact Study to be completed by 2019 to better assess the possible environmental impact of the facility.

3 NEA has received feedback from stakeholders and engaged interested parties, for example the sailing fraternity, on their suggestions. We will take into account the outcomes of the Environmental Impact Study and suggestions from stakeholders when considering the next steps. NEA will also be engaging stakeholders and interested parties when the study is completed.

Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) what is the standard protocol for NEA to handle feedback about smokers smoking in prohibited areas; and (b) where there is no pictorial evidence and NEA is unable to catch the culprit red-handed, what other measures are taken to ensure that culprits will be apprehended especially those who have had multiple reports made against them in residential areas.

Mr Liang Eng Hwa: To ask the Minister for the Environment and Water Resources (a) what is the progress of efforts to keep our neighbourhood spaces smoke-free; (b) whether banning smoking in more designated areas have resulted in improving a smoke-free environment; (c) whether operators and premise managers are doing their part to stop patrons and visitors from smoking in prohibited areas; and (d) whether there are adequate enforcement resources and penalties to stop smokers who disregard the prohibitions imposed by NEA.

Reply:

The Government has over the years progressively extended the smoking prohibition to more public places, to protect more people from the harmful effects of passive tobacco smoke. Such places include the common areas of housing estates such as void decks, fitness corners, and playgrounds, as well as sheltered pedestrian walkways and bus stops. In 2016, the prohibition was further extended to neighbourhood and reservoir parks. Today, smoking is disallowed in more than 32,000 places and progress has been made towards our vision of a smoke-free and conducive living environment.

2 Generally, smokers appreciate the reasons behind these restrictions and most comply willingly. However, there is a minority who do not, and this is where the concerted efforts of various stakeholders can make a difference. When someone we know – be it a family member or a friend – lights up where he or she should not, we ought to remind them to spare a thought for those around. Such social cues are important for signalling and entrenching the positive social norms that smokers should abide by.

3 Operators and managers of smoking-prohibited premises have a statutory responsibility to stop patrons from smoking and request them to leave if they refuse. Most managers are aware of the important role they play in safeguarding the health of their non-smoking patrons. Managers who fail to discharge their duties will be liable for a maximum fine of \$2,000 upon conviction.

4 Regarding the Member's question about the National Environment Agency's (NEA) protocol in responding to feedback on unlawful smoking, NEA upon receiving such feedback, will engage the manager of the relevant smoking-prohibited premises to ensure that signs are prominently displayed to remind smokers of the prohibition, and to remove any misleading cues such as litter bins fitted with ashtrays.

5 If the complaints persist, NEA will undertake further investigations by contacting the complainant and other witnesses for additional information. NEA may also obtain video footage from nearby CCTVs if available. If the alleged offender is identified, NEA will interview the person to ascertain culpability. A summons may then be issued if there is evidence that an offence had been committed. Errant smokers can face fines of up to \$1,000 upon conviction.

6 All said, it is not possible for the NEA to monitor every one of the 32,000 smoking-prohibited places at all times. Residents who come across people smoking in prohibited areas can submit feedback, including details of the incident, to NEA through the myENV

mobile application, and NEA's hotline and website. Such information can provide useful leads for us to target areas where breaches of the smoking prohibition occur repeatedly.

7 While enforcement of the smoking prohibition will continue, it is not the panacea to curbing inconsiderate smoking. Our hope is for smokers to be mindful of the potential harm they may cause others, and not light up in places where smoking is prohibited. The families and friends of smokers, as well as the general public can also help reinforce positive social norms through reminders. Ultimately, we would like to help smokers kick the habit for the benefit of their own health, their loved ones, and the community.

Mr Zainal Sapari: To ask the Minister for the Environment and Water Resources what are the plans for NEA's daily-rated staff to receive the necessary skills required for the future jobs under the Environmental Services Industry Transformation Map.

Reply:

The National Environment Agency (NEA) launched the Skills Framework for Environmental Services (ES) in Dec 2017 as an integral component of the Environmental Services Industry Transformation Map (ES ITM). The framework maps the skills and competencies that workers in the industry need to perform their roles effectively.

2 NEA's daily-rated employees (DREs) are potential beneficiaries of the ES ITM. To equip DREs with the skillsets for future jobs, NEA has been providing training opportunities such as Workforce Skills Qualifications courses in environmental cleaning, landscape operations and digital literacy. NEA also encourages its DREs to attend relevant training programmes under the ES Skills Framework to broaden and deepen their skills and knowledge. With the requisite training and work experience, DREs may take on more challenging or expanded roles within the agency and in the wider ES industry.

3 One DRE who has benefited from NEA's upskilling efforts is Mr Somasundaram Ganeson. Mr Somasundaram was previously an Environmental Support Assistant who kept the streets clean. At 62, he was recently promoted to be a Higher Environmental Support Assistant in vector control, after completing a vocational course and attaining the skills needed for the new portfolio. Accordingly, he now commands a higher salary. Other DREs have similarly upgraded their skills and taken on new roles.

4 NEA is also working with Post-Secondary Education Institutions to enhance existing technical courses and develop new Continuous Education and Training programmes on relevant topics that would also benefit DREs who wish to upskill and avail themselves of job opportunities in the industry.

5 NEA will continue to partner stakeholders to expand education and training programmes to address the skills and manpower needs of the ES industry.

Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources (a) whether there has been a study on the effectiveness of campaigns and programmes- to create awareness on zero-wastage and recycling; (b) if so, what are the outcomes of such a study; and (c) whether the Ministry will consider embarking on a mass public consultation exercise to collate suggestions from the public on effective strategies to encourage zero-wastage and recycling.

Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources (a) what are the current efforts or guidelines for businesses to penalise wastage as well as incentivise the reduction and recycling of waste; (b) whether the current efforts and guidelines have been effective; and (c) whether there are any plans to build on the existing framework.

Reply:

My Ministry and the National Environment Agency adopt a combination of strategies to reduce waste generation and encourage recycling. In particular, we are focusing our efforts on three priority waste streams – food waste, e-waste and packaging waste. While there has been progress, more needs to be done to achieve our vision of a zero waste nation and circular economy.

Waste Reduction and Recycling

2 To make recycling easier, those living in HDB flats or landed properties are provided with either a blue recycling bin under their block or a centralised chute for recyclables under the National Recycling Programme (NRP). This has led to an increase in recyclables collected, from 25,300 tonnes in 2011 to 44,400 tonnes in 2017. In a survey conducted in 2015/2016, more than 70 percent of HDB households indicated that they practised recycling. However, this has not translated into an increase in our domestic recycling rates, which have hovered at around 20 percent in recent years. Taken together, these figures indicate that households are generally aware of recycling, but do not practise it regularly. More needs to be done to make recycling part of daily living for all Singaporeans, by making it more convenient for households to recycle and through more outreach and education on good recycling practices.

3 We also target large waste generators by requiring them to report their waste data and waste reduction targets and plans since 2014. In 2016, 269 large hotels and shopping malls provided these information to NEA. They have also become more aware of how to improve their waste management systems. The proportion of large hotels and malls that recycle has increased from 84 percent in 2014 to 94 percent in 2016. We will look into how the reporting requirement can be extended to other large waste generators such as industrial premises.

Food Waste

4 My Ministry works closely with other Government agencies and private sector partners to combat food waste. NEA and the Agri-Food & Veterinary Authority of Singapore (AVA) have published food waste minimisation guidebooks for food retail establishments, supermarkets and food manufacturing establishments. NEA's 3R Fund has also supported 22 premises to install on-site food waste treatment systems. Our food waste recycling rate has increased from 12 percent in 2012 to 16 percent in 2017. But we can do better. My Ministry will continue to explore how we can not only recycle more food waste, but reduce its generation in the first place.

E-Waste and Packaging Waste

5 To better manage e-waste, my Ministry will put in place an Extended Producer Responsibility (EPR) framework for e-waste management by 2021. We are also studying the feasibility of extending the EPR concept to other waste streams, such as packaging waste including plastics. We will bring forward the mandatory reporting of packaging data and waste reduction plans from 2021 to 2020. This will build on current voluntary efforts such as the Singapore Packaging Agreement (SPA) which encourages businesses to minimise packaging waste. Since its introduction in 2007, the signatories have collectively reduced 46,000 tonnes of packaging waste and saved over \$100 million in packaging material costs.

Zero Waste Masterplan

6 My Ministry recently announced that we are developing an inaugural Zero Waste Masterplan to be released next year. In developing the plan, we will be consulting the public and industry stakeholders on our strategies for achieving a Zero Waste Nation and circular economy.

7 In the meantime, we encourage ground-up efforts to reduce waste and encourage recycling. Everybody must do their part. We also welcome anyone with good suggestions to write in to NEA via email or social media. Consumers can also encourage businesses to adopt environmentally-friendly practices through their purchasing choices and by giving them feedback. Everyone's effort is important in our journey towards becoming a Zero Waste Nation and achieving a circular economy.

Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources (a) what is the progress thus far on raising the awareness of climate change; (b) what is the number of individuals, organisations and educational institutions that have taken the Climate Action Pledge; (c) what are the plans to include more individuals, organisations and educational institutions in the second-half of the year; and (d) whether the Ministry will work with or track the organisations and educational institutions in terms of their follow-up actions and, if so, how.

Reply:

Singapore designated 2018 as the Year of Climate Action to raise awareness of climate change and to urge people to take climate action for a sustainable future. The public response has been very good. Many community groups, grassroots organisations, corporations, schools and NGOs have stepped forward to organise events and activities to raise awareness of the importance and impact of climate change, and to encourage the public to take responsibility to live more sustainable lifestyles.

2 Since the Year of Climate Action was launched on 26 January 2018, more than a quarter million climate action pledges have been received. Of these, 221 are from educational institutions and 266 are from organisations, including NGOs

3 Many initiatives have come out of this Year of Climate Action. Let me highlight a few. The National Youth Council (NYC) is organising a series of youth conversations throughout the year, and climate change is a key topic. Youths have shown keen interest in how they can contribute to climate action. The Singapore Scout Association has introduced a new Climate Action Programme, where Scouts earn Climate Action Ambassador Badges by initiating climate action activities and encouraging the community to do likewise. The Singapore Environment Council (SEC) has launched an EcoLifeSG app which helps users to calculate and track their carbon footprint. As part of UN Environment's call to action on World Environment Day, City Developments Limited (CDL) and Global Initiatives (GI) launched a 'live' art installation at the Marina Barrage using discarded plastic bottles to raise awareness on the urgent need to reduce single-use plastics.

4 Recently I went to the UN to present Singapore's first Voluntary National Review (VNR) at the High-Level Political Forum on Sustainable Development. I shared that Singapore's sustainable development is a Whole-of-Nation effort. Since our independence, we have balanced economic growth with environment protection and social inclusion. We have also taken a long-term approach towards policy implementation, based on collaborative multi-stakeholder partnerships. Our Year of Climate Action efforts is a good example of how we have come together as a nation to fight climate change and ensure sustainable development.

5 We will continue to work with stakeholders to promote climate action messages in the second half of the year. The recent Partners for the Environment Forum on 10 July 2018 was themed "Accelerating Action on Climate Change", and gathered more than 260 participants to discuss how to better collaborate on climate action. A Climate Action SG Alliance has been formed by 18 corporate, educational and civil society leaders to develop new climate action initiatives to rally the public. In the coming months, they will look at how to promote education in schools on waste minimisation, how to encourage businesses to be more environmentally sustainable, and how to educate the community on recycling right.

6 Individuals, organisations and educational institutions that have taken the climate action pledge have taken an important step by making a public commitment of their plans. As organisations and institutions are at different stages of their climate action journey, they are able to craft their own pledges to commit to a realistic and achievable climate action plan that works for them. My Ministry will not be tracking the fulfilment of the pledges but will be happy to work with interested parties to support their plans. NEA offers a Climate Action SG Grant for NGOs and interest groups to fund projects that promote climate action messages, promote the 3Rs and energy conservation. Successful applicants receive a grant of up to \$5,000. We have also supported organisations with good ideas to reach out to a wider audience. For example, we worked with PacificLight on their climate action-themed “Create Sustainability” competitions for educational institutions. We encourage parties who have taken the climate action pledge to share their progress at suitable events so that there is mutual sharing and mutual encouragement as we all walk the sustainability journey together for the good of Singapore and the world.

Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources (a) how are Singapore's efforts to manage this year's climate change proceeding; (b) whether such efforts are sufficient in light of the forecast by the Climate Prediction Centre of the US National Oceanic and Atmospheric Administration of a 70% chance that El Nino will develop during end-2018; and (c) what countermeasures will Singapore adopt should El Nino develop.

Answer:

Climate change poses existential challenges for Singapore as an island city-state. In 2016, we published our Climate Action Plan which outlines Singapore's long-term strategy to mitigate and adapt to climate change. We continue to build on these plans.

2 This year, we announced the introduction of a carbon tax which will take effect from 2019. This tax will incentivise emissions reduction across the economy and encourage our companies to adopt more energy efficient practices as we transition to a low-carbon future.

3 We have also made progress in adapting Singapore to the potential impacts of climate change. In June, we opened Singapore's third desalination plant in Tuas, and two more are currently under development. These weather-resilient sources will contribute to our water resilience as we continue to diversify our water supply. To prepare for warmer temperatures, agencies have put in place precautionary guidelines for groups that are at higher risk of heat injury, such as outdoor workers. Across government, agencies will continue to take steps to build a carbon-efficient and climate-resilient Singapore.

4 But climate action cannot be the sole undertaking of the government. Everyone must participate in this effort. This is why we have designated 2018 as the Year of Climate Action, to raise our national consciousness of climate change and galvanise ground-up action for a sustainable Singapore. So far, more than 250,000 individuals, organisations, and educational institutions have made Climate Action pledges. We are encouraged by their commitment and hope this momentum continues beyond 2018.

5 The Meteorological Service Singapore (MSS) assesses that there is a 60-70 per cent chance of a weak El Niño developing late in the year. Should the El Niño occur, it is not likely to have a significant impact on rainfall patterns in Singapore and the nearby region, due to its expected weak intensity and late development during the year-end rainy season. We do not expect a repeat of the strong El Niño event experienced in 2015/2016, which was one of the strongest in recent history and led to significantly reduced rainfall in Singapore. The MSS will continue to monitor developments and provide relevant alerts to the public and relevant agencies.

Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) in the past three years, how effectively are firms meeting water efficiency benchmarks; (b) whether PUB will work closely with those that fail to achieve the benchmarks to help them reduce water wastage; (c) what is the status of the industry consultation on water efficiency practices; and (d) what else is the Ministry doing to keep water consumption manageable.

Reply:

As one of the most water-stressed countries in the world, water has always been an existential issue for Singapore. We need to invest ahead in weather-resilient water sources, and expand and renew our water infrastructure and network in a timely manner. But this is not enough. To ensure the long-term sustainability of our water resources, it is equally important that we manage demand and use water prudently.

2 The non-domestic sector currently makes up more than half of our total water demand, and this is projected to increase to about 70% in 2060. Companies must use water efficiently.

Mandatory Submission of Water Efficiency Management Plans

3 PUB requires large water users in the non-domestic sector to monitor their water usage through the installation of water meters and submit a water efficiency management plan annually. Through this process, companies can better understand their water usage patterns and identify ways to conserve water.

4 Since 2015, more than 600 large water users have been submitting their plans annually. This has given PUB insights into how various industries use water and enabled PUB to develop targeted initiatives.

Industry-Specific Water Efficiency Benchmarks

5 During the Committee of Supply debate this year, I announced the launch of the Best Practice Guide on Water Efficiency for the Buildings sector. Another two guides - for the Wafer Fabrication and Semiconductor sector and the Refineries, Petrochemicals and Chemicals sector - were launched during the Singapore International Water Week last month. PUB has also developed water efficiency benchmarks for the office buildings, hotels, retail malls, wafer fabrication and semiconductor sectors. The series of consultations with industries and relevant stakeholders, as Er Dr Lee has mentioned, was instrumental to the development of these guides and benchmarks. PUB will continue to work closely with industries on water efficiency benchmarks and guides for other sectors.

Encouraging Water Efficiency Efforts in Businesses

6 Through these benchmarks and guides, companies can assess how well they fare relative to their peers and learn from best practices. As the benchmarks have just been

published this year, PUB will monitor the performance of the companies and help them improve their water efficiency, especially those who fall below the median performance. Through one-to-one engagement sessions, PUB advises the companies on opportunities for water savings and offer customised expertise for water recycling and reuse projects.

7 To encourage companies to implement such projects, PUB provides funding support, such as the Water Efficiency Fund and the Industrial Water Solutions Demonstration Fund. Companies can tap on these funds to carry out water audits, water recycling, use of alternate sources of water, and the test-bedding of innovative water technologies.

8 Companies have responded positively, with a number looking to implement new water efficiency projects. For example, PUB has worked with and co-funded Micron Semiconductor Asia Pte Ltd to install a wastewater recycling plant this year. Once implemented, there will be an expected annual reduction of 400,000m³ in their NEWater demand.

9 To recognise exemplary companies, PUB introduced the Water Efficiency Awards in 2017 for companies who are within the top 10th percentile of the industry-specific benchmarks. Last year, 27 award recipients from seven industries were presented with these awards.

10 PUB is taking it one step further. From 2019, all large water users will need to appoint a certified water efficiency manager who has undergone training on how to conduct water audits and implement water efficiency measures. This will level up the capabilities of the industries in managing their water use.

11 Water is valuable and I urge all companies to look into water conservation efforts. PUB stands ready to help companies in this.

Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources whether the debt and business reorganisation of Hyflux Ltd will affect Singapore's water system and water security.

Reply:

PUB's key interest is to safeguard Singapore's water security and confidence in our water supply. There are two desalination plants that Hyflux is involved in under a Design, Build, Own and Operate arrangement. One is the SingSpring Desalination Plant, which is majority owned by Keppel Infrastructure Trust with Hyflux owning a minority stake. This plant is not affected by Hyflux's recent debt and business reorganisation.

2 The other plant, the Tuaspring Desalination Plant, wholly owned by Tuaspring Pte. Ltd., a subsidiary of Hyflux, is affected by the reorganisation, but continues to supply desalinated water to PUB.

3 Hyflux, Tuaspring and its creditor are currently in discussion on the potential divestment of Tuaspring. As this is a commercial matter, it will not be appropriate for my Ministry to comment further. Nonetheless, we are monitoring developments closely. Members of the House can be assured that there are adequate measures in place to ensure the plant remains in operation. Any divestment has to be approved by PUB.

4 Mr Speaker, water supply is an existential issue and one which PUB treats with the utmost seriousness. Water supply infrastructure is planned well into the future and investment made ahead of demand. We just opened our latest desalination plant, Tuas Desalination Plant, in June 2018. More water supply infrastructure is being constructed over the next few years. We will not allow the security of our water supply to be affected.

Mr Liang Eng Hwa, MP for Holland-Bukit Timah GRC: To ask the Minister for the Environment and Water Resources (a) whether NEA can extend the deployment of surveillance cameras beyond HDB estates to high-rise private estates to carry out enforcements against high-rise littering; and (b) whether the Ministry will amend the necessary legislation to empower NEA to do so.

Mr Kwek Hian Chuan Henry, MP for Nee Soon GRC: To ask the Minister for the Environment and Water Resources whether there are effective programmes to cultivate the habit of not littering and to dispose of waste in a proper manner like that in Japan and Taiwan.

Reply by Dr Amy Khor:

Singaporeans take pride in a clean and green Singapore and most do their part to keep the environment clean. However, there is an irresponsible minority that continues to litter and disregard prevailing societal norms. To tackle such anti-social conduct, the National Environment Agency (NEA) has taken a tough stance on litterbugs. Last year, it took 32,000 enforcement actions against littering offenders.

2 While enforcement may serve as a deterrent, it is not the panacea. Our primary line of defence against such behaviour should be to foster collective responsibility for our environment and cultivate positive social norms and civic mindedness among our people.

3 To this end, the NEA and various partner organisations have been conducting campaigns and programmes to promote environmental awareness and encourage greater stewardship of our common spaces. The annual Clean & Green Singapore (CGS) co-organised by the NEA, PUB, the National Parks Board (NParks), and the Community Development Councils (CDCs) encourages the community to play an active role in keeping Singapore clean and litter-free. There are also other initiatives such as the Public Hygiene Council's annual *Keep Clean, Singapore!* campaign which advocates the value of maintaining cleanliness beyond our own homes, and fostering the habit of picking up after oneself. The month-long event held in May this year saw more than 370 organisations, including grassroots organisations, public agencies, and corporations, take part in more than 500 clean-up activities across the island. NEA has also been targeting its publicity efforts at mass events such as the National Day Parade celebrations to remind people to pick up after themselves. These efforts reflect the whole-of-society approach needed to keep our public spaces clean.

4 Our national schools have also set aside time for students to clean the common areas of their school each day, and these activities have helped to inculcate values such as a sense of responsibility and consideration for others, as well as for the environment. By starting young, these positive habits are passed down through the generations, just like in Japan today.

5 To the Member's question regarding littering in high-rise estates, our approach is no different; we will continue to work with grassroots organisations and town councils to raise awareness about this issue amongst residents. Unlike public estates, private estates are collectively owned by their residents and public access to such estates are restricted. Home owners in private estates therefore have the autonomy to govern and manage the shared private spaces in a responsible manner. For this to happen, residents should come together to encourage and influence acceptable social behaviour in their communities. Many condominiums have already put in place by-laws prohibiting littering within their

estates. The management committees of these private estates can work with their residents to cultivate the right behaviour accordingly.

6 While the Government will persist in our efforts to develop greater environmental stewardship, we cannot do this alone. I urge everyone to play their part in keeping Singapore a clean and green city.

Asst Prof Mahdev Mohan: To ask the Minister for the Environment and Water Resources (a) how will the Government tackle marine plastic pollution in the region; (b) what steps are being taken to prolong the life of Semakau landfill beyond 2035 by reducing excessive consumption of single-use plastic; and (c) how is the Government encouraging the private sector to develop, use and promote sustainable alternatives to plastic.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources what plans does the Ministry have to encourage more businesses to reduce usage of single use plastic.

Reply by Dr Amy Khor:

Marine Plastic Pollution

My Ministry takes the issue of marine plastic pollution seriously, and measures are in place to prevent marine pollution from land-based sources. For example, we have strict anti-littering measures and dispose of all general waste at our waste-to-energy plants. Any litter that enters our waterways is removed using litter traps and flotsam removal craft before it reaches the sea. Beach and underwater clean-ups are also conducted.

2 However, tackling marine plastic pollution will require international and regional cooperation because of its transboundary nature. There has been positive momentum. The United Nations Sustainable Development Goal 14 emphasises the conservation and sustainable use of the oceans, seas and marine resources. Singapore actively participates in regional and global discussions to address marine litter and microplastics. Singapore also contributes to international capacity building efforts under the Singapore Cooperation Programme. Last October, the National Environment Agency (NEA) organised a joint Third Country Training Programme with Norway on waste management and reduction of marine litter for government officials from our region.

Efforts to Reduce Single-Use Plastics

3 Our only landfill at Semakau will run out of space by 2035 based on current waste disposal trends. Waste, including single-use plastics, are already incinerated where possible as this reduces the volume of waste by up to 90 percent. To prolong the lifespan of Semakau Landfill, my Ministry has been developing measures that addresses the entire waste value chain and across different waste streams – by encouraging businesses and producers to reduce waste and recycle, engaging and partnering the public and private sector and supporting research and development.

4 Regarding single-use plastics, a recent NEA life-cycle assessment study found that available alternatives to plastics, including biodegradable bags, also have an environmental impact. For example, they consume water during production or result in forest destruction. Substituting plastics with these alternatives is not likely to improve the environmental outcome. This is especially so in Singapore where we incinerate our waste

instead of landfilling it. Our approach is focused on reducing the use of single-use plastics and packaging.

5 To encourage businesses to minimise their contribution to plastic waste, my Ministry recently announced that 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. We are also studying the feasibility of implementing an Extended Producer Responsibility framework for certain single-use packaging and plastics. We have already taken the lead by disallowing the use of disposables in our new hawker centres for dine-ins.

6 NEA provides funding support to organisations with initiatives to reduce the use of single-use disposables or promote plastic recycling. These include the 3R Fund, 3P Partnership Fund or the Call for Ideas Fund. For instance, Zero Waste SG received funding for their Bring-Your-Own Campaign in 2017, where they partnered retailers to encourage consumers to use reusable containers, bottles and bags through educational tips, resources and incentives. We will continue to engage, educate and support businesses and the public in reducing the use of single-use plastics.

7 The private sector has also taken steps to discourage the excessive consumption of single-use plastics. For example, KFC has stopped providing plastic lids and straws for dine-in. Start-ups like UnPackt are also promoting packaging-free shopping by requiring customers to bring their own reusable containers for groceries.

8 To support research and development in waste reduction, recycling and the recovery of valuable fractions, NEA has embarked on the Closing the Waste Loop Initiative. The Initiative encourages collaboration between institutes of higher learning, research institutes and private sector partners to develop technologies and solutions to tackle challenges in waste management. As part of the Initiative, NEA has solicited and is evaluating research proposals on the sustainable design of plastic materials, reducing the use of plastic materials and packaging, making plastics more reusable and easier to recycle, and recovering value from waste plastics.

9 Ultimately, the issue of marine plastic litter and excessive use of single-use plastics will require everyone to play his or her part. This can be done by properly disposing of waste into litter bins and using reusable bags and containers, instead of disposables. Individuals can find information on other ways to reduce and reuse on NEA's website and the myENV mobile app.

Mr Patrick Tay Teck Guan: To ask the Minister for the Environment and Water Resources whether NEA can lower the cost burden passed to hawker centre tenants and stallholders such as that in the implementation of one-stop payment terminals, electronic cashless payments, tray returns, dishwashing, and general cleaning.

Answer:

The primary objective of hawker centres is to provide hygienic and affordable food. The Government has invested in helping stallholders make a decent living and preparing them for future challenges, such as increased manpower shortage and rising labour costs.

2. The implementation of centre-level productivity initiatives, such as Centralised Dishwashing and Automated Tray Return Systems, will enhance productivity in our hawker centres. It will also reduce the hawkers' workload while addressing their manpower constraints. As labour costs are expected to increase in future, the productivity savings from these initiatives will translate into cost savings for the stallholders.

3. To help lower the initial cost burden, the Government is co-funding up to 70% of the operating costs of these initiatives for two years. This has been well-received in the hawker centres which have come on board our Productive Hawker Centres initiative, where more than 90% of the stallholders have adopted Centralised Dishwashing services. With these services, stallholders no longer need to collect and wash crockery or employ someone to do so. Stallholders also do not have to buy their own crockery as these are provided by the Centralised Dishwashing vendor.

4. In October last year, NEA launched the Hawkers' Productivity Grant that provides funding support for the purchase of kitchen automation equipment. This also helps to increase our hawkers' productivity and reduce their workload. Stallholders can claim 80% of the qualifying cost of the equipment on a reimbursement basis, up to a total of \$5,000 within a three-year time frame. NEA has approved some 120 applications since the launch. In the same vein, the Government requested a Call-for-Collaboration (CFC) for the provision of e-payment solutions for food businesses in April 2018. This will reduce the costs to hawkers who wish to adopt the option of electronic cashless payments to increase productivity.

5. For cleaning, NEA adopts procurement best practices to maximise value for money. These include open tenders to facilitate price competition, and demand-aggregation to bring down unit costs. NEA also adopts a price-quality model which balances between costs and service standards to stall-holders.

6. We will continue to monitor the costs to stallholders closely and, where necessary, review the measures to help our stallholders better manage their business costs.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources (a) whether the Ministry monitors the amounts of microbeads in reservoirs, tap water, and discharges into the ocean; (b) what percentage of microbeads is removed during the water treatment process; and (c) whether the Ministry will consider banning cosmetics that contain microbeads.

Answer:

PUB has in place a comprehensive water quality monitoring programme to ensure that our potable water supply complies with regulations and international standards, and is safe for drinking. Microplastics, which include microbeads, are removed at our waterworks that treat water for potable supply. At our NEWater and desalination plants, microplastics are removed using reverse osmosis membranes. Monitoring by PUB shows that our drinking water is free from microplastics.

2. PUB also ensures that all used water is collected and treated at water reclamation plants to internationally recognised discharge standards. During the treatment process, microplastics in used water will be substantially removed as sludge and incinerated. The bulk of the treated used water is further processed and reclaimed as NEWater. As a result of these processes, only a minuscule amount of microplastics is discharged into the sea. Nevertheless, PUB is looking into incorporating membrane bioreactor technology in our used water treatment process to further improve the microplastics removal rate.

3. We are monitoring international developments on microplastics, including microbeads in cosmetics. The National Environment Agency encourages businesses to reduce the use of microbeads in their products. Multinational corporations, such as Johnson & Johnson, Unilever, L'Oreal Group, Colgate-Palmolive, and Estee Lauder Company, have voluntarily phased out microbeads in their products. Major local retailers such as Guardian Singapore, Watsons and NTUC Fairprice, have also indicated that they have phased out microbeads in their house-brand products.

4. We are committed to keeping our watercourses free from pollution, and will continue to review the effectiveness of our regulatory and monitoring regime in safeguarding our water resources and the environment.

Mr Kok Heng Leun: To ask the Minister for the Environment and Water Resources whether he will provide an update on (i) the types of assistance provided to Sungei Road Hawking Zone (SRHZ) users since September 2017 and (ii) the status of the 120 or so SRHZ users who had not taken up the Ministry's offers for relocation, job placement or financial assistance.

Answer:

The Sungei Road Hawking Zone (SRHZ) was closed on 10 July 2017. Ahead of its closure, various agencies, including the National Environment Agency (NEA), Ministry of Social and Family Development (MSF), Workforce Singapore (WSG), and Central Singapore Community Development Council (CDC) provided SRHZ users with financial, employment and social support. These included the provision of lock-up stalls at hawker centres managed by NEA, referrals to other flea markets, financial assistance, and job placement.

2. In September last year, we updated that the Government had engaged about 200 SRHZ users. Close to 80 received some form of assistance. Since then, the agencies have helped about 20 more former users. Hence, to date, a total of about 100 out of the 200 users have received Government assistance. Around 40 former users have taken up stalls at hawker centres, and about 30 former users have chosen to operate at other flea markets. Another 30 users have received employment and/or financial assistance. Of the 200 users who were engaged, 100 or so users have declined assistance. We understand that they have other means of support, such as employment or family support.

3. We will continue to engage and render assistance to former SRHZ users who come forward.

1. Mr Deputy Speaker, I thank Members for speaking in support of the Bill. Let me now address their queries in turn.

A. Implementing the No Smoking Zone

2. Members have voiced concerns about the harm posed by passive cigarette smoke to vulnerable groups such as the young and the elderly, and asked what more can be done. Some, including Ms Cheryl Chan, have also asked whether more No-Smoking Zones are being planned.

3. The No-Smoking Zone or NSZ in Orchard Road is a new initiative. We decided on the shopping belt because the area experiences significant and dense pedestrian traffic, and is a site for alfresco activities.

4. Support from stakeholders was another consideration. We had strong backing for our plans from businesses and building owners, led by the Orchard Road Business Association.

5. We also considered the availability of suitable locations for Designated Smoking Areas (DSAs), given that the NSZ would cover a relatively large area with numerous commercial premises. Since 2015, NEA has been working with building owners in Orchard Road to allocate sufficient space for DSAs. Today, about 40 DSAs can be found across the prospective NSZ. As far as possible, these DSAs are located away from the main thoroughfare along Orchard Road, to ensure smoking is contained and not done in clear view of passers-by, especially impressionable youths. This will help protect public health and avoid normalising smoking.

6. Like Ms K Thanalethimi, I hope that DSAs would become unnecessary one day. But we must be practical in our approach given the large number of visitors and tourists along Orchard Road.

7. Mr Louis Ng suggested a pilot to prohibit smoking while on the move. Once the Orchard Road NSZ is in force, every public place within the zone would be smoking-prohibited, and smokers would not be able to light up while walking along the shopping belt. Outside of the NSZ, smoking is already disallowed in many public places. These include sheltered pedestrian walkways, overhead bridges, and the corridors of public estates.

8. Our priority is to implement the NSZ well, monitor the outcomes and make any necessary improvements. We will then assess the impact of the Orchard Road NSZ and its DSAs, before considering whether to replicate it elsewhere. The NSZ will be brought into force in the coming months, and details will be provided in due course.

B. Provision of Designated Smoking Areas

9. Mr Louis Ng and Ms Cheryl Chan asked if we plan to provide DSAs in places beyond Orchard Road, such as in our housing estates. Unlike Orchard Road, our heartlands are where our homes and schools are, and where our young children and youths spend their time daily. DSAs typically serve as congregation points for smokers. The daily sight of people gathering to smoke at DSAs at residential areas may give our young the impression that it is normal to smoke. As much as possible, we want to avoid this.

10. Furthermore, given the design of our housing estates where HDB blocks are well-connected and dense, it may be challenging to find suitable locations that ensure that DSAs are not too conspicuous.

11. Hence, our approach has instead been to extend the smoking prohibition to as many areas as possible within housing estates where members of the public frequent, including sheltered walkways, exercise areas, and playgrounds. We will continue to monitor and enforce against smoking violations in these areas.

C. Addressing Smoking in Homes

12. Members have also called for restrictions on smoking in homes, including imposing penalties when smoke wafts out of a residential unit. Indeed, indiscriminate smoking can be distressing, and I empathise with all those who are affected.

13. Nevertheless, homes are private spaces; we need to be mindful that not everyone would support the view that the Government should intrude into one's private space on the issue of smoking, and indeed the member Ms Rahayu had alluded to that earlier. We have witnessed disputes in some private estates over the management committee's right to prohibit smoking in one's balcony – a private space. As Mr Ng rightly pointed out, regulation must be balanced against privacy concerns.

14. Moreover, if we were to prohibit smoking in one's own home, it would inevitably entail bringing to bear the necessary investigation and enforcement powers in our homes. We must not take this lightly. Such an intrusive regulatory approach to tackling

neighbourly issues could ultimately be even more detrimental to community harmony and ownership.

15. Mr Ng cited a recent US ban on smoking within public housing estates as an example of how a comparable regime could be implemented in Singapore. The US smoking ban does not apply to all homes, but only to public housing estates for low-income residents, through the imposition of conditions in the tenancy agreements. Tenants who do not wish to comply with the smoking ban may have to look for alternative housing. The context of the US smoking ban is very different and we do need to consider our local circumstances before adapting practices from abroad.

16. We have been pro-actively addressing second-hand smoke in our housing estates. Over the years, we have disallowed smoking at common areas, including at the lift lobbies, corridors and staircase landings. In response to Ms Rahayu Mahzam's comment that there is a lack of understanding about the rules relating to smoking in sheltered walkways or drop-off points, especially during rain, we would like to clarify that the smoking prohibition applies regardless of weather.

17. Ultimately, living in the community is about give and take. I urge all smokers to be considerate, and to refrain from smoking in a way that would negatively affect others. Families and friends of the smokers as well as the public in general, could help to reinforce the right social norms, through nudges and reminders, in order to help address this issue. In the spirit of good neighbourliness, we should try to understand one another's concerns, communicate and resolve disputes amicably. If professional assistance is required, residents can approach the Community Mediation Centre.

D. Enhancing Enforcement Measures

18. Er Dr Lee Bee Wah, Mr Gan Thiam Poh, and Ms Rahayu Mahzam highlighted the frustrations of non-smokers faced with inconsiderate smokers around their neighbourhood. They have asked about enforcement capacity, and how we plan to make enforcement more effective and efficient in light of the growing number of smoke-free places.

19. NEA has been engaging business owners about the Orchard Road NSZ, and will calibrate its enforcement capacity according to the situation at the ground.

20. Enforcement is necessary, but it is not the silver bullet. Instead, our deeper aim is to foster social norms that promote health and wellbeing. We need the community to help us remind smokers where they should not be smoking. Smokers must also play their part and be mindful of those around them before lighting up.

21. Ms Thanalechimi also asked how technology can be further leveraged to facilitate reporting of unlawful smoking and errant managers. Members of the public can notify NEA about smoking violations through the myENV app and OneService mobile applications.

22. NEA is also exploring the use of thermal cameras to deter indiscriminate smoking, such as the instances Ms Cheryl Chan had raised earlier, especially at corridors, lift lobbies and staircase landings, which other Members had also raised concerns about. These cameras are equipped with heat-detection capabilities that can detect smoking activity, and can be operated remotely. When deployed, these cameras will be able to capture images of the smoking infringement, and facilitate NEA's investigations.

23. In response to Ms Rahayu Mahzam's question whether the Community Volunteer programme has enhanced enforcement of the smoking prohibition, let me clarify that the Community Volunteers or CVs are not deployed to supplement NEA's enforcement officers.

24. The CVs' primary role is to educate environmental offenders and promote environmental consciousness in the community. CVs can only ask for the particulars of uncooperative offenders and can give the information to NEA for investigation. CVs have been deployed in Orchard Road to raise awareness of the upcoming NSZ and help ease smokers into the regime when it comes into operation.

25. These efforts should also go some way in minimising smoking violations within the newly prohibited places, a concern raised by Ms Thanalechimi.

26. We should adopt a whole-of-society approach towards encouraging gracious behaviour. This way, we can all enjoy clean air in the shared spaces around us, while building a stronger community. I agree with Ms Rahayu Mahzam and Ms Thanalechimi that public education is a critical plank in our efforts to create a smoke-free environment, and we will explore ways to enhance that.

27. Beyond encouraging smokers to be considerate, we also want to help them quit smoking. The Health Promotion Board will expand its outreach and support network

through its “I Quit” campaign. The campaign will raise awareness about the harms of smoking, and encourage smokers to kick the habit for the sake of their families.

E. Provision of Smoking Facilities in Premises

28. Mr Gan Thiam Poh and Ms Joan Pereira suggested providing smoking rooms in premises such as office buildings, public facilities, and coffee shops.

29. While smoking rooms may reduce exposure to second-hand tobacco smoke, they cannot eliminate it completely. The smoke can still seep into other parts of the building where people do not smoke. Hence, we have restricted where and how smoking rooms can be set up.

30. Smoking rooms are only allowed in certain premises such as office buildings and public entertainment outlets. However, the smoking room has to meet requirements such as having separate ventilation, and must not be used by any employee for work.

31. Mr Ng and Ms Chan asked about the guidelines for smoking facilities. Within the Orchard Road NSZ, a DSA must be demarcated clearly and be provided with at least one cigarette waste bin. The DSA must not be located where smoking is currently prohibited, and must not obstruct public walkways or cause dis-amenuities. An example of a DSA that complies with these requirements is one located at Far East Shopping Centre. There, the DSA is inconspicuously located at a distance from the pedestrian thoroughfare, and in the open, so second-hand smoke does not accumulate.

32. Ms K Thanalethimi asked that time be given to managers who are required to set up smoking facilities. NEA will give sufficient notice to the manager of a place to set up any DSA required. In fact, businesses and premises owners have worked with NEA to identify suitable locations for DSAs since 2017, ahead of the establishment of the Orchard Road NSZ.

33. In the case of smoking facilities located within food establishments such as coffee shops, I would like to update Mr Ng and Ms Pereira that since June 2017, smoking corners have been disallowed in new food establishments across the island. When the Orchard Road NSZ comes into effect, outdoor smoking areas at food establishments within the NSZ will also have to close. Existing food establishments that change hands and are issued a new licence would similarly have to remove their smoking corners. We have taken these steps to increasingly create a smoke-free dining experience for everyone.

F. Rationale for Enhanced Enforcement Powers

34. Mr Louis Ng asked about the rationale for the provisions on enforcement powers. The new section 4A gives NEA the powers to enter and inspect smoking-prohibited premises, as not all of these premises are freely accessible to the public.

35. As I mentioned earlier, NEA has at times encountered challenges in investigating complaints about smoking in certain smoking-prohibited premises, such as at pubs and bars, where uncooperative managers have denied entry to NEA's officers. Managers who refuse NEA entry would now be liable for an offence under the new section 4B. These provisions will deter managers from obstructing or hindering NEA's officers discharging their duties to safeguard public health, and reduce abortive enforcement work.

36. Nonetheless, the powers of entry will be exercised judiciously by trained and authorised officers. I have earlier set out the restrictions on the exercise of powers of entry. The new section 4A also does not allow authorised officers to make forcible entry under any circumstances. The powers can only be exercised for the purposes of the Act, namely, to enforce the smoking prohibition.

37. Authorised officers would only be allowed to take possession of materials related to the suspected offence. In practice, we will ensure that only officers directly investigating the case may access the evidence.

38. These amendments will also underscore our firm stance against abuse and threats made against our officers. Those found guilty of such acts will face fines of up to \$2,000 for a first offence, and \$5,000 for a second or subsequent offence, or a maximum of 3 months' imprisonment, or both.

39. Similar obstruction provisions and penalties are also found in other laws such as the Environmental Public Health Act or EPHA administered by NEA.

40. Under the EPHA, any person who obstructs or hinders an authorised officer in the performance of his duties under the Act will be liable on conviction to a fine not exceeding \$5,000, and, in the case of a second or subsequent conviction, a fine not exceeding \$10,000 or to imprisonment for a term not exceeding 3 months, or both. We will regularly review the penalties for breaches to the Act, as suggested by Mr Thanalechimi.

41. Last year, NEA issued 22,000 tickets for smoking; and there are calls from Members for NEA to be even more effective and responsive in undertaking its enforcement duties. Taken together, these provisions will serve to enhance NEA's operational effectiveness and efficiency in discharging its responsibilities.

G. Miscellaneous Queries

42. Ms Chan asked whether MCSTs have to pass a by-law to disallow smoking within the compound of private condominiums. The answer is no. Smoking is already prohibited in the common areas of private estates, including the lift lobby, void decks, and common function rooms; so no by-law is required to prohibit smoking in those areas.

43. Regarding Er Dr Lee's proposal to restrict the sales volume of cigarettes and increase the tax on tobacco, I will convey her suggestions to my MOH and MOF colleagues administering the tobacco excise regime for them to consider.

H. Conclusion

44. Mr Deputy Speaker, the Bill marks an important step towards our smoke-free vision. The Orchard Road NSZ will ensure a clean and healthy environment for shoppers and visitors. We have come a long way, and many segments of society support our push for a healthier living environment.

45. Smoking habits, however, are hard to break, and we must persevere in helping those who are trying their best to quit smoking. The Government will persist in our efforts to control access to tobacco products and discourage smoking through a combination of fiscal, regulatory, and educational measures.

46. However, these efforts alone are insufficient, without the help of the community. Families and friends should give smokers emotional and psychological support to kick the habit.

47. The Orchard Road NSZ represents our commitment to safeguarding the health of the community. I hope smokers will also support our efforts to maintain a conducive environment for all.

Mr Speaker, on behalf of the Minister for the Environment and Water Resources, I beg to move, "That the Bill be now read a second time."

1. Smoking is a significant and longstanding public health challenge in Singapore. Although smoking rates have dipped from a high of 23% in 1977 to 12% today, its associated diseases continue to claim the lives of more than 2,000 Singaporeans each year, or an average of 6 persons every day.
2. The social cost of smoking is not small, amounting to some S\$600 million in lost productivity and direct healthcare costs annually. The health effects from exposure to second-hand smoke are also well-documented.
3. To tackle tobacco addiction, the Government adopts a comprehensive, multi-pronged approach which involves curtailing access to cigarettes, sustaining public education and cessation efforts, and restricting where one can smoke.
4. We have been a global frontrunner in tobacco control, and were one of the first countries to prohibit smoking in public places. Today, curbs on tobacco advertising and a minimum legal age for smoking are in force, and more than 32,000 places have been made smoke-free.
5. Our vision is to become a smoke-free nation where tobacco use is discouraged, and people can enjoy clean air and a conducive living environment, free from passive smoke. We continue to press on towards this goal.
6. Last year, we announced plans to turn the Orchard Road precinct into a "No-Smoking Zone" or NSZ. The shopping belt was chosen because of the heavy footfall it experiences year round from both locals and tourists.
7. As a destination attraction, Orchard Road draws large crowds. We want to ensure that pedestrians, particularly families with young children and elderly, are protected from passive tobacco smoke along the busy thoroughfare.
8. Many businesses operating in the NSZ have expressed support for this initiative, which is in line with their plans to ramp up new offerings and activities along the shopping belt. My thanks go out to the Orchard Road Business Association or ORBA, in particular for facilitating the preparations for the NSZ.
9. But the journey to quit smoking is a challenging one, and smokers need time to wean themselves off the habit. We recognise this, and will make provisions for smoking at certain designated areas. This pragmatic approach maintains a balance between the interests of smokers and non-smokers, even as we discourage tobacco consumption.
10. The Bill before us today therefore proposes amendments to the Smoking (Prohibition in Certain Places) Act ("the Act") to strike this balance.

A. Enabling Prescription of No-Smoking Zones

11. We will introduce a new section 3A to expand the scope of the Act so that the National Environment Agency (NEA), with the approval of the Minister can – in addition to prescribing any specific place as a smoking-prohibited place – prescribe a geographical area as an NSZ. Once designated an NSZ, every publicly-accessible place within the NSZ will become smoking-prohibited, including along uncovered footpaths and pedestrian crossings.

12. It will be an offence to smoke at these places. The existing smoking-prohibited places such as the shopping malls and the common areas of commercial office buildings will remain smoke-free. The penalty for unlawful smoking within an NSZ will be no different from that imposed in any other smoking-prohibited place.

13. Under the new section 3C, it will be made clear that managers of premises may set up designated smoking areas or DSAs within their compounds. These facilities must conform to prescribed requirements in respect of their design, amenities, and location.

14. For example, DSAs must not be located in certain types of smoking-prohibited places, and must not obstruct public walkways and cause dis-amenities. We will periodically review the requirements to guard against a proliferation of DSAs and ensure these facilities serve their purpose.

15. Ahead of the establishment of the Orchard Road NSZ, businesses and premises owners have worked with NEA to identify suitable locations for DSAs, away from the main thoroughfare. The various DSAs are spaced out for convenient access.

16. Between October 2016 and December 2017, MEWR had studied the effectiveness of DSAs in the Orchard Road area in reducing smoking activities along the pedestrian thoroughfare. We found that the DSAs led to a one-third decline in the number of smokers along the main thoroughfare. 70% of the non-smokers interviewed also felt that passive tobacco smoke along the main thoroughfare had been reduced after the DSAs were set up. These findings are encouraging. When the NSZ is in operation, Singaporeans and tourists can look forward to cleaner air along Orchard Road.

B. Strengthening Powers of Enforcement

17. Sir, the next set of amendments aim to strengthen NEA's operational effectiveness in enforcing the smoking ban. Under the existing Act, the managers of smoking-prohibited places are responsible for ensuring the ban is observed within their premises. The vast majority do so, including those managing coffee shops and food courts, and I appreciate their efforts in safeguarding a smoke-free environment.

18. However, from time to time, there is a minority who disregard their responsibilities. NEA has faced challenges in investigating complaints about smoking violations at

smoking-prohibited places where access is restricted, particularly in public entertainment outlets such as nightclubs and pubs.

19. Currently, to investigate complaints about smoking violations, NEA enters and inspects the premises with the manager's consent. While most have been cooperative, some managers have hindered investigations by denying NEA's authorised officers entry into their premises, which prevents timely, effective investigation and enforcement. This is unsatisfactory.

20. We are therefore introducing new sections 4A and 4B to explicitly provide NEA's authorised officers the powers to enter, without warrant, smoking-prohibited places to investigate feedback on related infractions.

21. For common areas of residential premises, NEA can enter only if there is reasonable belief that an offence under the Act has been committed there, or that evidence of an offence can be found there, such as upon receiving public feedback about unlawful smoking. For all other smoking-prohibited places, NEA can invoke the power of entry at all reasonable times, such as the operating hours of the place, or at any time if there is reasonable belief that an offence under the Act has been committed there, or that evidence of an offence can be found there.

22. It will also become an offence to obstruct, hinder, or delay authorised officers exercising these powers. The new sections allow NEA to prosecute uncooperative managers for refusing entry or for obstructing its officers in the course of their duty.

23. NEA's authorised officers enforcing the smoking ban at times encounter belligerent smokers who turn aggressive. The provisions in Section 4B will explicitly make it an offence to obstruct, hinder, or delay these authorised officers in the performance of their duties. Those who verbally or physically abuse an authorised officer will also be liable under these provisions. Penalties likewise will be levied on those who furnish false or misleading information, including those who withhold identification.

24. These amendments aim to deter uncooperative smokers from hindering the agency's enforcement efforts, and underscores our firm stance against abusive and uncivil behaviour. Similar offences can be found in other laws such as the Environmental Public Health Act and the Tobacco (Control of Advertisements and Sale) Act.

25. The Bill will also clarify that NEA can obtain audio, visual, or physical evidence from a smoking-prohibited place necessary for prosecuting suspected breaches in that place. We will ensure that only authorised personnel such as NEA officers involved directly in the investigations would have access to evidence collected during investigations.

C. Miscellaneous Amendments

26. The remaining clauses 5 to 8 in the Bill are technical in nature, and are made for clarity.

D. Conclusion

27. Mr Deputy Speaker, sir, smoking continues to exact a heavy toll on the health of smokers and non-smokers. The proposals in this Bill serve to discourage smoking and enable us to protect more Singaporeans against second-hand smoke exposure.

28. Following the implementation of the No-Smoking Zone in Orchard Road, we will monitor its effectiveness before considering whether to extend the regime to other areas. Nonetheless, smoking is likely to continue in Singapore and around the world for some time to come and we must take a practical approach towards regulating smoking activities. There are no quick solutions. Our smoke-free vision is a work in progress and we will continue to press on.

29. While enforcement measures are being augmented, the efforts of the community remain key to fostering considerate behaviour amongst smokers and nudging them towards kicking the habit. I therefore seek Members' support for this Bill.

30. Mr Deputy Speaker, I beg to move.

Mr Kok Heng Leun: To ask the Minister for the Environment and Water Resources (a) whether any assistance has been provided to the vendors displaced from the Kreta Ayer weekend market; and (b) whether the Ministry will consider allowing vendors to resume their activities at the weekend market once renovations are completed.

Answer:

The Kreta Ayer Flea Market was organised and operated by the Kreta Ayer Community Centre Management Committee (KA CCMC). The vendors operating at the flea market were registered with and managed by KA CCMC. KA CCMC had applied for and was issued a temporary fair permit by NEA to hold the flea market in an open public area.

2. In June 2018, KA CCMC informed NEA that the flea market would be affected by construction works and would therefore cease operations from 2 Jul 2018. Accordingly, the temporary fair permit was cancelled. Prior to the market's closure, we understand that KA CCMC, as the operator of the flea market, had reached out to individual vendors about a month ahead of the closure to explain the decision and address the vendors' concerns. KA CCMC further offered financial support and referred some of them to temporary flea markets at other precincts. There are also various Government-funded training programmes for those who wish to pick up new skills and seek more stable forms of employment.

3. NEA has not received any new application for a trade fair permit to restart the Kreta Ayer Flea Market. NEA will assess such applications on a case by case basis, taking into consideration the potential impact on fair competition for the surrounding shops and the need to minimise disamenities to residents in the vicinity.

Question:

1013. Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources to date, what is the total number of commercial or retail buildings that provide e-waste recycling bins.

Answer:

To promote the environmentally sound management of e-waste, NEA has worked with industry partners to set up voluntary e-waste recycling programmes which provide recycling bins at public locations for consumers to recycle their e-waste. Examples of these programmes include StarHub's Recycling Nation's Electronic Waste (RENEW), Singtel x SingPost ReCYCLE and the M1 Drop-off Point Campaign. There are currently more than 500 such voluntary e-waste recycling bins across Singapore, and around 170 of them are found in commercial or retail buildings. In 2017, these bins collected about 140 tonnes of e-waste in total.

2 Building on these voluntary initiatives, my Ministry will implement a national e-waste management system based on Extended Producer Responsibility by 2021. The mandatory system will scale up our e-waste management efforts and consumers can expect greater convenience when recycling their e-waste.

Question:

998. Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources in respect of funding support for initiatives to reduce plastic packaging (a) what is the current take-up rate of the 3R Fund and 3P Partnership Fund; and (b) how popular are these schemes among the food delivery and food and beverage industries.

Answer:

The 3R Fund is a co-funding scheme that supports companies to reduce waste and encourage recycling. As of July 2018, NEA has disbursed \$1.4 million for 19 completed projects and committed another \$2.5 million in support of 22 ongoing projects.

2 The 3P (People, Private and Public) Partnership Fund supports ground-up environmental initiatives. Over the past three years, about \$3.2 million was disbursed in support of more than 3,000 projects, with about three quarters of funding going towards waste minimisation activities.

3 We supported the Zero Waste SG's Bring-Your-Own Campaign which has averted the use of two million pieces of plastic disposables and packaging waste. 430 retailers and F&B companies came together to encourage consumers to bring their own reusable containers, bottles and bags. We also supported F&N to work with retailers and tertiary institutions to raise awareness of recycling plastic bottles and aluminium cans.

4 We are heartened that some food delivery companies are discouraging the overuse of plastics on their own accord. Foodpanda and Deliveroo provide options for customers to exclude disposable cutlery in their orders. We welcome more of such initiatives from the food delivery and food and beverage industries and are prepared to support companies' efforts to reduce plastic packaging and plastic waste through the 3R and 3P Partnership Funds.

Question:

Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources (a) which are the water bodies in Singapore that are open for fishing; and (b) whether there are plans to open more such water spots for fishing.

Answer:

1 Since 2004, PUB has progressively opened up its reservoirs and waterways for water sports and activities such as kayaking, dragon boating and fishing under the Active, Beautiful and Clean (ABC) Waters Programme. This is to bring the community closer to water, so that they can better cherish and appreciate this precious resource.

2 Today, the public can fish at designated areas within ten reservoirs and five waterways such as Kolam Ayer ABC Waterfront, Geylang River, Rochor Canal, Bedok Reservoir, Lower Seletar Reservoir and Pandan Reservoir. The full list can be found on PUB's website. Popular fishing locations such as Bedok Reservoir, Pandan Reservoir and Kolam Ayer ABC Waterfront are frequented by recreational users, including families and anglers, especially on weekends. The designated fishing areas are located a safe distance away from water activity zones, footpaths and park connectors. As reservoirs are key sources of water supply, ensuring the water quality in our reservoirs is of utmost importance. Nevertheless, PUB will continue to assess and open up suitable new sites for water sports and activities.

3 Exercising a little consideration goes a long way in making our reservoirs and waterways a safe and pleasant environment for all to enjoy. PUB appeals to the public to adopt responsible fishing practices such as fishing only at designated areas, casting lures with care to avoid injuring others, and discarding unwanted fishing lines and hooks properly. Members of the public are encouraged to call the PUB hotline at 1800-2255-782 should they spot any illegal and unsafe fishing activities.

1. Mr Speaker, managing plastic and packaging waste is one of the key priorities of my Ministry. I thank Mr Louis Ng for speaking in support of my Ministry's work, and encouraging everyone to strive for a plastic-lite Singapore.

A Long-term Approach for a Sustainable Singapore

2. My Ministry believes the long-term approach is to engage Singaporeans on the importance of sustainability. Quick fixes address the symptoms but not the root of the problem. Hence our aim is to build a national consciousness to care for the environment. So that Singaporeans and businesses will take action, even beyond what the regulations require. This process may take longer. But this is the right way; the positive effects will go beyond plastic bags, beyond packaging, beyond waste management to areas including climate action.

3. We can succeed. We see growing numbers of businesses and Singaporeans who go the extra mile to care for the environment. Mr Louis Ng himself is one example. He has also cited many examples.

A Holistic Approach to Manage Plastics and Packaging Waste

4. Let me share with Members the holistic approach my Ministry is undertaking to reduce plastic use and manage plastic waste. This goes beyond plastic bags to include packaging such as bottles and containers. One third of domestic waste comes from packaging.

5. Even as we seek to reduce plastic usage, we recognise that plastics have their uses; substituting them with other materials may not be more environmentally friendly as some may perceive. For example, the British Government estimated that a cotton tote bag must be used 173 times before its greenhouse gas emission impact improves beyond the plastic bags we use to line our bins. Our life-cycle assessment of common carrier bags had the same conclusion. Hence, our approach is to reduce excessive consumption of all types of packaging, including plastics used by businesses and individuals.

6. We started the Singapore Packaging Agreement in 2007. This voluntary initiative is well-supported by companies and has collectively reduced some 46,000 tonnes of packaging.

7. We are now moving to a regulatory system to tackle packaging waste systematically on a larger scale. Hence, we brought forward the requirement for businesses to report the type and amount of packaging they are putting on the market and their plans for reduction, by one year to 2020. This will focus management's attention on the amount of packaging used, and raise awareness of the potential to reduce packaging.

8. We are also studying the feasibility of adopting the Extended Producer Responsibility (EPR) approach for packaging waste. This will impose collection targets on businesses who use or produce packaging. It incentivises businesses to reduce their packaging upstream, and ensures the proper recycling of packaging downstream.

9. We will publish the details of these initiatives to address packaging waste, and other measures for e-waste, food waste and so forth in the inaugural Zero Waste Masterplan to be launched next year. We will not hesitate to legislate where necessary. But we will do so by taking a pragmatic and considered approach that suits our local context. While we always seek to learn from others, it is never our practice in policy making to simply follow what other countries have done.

Marine Plastic Pollution

10. Our efforts to address plastic waste go beyond our borders. We take the issue of marine plastic pollution seriously. Singapore participates actively in regional and international discussions to address marine litter and microplastics. We also contribute to international capacity building efforts. For example, under the Singapore-Norway Third Country Training Programme, NEA partnered experts from UNEP and our Norwegian counterparts to share our expertise on waste management and pollution control, as well as the management of plastics waste and microplastics.

11. We are heartened by the efforts of various countries to tackle marine plastic pollution as highlighted by Mr Louis Ng. Singapore is also doing our part. We have strict anti-littering measures and dispose of most general waste at our waste-to-energy plants 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.

12. Let us be clear. Marine pollution is caused by the improper disposal of plastic waste, and not the use of plastics per se. A 3rd March Economist article entitled 'The known unknowns of plastic pollution' reached the same conclusion. Hence, our measures deal with the root cause of marine pollution and are not merely addressing symptoms as Mr Louis Ng posited.

13. The result is that Singapore is acknowledged as one of the smallest contributors to marine plastic pollution in the world, according to studies including a 2015 University of Georgia study on "Plastic Waste Inputs from Land into the Ocean" and the UN Environment's 2016 report on marine plastic debris and microplastics.

14. Notwithstanding, we will continue to address the issue of marine plastics pollution through our stringent anti-littering measures, educating the public against littering and excessive consumption of plastics and introducing regulatory measures to minimise plastic and packaging waste upstream.

Public Sector Efforts

15. The public sector is also doing its part to promote green practices among its agencies. We have published a Best Practice Guide to guide agencies to organise environmentally-friendly events. For example, we avoid the use of plastic bottled water and disposables by providing water dispensers and reusable crockery and cutlery where possible. We will also continue to improve our Public

Sector Sustainability Plan, where waste reduction is a key thrust, and I'll try to make sure that "plastics" is mentioned more than once. Under the plan, we require large buildings to report the amount of waste disposed and will set waste reduction targets for the public sector.

16. I am happy to share that my Ministry is definitely taking the lead. We do not serve bottled water for meetings. Our staff bring their own plates and cutlery for events to avoid the use of disposables. We are encouraging other public sector agencies to do the same for their meetings and events such as the National Day Parade and community activities to minimise the use of plastics.

Working with our 3P Partners

17. Beyond what the public sector is doing, I am encouraged that many passionate groups and individuals like Plastic-Lite SG, UnPackt and Tabao Girl are moving the ground in their own ways. Companies such as KFC and IKEA have similarly done so. I welcome more to join them. NEA will support them if required, such as through the 3P Partnership Fund.

18. Last year, NEA supported Zero Waste SG's Bring-Your-Own Campaign that brought 430 retailers and F&B companies together to incentivise consumers to bring their own reusable containers and bags. Not only did it raise awareness, it also averted the use of two million pieces of plastic disposables. This shows how we can multiply our impact if we all work in partnership.

19. On the proposed carrier bag charge, we will continue to monitor developments in this area. Mr Louis Ng referred to the Hong Kong system of giving free bags for hygiene purposes. This addresses the issue of providing some bags to households for bagging their waste. But as he also noted, this also complicates the system, making enforcement even more difficult. I understand from reports that the non-compliance rate in Hong Kong is about one-third to half.

20. The Singapore Environment Council's latest survey showed that two-thirds of respondents use their plastic bags for bagging waste. An equal proportion of respondents ranked a plastic bag charge as their most and their least preferred option. There is still more we can do to persuade consumers not to take more than they need, and to bring their own reusable bags. As the same Economist article puts it, even though plastics is not at the top of environmental ills, it is highly visible, and I would say, emotional. This gives us the opening to encourage Singaporeans to form the right habits.

21. I believe this is one area where we can work with our 3P partners to engage and educate Singaporeans and change their habits.

Conclusion

22. Sir, to sum up. The key shift my Ministry is working on is to develop in Singapore a national consciousness to care for the environment. Let's give the policies we have or will be putting in place time to take effect and for people to change habits. I would like to thank as well as urge the many passionate

individuals like Mr Louis Ng, and the passionate groups, including the many who are here today, to continue to partner us to shape our nation's values. Only then will our efforts be sustainable.

Supplementary questions

Louis Ng: Sir, I have three clarifications. I think the Senior Minister of State mentioned about encouraging but can I confirm whether the Public Service is planning to eliminate single use plastic in our catering of events?

Same for the NDP, I think the Senior Minister of State mentioned that we are going to encourage but I think planning would have probably started for 2019. So, can I confirm that NDP 2019 will only use reusable items with minimal packaging?

Lastly, for the proposed carrier bag charge, can I ask whether MEWR can at least do a study on this issue and whether they can report back to this House once the study is completed.

SMS: I thank the Member for his further clarifications. Firstly, in terms of getting the public sector to reduce its use of disposables, as I have said, we have a Best Practice Guide, and actually in the Best Practice Guide, we mentioned 'plastics' many times. So, we have encouraged them to reduce the use of plastic bottles, plastic bags, as much as possible, as well as reduce packaging of their collaterals. And, I think, what we can say is that we will encourage them to do this as much as possible because for some events, including NDP and major events, it may not be possible to entirely do away with bottled water, and just use water dispensers, because of the large number of people. So, as far as practicable and applicable, we will encourage them to do so.

With regard to NDP 2019, we will encourage the NDP organisers to do this also as much as it is practicable.

With regard to the study, actually we have already done an extensive study on single-use carrier bags and disposables, and we have shared in this House and with the Member too the results of the study where it showed it is not necessarily true that using other types of disposables versus plastics will give you a better environmental outcome or impact. As I also noted earlier in this speech, even the British study has shown that for a reusable tote bag to benefit in terms of greenhouse gas emission reduction, you have to use it 173 times. So, what you really want to do is to go upstream. And I suppose I will be disappointing the Member by reiterating and repeating what I have said in this House before and what I will be saying again on the same issues that you have also raised in this House that really, what we want to do is move upstream. And we will not hesitate to implement and take regulatory measures to manage waste and to protect the environment where we think it is practicable, effective and useful to do so. So, we

will be implementing carbon tax, as well as EPR on e-waste, as well as mandatory reporting for packaging waste and the reduction plans.

As far as carrier bags are concerned, we think that it is more practicable, more sustainable, to take the long-term approach. It may take a longer time, but it is really to change habits, educate and encourage the public to reduce the use of disposables and all types of packaging.

Louis Ng: I know we have the guidelines; I know this will not happen overnight as well. Malaysia has announced that they are going to do it by 2030. So, I am just wondering if MEWR has a long-term plan of eliminating single-use plastics in public-sector events. Can we at least commit to, say, we will eliminate this by 2030? So, maybe not NDP 2019, but NDP 2030? Can we do this?

SMS: We will leave it to whoever the Minister for Environment is at that point in time to decide on NDP 2030.

Question:

Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources whether the Ministry has been conducting audits on social enterprises managing hawker centres to prevent the use of hidden fees and charges and what level of surplus of income is deemed acceptable for these social enterprises.

Answer:

The National Environment Agency (NEA) started appointing socially-conscious operators to manage new hawker centres on a not-for-profit basis in 2015. As private sector operators, they have experience in food and beverage operations as well as property and lease management. This expertise could be harnessed to attract new hawkers to the trade, provide residents with a variety of good and affordable food choices, and improve the vibrancy of the hawker centres by amongst others, ensuring that sufficient stalls are open during meal times and organising place-making programmes at the centres. This is in contrast to some existing hawker centres where stallholders operate shorter hours, and hence do not fully cater to the dining needs of residents.

2 The operators have brought benefits to patrons and stallholders. They have ensured that hawkers provide clean and tasty meals to residents. The operators have also introduced interesting food options such as prawn paste chicken rice and halal tze char, and new dining concepts such as the “Fareground” at Pasir Ris Central hawker centre which brings together “hipster” hawker fare such as beef bourguignon and kebabs to attract younger patrons to the hawker centres. Almost every stall in the new hawker centres offer at least one economical meal option, priced at \$3 or less.

3 The operators have also implemented productivity improvements that are critical for this manpower-intensive sector. Centralised dishwashing has reduced hawkers’ workload while improving the cleanliness of the centre. During my recent visit to Our Tampines Hub hawker centre, a stallholder expressed that centralised dishwashing helped him save on water charges and address his challenges of hiring dishwashers. The operators have also complemented the Government’s efforts to support aspiring new hawkers. One example is the Entrepreneurship Programme introduced by Fei Siong at Hougang Ci Yuan hawker centre, where new hawkers are provided with on-the-job training to help new entrants operate their stalls. They are mentored by veteran hawkers, some of whom even shared culinary experiences and recipes. 16 hawkers have benefitted from this programme to date.

4 Nonetheless, we recognise that there have been concerns over costs to stallholders. NEA ensures that rentals charged and essential services that contribute to operating costs are reasonable. One key tender evaluation criteria when evaluating bids from potential operators is the rental and operating costs that the operators will charge stallholders. Operators who propose lower rentals

and operating costs will be considered more favourably, and they are not permitted to vary these charges over the term of the tenancy. Before signing any tenancy agreement with potential stallholders, the operator will have to make known these charges to them. Operators must also bear the risks of rental arrears and stall vacancies. In addition, NEA requires operators to be transparent about costs. Any new charges, including optional charges for value-added services offered by the operators, are subject to NEA's approval.

5 These measures limit the potential profits, if any, of operators and ensure that rentals are affordable for stallholders. Today, the stall rentals together with operating costs at our new hawker centres are significantly lower than those in comparable food courts and coffee shops. The operators also fund their own initiatives to achieve social objectives and enhance the vibrancy of the hawker centres. These include the \$1 Meal Carnival at Yishun Park hawker centre in June this year to attract the community to dine at the centre, and the offering of drinks at concessionary rates to senior citizens at Jurong West hawker centre.

6 It takes time for a new hawker centre to establish itself. The Government will continue to refine and improve the management model, so as to provide affordable food in a hygienic environment while allowing hawkers to make a decent livelihood. With time, we expect the new hawker centres to enhance their vibrancy and grow into valued community dining rooms.

Supplementary Questions:

Assoc Prof Daniel Goh Pei Siong: Two questions, please. Was NEA aware of the extra costs that were at the centre of the recent public concerns? The second question is, does NEA conduct regular surveys of hawkers with respect to satisfaction with management or any other management issues that they bring up to NEA?

SMS: I think the operator had explained, had come out to clarify, and we have also made clarifications that the costs are optional costs. If the Member is referring to, for instance, the Hougang Ci Yuan hawker centre managed by Fei Siong, that \$600 was an optional cost and not a mandatory charge. As I have noted, all mandatory charges have to be declared upfront to the stallholders before they sign on the tenancy agreement. And if there are optional charges or any new initiatives that would impact costs, they are required to inform us and to get our approval. So, of the 40 odd stallholders in Ci Yuan hawker centre, for instance, only nine of the non-EP stallholders have taken up this optional charge.

Actually, even though we have appointed operators to manage our new hawker centres, we also have place managers that visit the hawker centres regularly, on a weekly basis to carry out checks on defects, on cleanliness as well as to engage the stallholders. So, the stallholders can, at any time approach our place managers if there are pertinent issues.

Mr Zainal Sapari: I have a follow up question for the Senior Minister of State. I agree with her it takes time for the hawkers to establish themselves but there are some that are still struggling among the hawker centres managed by the social enterprises. So, I would like to ask whether NEA would consider lowering the rentals for a period of time until they could pick up enough business to make it sustainable?

SMS: As I have noted that for the new hawker centres, the rentals for the stalls as well as the operating costs for essential services – general cleaning, dishwashing and so on – are made known to the stallholders so you would assume that when they signed on the tenancy agreement, they would have taken into account all these costs in their computations. In fact, even in our existing hawker centres which are tendered out, they would also have tendered based on what they understand to be the market rate, in most instances.

At this point in time, we have no plans to offer any subsidies because they actually came in knowing what the costs are. But having said that, we do understand and appreciate the concerns of the stallholders and we are keeping a close watch on the situation.

As a matter of fact, for the new hawker centres, as I have said, it takes time for them to establish their business. And I think it is not unexpected that some stalls may not do as well as others at the beginning. In fact, the turnover or the vacancy rate for these new centres are actually quite comparable to our existing centres. The footfall for some of these hawker centres have increased over time significantly. So, we are keeping a close watch.

Mr Louis Ng Kok Kwang: A quick point to echo what Member of Parliament Zainal Sapari has said whether we really can provide some subsidies for the hawkers at some of these social enterprise hawker centres who are really not doing well. I know they came in knowing what the rental is, but the fact now is that, in contrast to what Assoc Prof Daniel Goh had stated, some of them are really finding it hard to break even – the social enterprises. So, can we provide some help to the hawkers at these social enterprise hawker centres which really are not doing well because of very low footfall?

SMS: I think that when there are specific cases, it can be made known to us. But as I have said, we keep a close watch on the viability of the businesses in these new hawker centres. And as of now, even for the hawker centres which had some bad press coverage and apparently low footfall, they have actually improved their business significantly. The operators have been able to enhance the vibrancy of these hawker centres, for instance, providing free shuttle bus service to the nearby industries and factories as well as office workers to dine in the hawkers centres, complimentary car parking, as well as discounts, lucky draws and so on to bring them in.

For instance, in Jurong West hawker centre, they have managed to bring in some popular stallholders which have also significantly increased the footfall. So, based on our understanding and survey of what is happening, we do not see that there is a need to do this but as I have said, if there are individual stalls that face problems, we can always take a look at it.

Assoc Prof Daniel Goh Pei Siong: Just a quick follow up. With regards to the social enterprises, are they sustainable? Because if they are facing problems in terms of keeping up with costs themselves and trying to get more money because putting in all these extra costs to the hawkers, are they doing well? Is the model sustainable in that sense?

SMS: I think the earlier question was not about whether the social enterprise was doing well but the particular individual stallholders, from Member of Parliament Louis Ng. With regards to the social enterprise, as I have said, when they bid for the hawker centres, they know that we will consider favourably those where they offer lower rentals, lower operating costs and so on. They have to bear risk of rental arrears as well as vacancies and so on. So, again the terms of the tenure are clear, transparent.

As far as we are concerned, Ci Yuan, for instance, had actually renewed their tenancy agreement with us, because they have actually met our KPIs: they have been able to provide a good variety of affordable food to residents, ensure that the hawker centre is able to provide meals at all times of the day, they were able to enhance the vibrancy of the hawker centres and also implement productivity initiatives. So, we have actually renewed their tenancy.

Question:

2197. Ms Foo Mee Har: To ask the Minister for the Environment and Water Resources what impact has the hike in water prices had on water conservation efforts and overall consumption patterns.

Answer:

In Singapore, water is priced to reflect its scarcity value. We have raised water prices to reflect the rising costs of water supply, so that our water system remains financially sustainable. This will allow us to continue investing ahead of time to ensure a secure and reliable water supply, while encouraging everyone to conserve this precious resource and use it wisely.

2. I mentioned during my Ministry's Committee of Supply debate this year that Singapore's daily household water consumption has decreased from 148 litres per person in 2016 to 143 litres per person in 2017. This is encouraging.

3. The increase in water prices is not the sole reason for the reduction in household water consumption. Our water conservation measures such as minimum water efficiency standards and the mandatory water efficiency labelling of water fittings and appliances are also important factors. Over the years, we have progressively expanded the mandatory water efficiency labelling scheme to cover more fittings and appliances, and phased out the less efficient products. These efforts are bearing fruit. PUB's household water consumption study last year showed that more than half of the water fittings and appliances used by households are water efficient models.

4. We will continue to encourage the use of more water efficient products. Starting this month, PUB will require all dishwashers sold in Singapore for household use to have a water efficiency label, so that consumers can make informed purchasing decisions. From April next year, all other water fittings with a 1-tick rating will be phased out from the market. To further boost this effort, the water closet replacement project was launched, where PUB has successfully replaced non-water efficient water closets, basin and kitchen taps for some 3,700 eligible households to-date. Recognising that showering contributes most to household water usage, smart shower devices will be installed in 10,000 new homes over these two years to motivate residents to watch and cut down on water usage during showers.

5. PUB is also keeping up its efforts in the non-domestic sector. PUB has been working closely with more than 600 large water users in the submission of their water efficiency management plans. PUB is working with companies to progressively develop and make available water efficiency benchmarks and best practice guides. These will be resources developed with the industry, for the industry. Companies have already responded positively, with a number looking to implement water efficiency projects.

6. Water is a scarce resource that should not be taken for granted ever. I urge everyone to do our part to use water wisely, so that we can continue to enjoy it for years to come.

Question

Mr Dennis Tan Lip Fong: To asked the Minister for the Environment and Water Resources (a) how many hawker centres are currently operating 24 hours a day; and (b) in each of the hawker centres which are currently operating 24 hours a day, what is the percentage of the stalls which are actually operating 24 hours a day over the total number of stalls in the respective hawker centres.

Reply by Minister Masagos Zulkifli:

Of the 114 hawker centres managed by the National Environment Agency (NEA) and NEA-appointed operators, only the hawker centre at Our Tampines Hub (OTH) operates 24 hours a day. On average, about 20% of its 42 stalls operate 24 hours a day. This was in response to requests from the community for a 24-hour hawker centre. But as the demand from patrons has not materialised, both hawkers and the operator are recalibrating the arrangement.

Question

Mr Lim Biow Chuan: To asked the Minister for the Environment and Water Resources whether NEA can consider a shorter period of closure for the repairs and renovation carried out for hawker centres so that the hawkers may have better options to continue their operations.

Reply by Minister Masagos Zulkifli:

Cyclical repairs and redecoration (R&R) works are carried out at hawker centres by the respective Town Councils or the National Environment Agency (NEA) every five to seven years. This ensures that hawker centres are well-maintained, to provide patrons and hawkers with a pleasant and hygienic cooking and dining environment.

2 R&R works are typically completed within two to three months, depending on the scope of works and size of the hawker centre. In planning for such works, NEA will seek feedback from the Hawkers Association and stallholders on the preferred closure periods, so that stallholders have ample advance notice and can make their plans accordingly. We also work with contractors to plan for the shortest possible closure period to enable stallholders to resume their businesses as soon as possible.

1. Mr Speaker, I thank the 13 Members for raising many thoughtful questions on the socially-conscious enterprise hawker centres (SEHCs). I will speak on why we embarked on the Socially-conscious Enterprise Hawker Centre (SEHC) model, how we select operators, and share our views on how the SEHCs are performing. SMS Amy Khor will elaborate further on our efforts to refine the SEHC model, and better support our hawkers.

2. Hawker centres are an integral part of Singapore. They are our community dining rooms – well-loved by Singaporeans from all walks of life. They serve three key social objectives by providing: affordable food in a hygienic environment; a decent living for our local hawkers; and vibrant social spaces to bond our communities. These are good objectives to achieve individually; but together, they compete against one another. So trade-offs need to be made for an optimal outcome.

HAWKER CENTRES AS A BALLAST TO STABILISE COOKED FOOD PRICES

3. Let me start by recalling that the Government restarted building hawker centres in 2011, after a hiatus of almost 30 years. We were concerned about the lack of affordable dining-out options for Singaporeans at a time when there was a boom in coffee shops and food courts. Natural market forces were pushing up rentals at those private Food & Beverage (F&B) outlets, and consequently food prices. The public was concerned about the rising cost of living. In response to widespread appeals from Singaporeans, we resumed building hawker centres to serve as a ballast to stabilise cooked food prices against the emerging dominance of coffee shops and food courts.

4. The Government has committed to building 20 new hawker centres by 2027, in new estates or existing ones that are relatively under-served. These will provide about 800 new hawker stalls at significant investment – each hawker centre costs \$15m to build. The Government absorbs the building costs and subsidises their ongoing maintenance, but does not recover such costs from stall rental.

HAWKER CENTRES MUST KEEP UP WITH THE TIMES

5. We recognise however, that just by building new hawker centres, we cannot automatically expect them to be viable and sustainable. In the early 1970s, the Government started building hawker centres to resettle street hawkers, so as to improve hygiene and food safety standards. Over time, they became our signature community dining rooms – to this day they enable us to preserve the important culture of eating out together, regardless of our status – rich or poor, young and old.

6. Over time too, a good number of these first and second generation hawkers, who receive cheap subsidised rentals, only work short hours. Residents in turn feedback that some existing centres do not fully cater to their dining needs. I was at Shunfu Mart Food Centre during a recent Ministerial Community Visit in Bishan East-Thomson Constituency. The hawkers only open for breakfast and lunch; some even just for breakfast. Residents do not have access to affordable food in the evening. This situation reflects a need for the careful balancing act to look after the interests of both hawkers and the community. Ultimately, hawker centres exist to serve Singaporeans. But we also have to be fair to hawkers and safeguard their well-being.

7. Our social and demographic landscape has changed significantly. Today, the median age of hawkers is about 60 years old. We have about 6,000 cooked food stalls at our 114 hawker centres. More than one third of our hawkers and their assistants will retire in the next 10 years. Being a hawker is physically demanding. Many successful hawkers tell us that they hope their children will not follow in their footsteps. The challenges of the trade deter many young Singaporeans. We have to transform and find ways to make the hawker trade sustainable; or we may end up with hawker centres without hawkers.

8. The demographic profiles and needs of residents have also evolved, particularly in newer estates. Patrons are more well-travelled and demand fresh concepts and wider food variety. Hawker centres have to compete with coffee shops, food courts, and other food outlets in the community. Even the traditional model of dine-in meals has been disrupted by central kitchens and food delivery services. We must help our hawkers meet these challenges, just like how we try to help our taxi drivers face the wave of challenges from disruptive competition like Uber and Grab.

9. To adapt to changing needs and circumstances, it is critical to find new operating models to sustain the hawker trade. This is similar to the role which NTUC Fairprice has played in the supermarket landscape. Over the years, NTUC Fairprice has been innovating and moderating prices of essential groceries, which has catalysed the transformation of the mom-and-pop grocery shops. Over time, as customer profiles change, NTUC Fairprice continues to meet the needs of a wide spectrum of customers, by providing diverse

product lines from affordable house brand options to premium brands. Even NTUC Fairprice would not have been sustainable if they only provided affordable alternatives without the attraction of choice for their customers.

SEHC OPERATORS CAN HELP SUSTAIN HAWKER TRADE

10. This is why we are trialling the SEHC model for our new hawker centres. We have started at 7 new hawker centres, out of more than 100 managed by the NEA. These SEHC operators bring new ideas and inject innovation that hawkers individually or the Government cannot. We are giving opportunity to those with expertise and networks in the F&B industry, to apply themselves to socially oriented purposes. For example, they are able to curate food stalls for quality and variety. They are also able to bring in famous food recipes, and are better placed to run hawker incubation programmes to help sustain the hawker trade. They also innovate to improve footfall and enhance vibrancy of the centres through better marketing and place-making programmes, and not just leave it to chance. As the single operator of each hawker centre, with F&B and management competencies, these SEHC operators can help our hawkers weather the competition from other F&B alternatives and adapt to technological disruptions, better than the hawkers can individually. In time to come, the better SEHCs will develop capabilities to support and sustain the hawker trade that we will appreciate.

11. To ensure that we select the right operators who do not profiteer, NEA has put in place safeguards through the tender and evaluation process. First, NEA favours operators with lower overall charges to stallholders. Operators are required to propose rentals and operating costs upfront, and cannot change these over the term of the tenancy. Second, operators must be transparent about costs. All new charges, including optional charges for value-added services, must be approved by NEA. Third, a large part of the hawkers' operating costs, like the Service & Conservancy Charges (S&CC) charges and table cleaning fees, are "pass-through" charges, which the operators do not benefit from. As a reality check, we compare some of these costs with the alternatives like hiring additional hawker assistants, or the consequences of cheap sourcing low quality workers.

12. Fourth, operators are required to reinvest at least 50% of any operating surplus into social benefits for the hawker centres and stallholders.

SEHCS HAVE ACHIEVED SOME EARLY SUCCESSES

13. I am heartened by the recent public discussion on how existing NEA centres are run better than the SEHCs. It is testimony that existing hawker centres under NEA management have done well over the years to meet the needs of their communities and hawkers. But it is not enough to keep doing things the same way. This is why we have to continue with the SEHC model.

14. Several Members asked what makes a successful hawker centre. I believe most of us have patronised our favourite stalls at popular hawker centres, such as at Tiong Bahru or Adam Road. Many such existing centres are well-established in their communities. They have anchor hawkers who draw customers from all over the island. The new hawker centres do not enjoy this advantage, and need time to build up a clientele. Location and connectivity are important factors. New hawker centres at Kampung Admiralty and Our Tampines Hub (OTH), situated at transport nodes and co-located with other public services or amenities, have enjoyed good business. Higher business volume will help stallholders cope with costs.

15. On the whole, SEHCs have achieved good outcomes despite the short time they have started operations. Foremost, food prices at SEHCs are affordable and comparable to existing centres. These are generally lower than prices at surrounding coffee shops and food courts. We cannot force hawkers to sell at cheap prices for all dishes at each stall. Instead, the operators have made available at least one affordable meal option at \$3 and below for each stall, and allowed hawkers to determine prices for other dishes. This means that prices are not kept artificially low. Instead, operators work with hawkers to offer a range of food offerings at different price points, so that there are both attractive options that residents are willing to pay for, and at the same time affordable options when residents want that. Some hawkers have also chosen to price their dishes low to attract more customers. For example, "Old Times" at the Kampung Admiralty Hawker Centre prices all dishes below \$3. Indeed, at each SEHC, there are close to 40 affordable options of various kinds of meals from 40 different stalls.

16. Secondly, SEHC operators have curated food stalls for quality and variety. They have tapped on their networks of hawkers, and have the expertise to conduct food tasting when letting out stalls. They have also introduced interesting food options such as prawn paste chicken rice and halal tze char, and new dining

concepts. This ensures a good variety of food options, which is not always a given in existing hawker centres. Even in popular hawker centres like Tekka, we can find rows of stalls offering similar food because NEA is required to award one vacant stall at a time based on tendered rentals to the highest bidder. NEA does not have a mechanism to curate an attractive collection of food options at each hawker centre, like in the case of SEHC model. Such an allocation system run by NEA would be complex to execute and be subject to potential audit issues.

17. The SEHCs are establishing themselves within their communities and serving the residents well. Ci Yuan Hawker Centre, recently passed its 3-year mark. The hawkers are doing well, and 97% of them chose to renew their contracts in July this year. At Bukit Panjang Hawker Centre, the renewal rate is similarly high at 96%. SEHCs at Kampung Admiralty and OTH are also doing well with hardly any vacant stalls and a long waiting list of potential hawkers. This is similar to NEA-managed hawker centres, where only 3% of cooked food stalls are vacant.

18. SEHC operators have also kept their centres open during breakfast, lunch and dinner – a major request made by the public. In contrast, some existing hawker centres focus on only one or two main meals a day, and some hawkers only work 3 to 4 days per week. To ensure vibrancy, SEHC operators have also introduced creative initiatives to increase footfall such as complimentary parking, lucky draw programmes and shuttle bus services for office workers.

19. The SEHCs are leading a new model of clean and productive hawker centres, applying the best practices they have learnt in the private sector to overcome the constraints of labour shortage. All the SEHCs come with productivity initiatives such as automated tray return systems (ATRS) and centralised dishwashing (CDW). Providing trained and properly supervised cleaners and a more hygienic environment have increased table turnover rates, benefiting both patrons and hawkers. The average tray return rates at SEHCs are much higher than those at our existing hawker centres because of the operators' efforts in implementing the ATRS. It makes the jobs of our cleaners easier and alleviates manpower challenges that our hawkers face in looking for workers to wash dishes. During my walkabout at Shunfu Mart Food Centre, I had noticed an Economy Bee Hoon and Nasi Lemak stall which had a faded sign advertising to hire a stall assistant. The hawker shared that her children were not interested in helping out at the stall, and she had been unable to hire an assistant despite advertising for a long time.

20. SEHCs have also managed to attract new entrants to sustain the hawker trade. The median age of hawkers at the 7 SEHCs is 43 years old, significantly lower than the median age of 60 in our other 107 hawker centres. This is an encouraging sign and can be attributed to various initiatives introduced by SEHC operators. For example, Timbre's Incubator Programme and OTMH's Train and Place Entrepreneurship Scheme nurture new hawkers. Collectively, the 5 SEHC operators have trained a total of 38 aspiring hawkers since they started operations. These efforts complement NEA's ongoing incubation stall programme (ISP), which has supported 12 aspiring hawkers to date. Eight of them are still on the programme, while the rest had decided that they were either not suitable for the hawker trade or withdrew due to personal reasons. In addition, the operators have introduced productivity measures such as centralised dishwashing, which allow hawkers to focus on their cooking and reduce the amount of menial tasks they need to do. Taken together, these initiatives reduce the physical burden of being a hawker, and can go a long way to help sustain our hawker trade.

MARKET MECHANISM IS WORKING; SEHCS SHOULD BE GIVEN MORE TIME TO STABILISE

21. Nonetheless, the SEHCs will take time to establish themselves. Ci Yuan Hawker Centre, the first SEHC, only started operating three years ago, with the latest at Pasir Ris opening in January. Hawkercs at these new centres need time to build up a clientele. Overall, the average monthly stall vacancy at SEHCs, at about 10%, is not exceptionally high and is not a bad result considering that most stalls are new. Many of the hawkers are also new to the trade, and need time to experiment with their recipes and decide if this is the career for them. The centres also need time to build up footfall.

22. The market mechanism is working, and Government should not intervene unnecessarily, in mandating low or no rental, which could otherwise affect fair competition. Hawkercs are entrepreneurs after all. We want to reward successful hawkercs to sustain the trade and preserve our beloved hawker heritage. It is natural to have some level of churn as better hawkercs replace those who are less suited for the trade. Market forces would lead to a fair distribution of hawker stalls, which ultimately benefits residents. It is inappropriate for Government to subsidise a hawker on the basis that business is poor. This would be unfair to a better performing hawker who thrives on healthy competition. It would also be unfair to other private sector food shop operators located in close vicinity to the centres. The model must therefore ensure that rentals and

costs are transparent and fair to hawkers, but cannot subsidise hawkers to the extent that it distorts the workings of the market.

23. In summary, despite implementation challenges, the SEHC model is generally sound. Food prices are kept affordable with a good variety of high quality options, and the majority of hawkers are doing well at the SEHCs. We should not undo these achievements. As with any trials and experiments, we cannot always get it right the first time. We have heard the feedback, and will adjust the model to better serve Singaporeans. We will continue with the SEHC model, and improve it so as to serve patrons well and look after the well-being of our hawkers.

24. I ask members to give the model time to adapt, adjust and optimise the outcomes we seek to achieve:

- a. First, availability of affordable food options that does not deny respectable earnings for our hawkers, and at the same time moderates the free market F&B alternatives;
- b. Second, a decent living for our local hawkers that is sustainable even while providing affordable options; and
- c. Third, to preserve our hawker centres, where we are proud of our unique vibrant social spaces, as community dining rooms where everyone goes to; where affordable food is also good food.

Thank you. Let me first thank Members for their questions and concerns for our hawker centres. In fact, I would like to take this opportunity to thank members of the public for the many views, discussion and suggestions that they have put forward. We appreciate such views and feedback to help us to improve to better serve our hawkers and Singaporeans.

2 I will speak on our efforts to better support our hawkers and look after their well-being.

3 As a regulator, NEA must strike a balance between serving the public well, and ensuring the well-being of hawkers, while working to achieve the social objectives of our hawker centres. Residents should have access to affordable food in a clean setting for all three meals. At the same time, hawkers must be able to make a decent living, under fair tenancy terms and conditions.

4 As with any trial, it is difficult to get the Socially-conscious Enterprise Hawker Centre (SEHC) model right from the start, especially since we have not built new hawker centres for almost 30 years. So, we set some key parameters. Let the market work; and when we get feedback, or issues are raised, we will move to address them swiftly and decisively, as we have done in the past month or so. We are not done with the stock-take of the model, and will continue to refine it to better serve Singaporeans. I will outline three areas of improvements which we have made and will continue to focus on.

5 First, we will better support stallholders to manage costs. My Ministry, together with MTI, conducted a study on the drivers of hawker centre food prices in 2014. We found that the costs of raw materials and manpower made up the bulk of the hawkers' costs at 76%, and not stall rentals which only comprised 12%. It is also shown through studies by the Institute of Policy Studies (IPS) that hawkers generally price food according to what the market can bear.

6 This is influenced by competition in the vicinity and the demographic profile of customers. Hence, rentals do not directly affect food prices. Nonetheless, for both our existing hawker centres and our new SEHCs or new centres, we have put in place measures to ensure that rentals are fair and not speculative. For existing centres, we have removed the reserve rent and disallowed subletting and assignment. For new centres, we have, in our tender evaluation favoured tenderers who offer lower total rental and operating costs, and prohibit any increases in rentals or operating costs for the duration of the tenancy, as one of our priorities is to safeguard the interests of our hawkers.

7 The median rental of stalls in SEHCs is about \$2,000 per month, not \$4,000 per month as some media reports have claimed. The median rentals of stalls in comparable existing hawker centres is \$1,700 per month, which is comparable to those of the new centres after accounting for the larger stall size, better-designed stalls and amenities at the new centres, and in some cases, the co-location of the new centres, with residential properties as well as other amenities.

8 Stall sizes at our new centres of between 10 sqm and 21 sqm, are much larger than existing centres, which are between 5 sqm and 13 sqm. Additionally, the actual stall rentals at our new centres range from \$750 to \$3,700 a month. This is in line with rentals of non-subsidised stalls at our comparable existing centres, which range from \$640 to \$3,900 a month.

9 Our hawker centre rentals, specifically those at SEHCs, are not linked to the rentals of surrounding coffeeshops and food courts. In fact, they are nowhere near the rentals at these private F&B outlets, which can range from \$4,000 to \$13,000 a month, before other operating costs. We will continue to monitor and ensure that stall rentals in our new centres are reasonable to enable hawkers to make a decent living.

10 As for existing hawker centres, no stallholders are paying astronomical rentals. The recent \$10,000 bid was an outlier and the bidder did not even commence operations. Besides rentals, the operating costs at the SEHCs and existing centres are comparable too. For example, Service & Conservancy Charges (S&CC) at the new centres are between \$110 and \$350 a month, within the range of \$130 to \$450 a month at our existing centres. Similarly, table-cleaning fees at the SEHCs are between \$300 and \$550 a month, again, within the range of \$200 to \$830 a month at our existing centres. Operating costs payable by hawkers at existing centres also frequently do not take into account the costs for dishwashing. At the majority of our existing centres, without centralised dishwashing (CDW), stallholders may have to hire dishwashers which could cost up to \$1,500 a month, which is much higher than the average CDW charges. Moreover, these

hawkers often have difficulties hiring and retaining such hawker assistants, as my Minister has said earlier, too.

11 Nonetheless, to further help SEHC stallholders manage costs, we announced last week that we will extend the Productive Hawker Centre (PHC) grants to these hawkers for two years, effective from 1 January next year.

12 With the grant extension, stallholders at our new centres will enjoy 50% reduction in their CDW costs for the first year and 30% for the second year. Currently, these grants are only available to hawkers at our existing centres under the PHC format. However, after a few years of operations with the new centres, we recognise that hawkers at the new centres may also need some support in transition as they need time to build up their clientele. These productivity solutions, such as CDW and automated tray return systems (ATRS), are necessary to alleviate our tight manpower situation and help hawkers solve problems like staff shortage. The average tray return rates of our SEHCs are far higher, at about 58%, than those at our existing hawker centres which are at about 25%. But we can do better. First and foremost, patrons should form the habit of returning their trays with the crockery after eating.

13 A high tray return rate will directly benefit both patrons as well as hawkers as it will lead to a faster turnover of tables, keep the birds away and lead to a cleaner environment that helps attract patrons.

14 It will also ease the workload of our cleaners so that the cleaning companies do not have to keep increasing the number of cleaners, which will eventually lead to higher cleaning costs for the hawkers. Even if they want to increase the number of cleaners, they consistently face manpower shortage and issues with hiring.

15 Greater public education and close partnership between operators, hawkers and patrons are key – everyone must play their part towards ensuring a clean environment in our hawker centres to benefit both patrons and hawkers. In fact, most hawkers have welcomed the productivity initiatives implemented at our new hawker centres. Toh Swee Han, a 39-year-old hawker operating the "Mang Cheng Xiang Curry Rice" stall at Our Tampines Hub (OTH) Hawker Centre, said that he was satisfied with CDW as it helped him reduce his cleaning costs significantly. He highlighted that CDW fees at OTH added up to only \$700, before the productivity subsidy, while it would cost him about \$3,000 to hire two assistants to cover the same workload.

16 CDW also saves stallholders from paying additional water charges, or managing an inventory of crockery and cutlery that has to be replaced due to wear and tear, or loss. Hygiene is better as they do not have to carry out dishwashing within the stall area. We hope that this will alleviate the workload of our hawkers, especially the older hawkers and make the trade more attractive to our younger hawkers by reducing menial work.

17 Following a Call-for-Collaboration (CFC) led by Enterprise Singapore (ESG), on behalf of NEA, HDB and JTC, NEA is partnering NETS to provide inter-operable e-payment solutions to our hawkers. Stallholders in SEHCs can take up the CFC e-payment solution for three years without paying transaction costs or terminal rental. This will provide an additional option to SEHC operators to encourage stallholders to opt for e-payment.

18 The above subsidies will help to reduce the operating costs of our hawkers at the new centres in their initial years. These will support them as they build up their customer base.

19 There may be some other fees from value-added services that the SEHC operators provide, such as coin changing services, but these are optional.

20 Second, NEA will rebalance the soft touch regulatory approach towards SEHC operators and exercise greater oversight to safeguard hawkers' well-being. NEA has reviewed some of the key contractual terms between the SEHC operators and stallholders. Some of the terms were replicated from contracts the operators use in the other food establishments that they run. In practice, operators have actually exercised flexibility with these terms. NEA has taken in the feedback of hawkers and worked with the operators to make four key changes as an immediate priority.

21 Operators will be more flexible on stallholders' operating hours. Stallholders will not be required to work more than five days a week or eight hours a day, although they could if they wished to.

22 Operators will also engage stallholders who intend to open more than eight hours a day on how they intend to do so and whether they would have sufficient manpower, for example, through engaging stall assistants or joint operators. As asked by a Member, operators can also decide if it is feasible to install food vending machines to meet meal requirements beyond operating hours, especially for small meals or snacks.

23 Operators will not require a notice period of more than two months for stallholders to terminate their tenancies, or require security deposits exceeding two months' rental. This would address concerns of some stallholders being locked into their tenancies.

24 Operators who impose liquidated damages on stallholders for regulatory or other breaches will limit these payments to no more than \$50 per day for minor ones and \$100 per day for major breaches. They will also bear all legal fees related to the tenancy.

25 NEA will continue to engage both hawkers and operators to address concerns in other areas. For instance, at OTH, the community had initially asked for a 24-hour hawker centre. But as the demand from patrons has not materialised, both hawkers and the operator will recalibrate the arrangement. With the changes made to operating hours, hawkers who do not wish to continue with the 24-hour operations which they had previously signed up for, can do so now. NEA will also ask operators to communicate stall tenancy agreement terms in simple language to ensure that potential stallholders can understand them clearly before they commit to run the hawker stalls.

26 In our contractual review, we found that the operators indeed have shown flexibility. For example, we have not observed any operators charging stallholders rentals for the remaining of their tenancy terms, in the case of premature termination. The operators have also agreed to make changes to the terms I have just described, and to waive any legal fees for new tenancy contracts and renewals.

27 Whilst there is a need to rebalance our soft touch regulatory approach towards our SEHC operators, we recognise, as I have said, that they have shown flexibility through the contract review process, and are making changes to some of their terms and practices. They have also shown innovation and creativity in implementing measures to drive footfall to the centres. These include family carnivals and loyalty programmes, which offer discounts and other promotions to build up a pool of repeat patrons.

28 In fact, many of these operators have been bearing the cost of various initiatives to improve footfall at the centres, such as free shuttle bus services and free parking not long after the centres began operations. They are required under the terms of our tender to plough back at least 50% of any operating surplus for the social benefits of the hawker centres. This, plus our tender process which favours operators who charge lower total rental and operating costs and our prohibition on SEHC operators to increase any rental or operating costs over the tenancy period, limits the extent of any operating surplus.

29 These safeguards are part of our efforts to manage and reduce the risks of profiteering. We stand ready to act decisively should there be any mismanagement by the SEHC operators. Potential measures include imposing liquidated damages, or even termination of their contracts. As part of our on-going stocktake, NEA will look at the selection criteria for operators, what to leave to market forces and whether any other safeguards should be prescribed.

30 Third, all SEHC operators have set up structured feedback channels for their hawkers and have had at least one meeting. They will continue to engage their hawkers regularly and address concerns together and quickly. NEA officers will be present at these meetings. I am hopeful that such structured and regular meetings will help encourage communication, resolve day-to-day issues and also reduce misunderstandings.

31 I attended one of these meetings at Ci Yuan Hawker Centre. The atmosphere was constructive and stallholders had positive experiences to share. For example, Zhang Li Jun, a 29-year-old hawker who has been operating the "Teochew Satay Bee Hoon" stall since 2015, said that with the Hawkers' Feedback Group, operators could proactively seek hawkers' views on various matters relating to the hawker centre and stalls, and also work together on ideas to help the centre do better.

32 I had a fruitful dialogue recently with HC3.0 committee members, hawkers and food advocates passionate about preserving our hawker culture. The participants contributed many ideas and we have agreed to set up a ground-up workgroup, comprising hawkers and other experts, to look at how to support new entrants to the hawker trade and sustain our hawker culture. We shall share details when ready.

33 Many of the new centres are doing well. When I visited Kampung Admiralty Hawker Centre recently, the place was crowded and many patrons shared with me that they were happy with the wide selection of hawker food at affordable prices. One patron even told me about the \$2.60 mee siam sold by "The House 22". Similarly, I met a group of ladies who frequent the OTH Hawker Centre. They excitedly told me how happy they were with the many tasty hawker fare offered there, such as laksa by "Social Bite", and "Chicken Rice @ OTH". In fact, the father of Mr Kiang, who runs "Chicken Rice @ OTH", was among the pioneer batch of chefs who developed the famous Chatterbox chicken rice at Mandarin Hotel. So, I share with you this little secret, which means that the next time I go, it will be a longer queue.

34 But for those centres which are not doing so well, we are working with the operators and stallholders to increase footfall, improve business and serve their patrons better. What they need now is our support, not speculation and negative publicity that will keep patrons away and cause stallholders more hardship. The latest efforts to discuss and resolve issues through regular dialogue is the right way to go.

35 In summary, we will continue to make adjustments and recalibrate the SEHC model to ensure that it continues to achieve the key social outcomes of our hawker centres, which are: to provide affordable food in a clean environment, allow our hawkers to make a decent living and build communities. We will seek and listen to feedback from hawkers and patrons, and continue with our stock-take to further improve the model.

36 Next year, we are nominating hawker culture for inscription on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity. It is a community-based effort involving many stakeholders, including our hawkers, to sustain the hawker trade. The UNESCO nomination will be an important recognition of our hawkers, as we let the world know about our local food and multi-cultural heritage. As of 18 November, we have received 133,000 pledges online. I urge Members and all Singaporeans who have yet to pledge to do so on the Our SG Heritage website.

37 I am heartened by the passionate discussions and support for hawker food and our hawkers. To sustain the hawker trade and preserve our hawker culture, I urge everyone to patronise our hawker stalls and support them. I wonder if all Members in this House have visited our new hawker centres. If you have not, I urge you to show your support by visiting and patronising them with your families and friends.

38 Let me share that there are many interesting and tasty hawker fare at these centres – so, a few more secrets – including some of my favourites, such as delicious min jiang kueh by "Munchi" at Yishun Park Hawker Centre, chendol from the dessert stall at Ci Yuan Hawker Centre run by a young hawkerpreneur, and tze char from "Jian Fa BBQ Seafood" at OTH Hawker Centre, just to name a few. Parents should bring their children to our hawker centres to appreciate our hawker culture and heritage food. Our hawker centres should not be treated as nice-to-have dining options, but an important part of our living and evolving culture as, after all, we started building new hawker centres again because of the many appeals from the community for the hawker centres.

39 I am confident that our hawker centres will continue to thrive as community dining rooms, bringing together Singaporeans from all walks of life and strengthening our bonds as a country.

Miss Cheryl Chan Wei Ling (Fengshan): Deputy Speaker, I would like to thank the Minister and the Senior Minister of State for their very elaborate response. I think many Singaporeans and myself really enjoy all the hawker food and we are supportive of the idea, including the need to try new models for what is relevant for time. But for the fact that because the term is called "social enterprise", I think it needs to clearly demonstrate that there is this element of social benefits, whether it is for the hawkers themselves or even for the consumers. I have two clarifications that I would like to ask the Senior Minister of State or Minister.

Firstly, for the grant that is given, for example, on the productivity initiatives, are these operators actually mandated to pass through all these benefits to the hawkers or are the hawkers paying extras for the e-payment system, the tray return system, etc?

Secondly, the Senior Minister of State mentioned about need for 50% of the surplus to be translated back to social benefits. Can the Senior Minister of State elaborate more on what are these social benefits?

SMS Dr Amy Khor: For the Productive Hawker Centre Grant of 50% and 30% for first and second year respectively, these would directly benefit the hawkers, because 50% of the cost of the centralised dish washing will be deducted from the payment they have to make for the CDW. So, it would be a direct benefit to the hawkers.

Regarding the sharing of any operating surplus, it is in the terms of the tender agreement with the operator that, firstly, if they are not a social enterprise, they would have to set up a separate entity to tender for the hawker centre because we require them to submit an annual set of audited accounts to us. And if there are any operating surplus, the condition is that they have to plough at least 50% of this operating surplus back to benefit the hawker centre, the hawkers or the community. Some of the proposals that have been made by the successful tenderers are, for instance, providing meal vouchers for needy residents or the elderly within the community, or sharing some of this operating surplus with the hawkers in terms of providing discounted meal vouchers or one-for-one meal vouchers, for instance, like Yishun Timbre+ does, to give to the residents so that they can purchase and part of the meal would be funded from the operating surplus.

So, there are various programmes, or it could be the training of hawkers or helping the low-income, for instance, to set up a hawker stall there. But if there is an operating surplus, they will have to propose how they want to plough this benefit back into the community or the hawker centre, and it would be subjected to NEA's approval.

Er Dr Lee Bee Wah (Nee Soon): Sir, I would like to applaud NEA for resuming the building of hawker centres. It is a welcome move. In fact, I was one of those who lobbied very hard to have a hawker centre in Yishun. But many of us would like to see the hawker centres that are run by NEA that provide good and cheap food. I have three supplementary questions.

I know that the Minister and Senior Minister of State have explained about the social enterprise hawker centres. But a lot of residents are asking what is the definition of "social enterprise". We do not see VWOs who come in, but we see those social enterprises that are set up by big companies. So, what is their motivation?

The second question: does this translate to lower cooked food prices? Is there any study done? How do you ensure that economic meals that are available at the hawker centres are available all the time? Because residents have told me that they were very often told "卖完了", or sold out. If they want to buy the economic meals, the answer is, "卖完了". I would like to know whether there is any checking?

The third question: what I understand is that hawkers are managed by social enterprise hawker centre company. Then, NEA staff oversees the social enterprise company. What my residents have been asking is: why can we not take away all these layers? Why can NEA itself not run the hawker centre, build up its own internal capability? This is something that many residents hope to see; they would like to see the old type of the hawker centres that offer good food at cheap price, rather than giving us a hawker centre that is very beautiful but then, most of the time, the food is more expensive than at the coffeeshops.

And lastly, I think the Minister did not answer my Question No 4, on the Incubation Stall Programme. I think there is such a programme and I would like to know how many have been under this programme and whether they continued beyond the incubation period; and if they do not continue, what are the reasons?

SMS Dr Amy Khor: The Member has raised five question in total, I think. Firstly, about the motivation of SEHCs. I think that first of all, this social enterprise hawker centre that the media has been using is a bit of a misnomer. We actually started by saying "socially-conscious operators". So what we are saying is, operators who tender for these hawker centres and run them, there must be a social mission. So, a social enterprise could be one of the operators or interested party to tender for the hawker centres, but not necessarily must be a social enterprise. What we have done is that within the tender conditions, we have ensured that there is a social mission. As I have said earlier, the Minister had also said, there are various safeguards that we have put in place in the tender conditions to ensure that we need the social objectives of the hawker centres that we started building again, in the first place. And that is to ensure that we have affordable food options of

a good variety in a clean environment, ensure that our hawkers can make a decent living, and of course preserve our hawker culture and ensure the vibrancy of our hawker centres.

We have said a number of times what these are. For instance, we favour operators who offer lower rentals and total operating costs. They cannot raise these rentals and operating costs through the term of the tenancy agreement. As I have said, there is also the requirement to plough back any operating surplus for social benefits to the hawker centres, the hawkers and the community. A good example of a socially-conscious operator would be NFC, which is part of NTUC and is a cooperative. In selecting SEHCs, we also look out for how we can harness their expertise, which is actually the recommendation from the Hawker Centre Public Consultation Panel that we try and leverage the experience of these operators in F&B and in business management, in order to be able to put in place various initiatives and various ideas to ensure and enhance the vibrancy of the hawker centres.

In relation to that, the Member had a question about why not let NEA continue to run hawker centres. The Minister had elaborated in detail, some of the reasons why we need to look at new management model for our new hawker centres. The reasons are because there are inherent challenges in the hawker trade: ageing profile of our hawkers, where our existing hawkers' age profile is 60 years which means within 10 years' time, one third would retire if we do not attract new hawkers into the trade. So it is renewal; manpower constraints, as well as the evolving needs and tastes of patrons; how do you ensure that what you offer meet the needs and demands of patrons. And also, in existing hawker centres, as the Minister had elaborated, our existing hawker centres have been around for years; they are already established. Many of them have anchor hawkers who are able to pull in the crowd. But on the other hand, you would also note that many existing hawker centres, when you go, you are sometimes not sure whether the stall is open. Only 35% of our hawkers in existing hawker centres open for three meals. Most of them for one or two meals; some only work three to four days. So, does this then meet the needs of our community, especially the newer communities where there are many dual-income families and they need to access food through the day and through the week for three meals.

These are some of the challenges and therefore, we looked at how we can try out and pilot new management models in order to overcome these challenges and to meet our social objectives. Indeed, SEHCs have resulted in positive outcomes. There are, of course, teething issues, and we are committed to looking at how we can recalibrate, make adjustments and improve the model, even as we look to implementing it for our new hawker centres.

Economical meals – how come they are not available? It depends on which point in time of the day you go to the stalls. Basically, majority of the SEHC stalls do offer at least one affordable option. But let me say that we only ask that they offer at least one affordable option and we are not asking them to artificially suppress the prices of all their food options. In fact, they can sell all the other food options at different price points, and that is really the concept of a community dining room, where people from all walks of life can come together, share a table and enjoy a meal at different price points. And that will ensure that they will be able to make a decent livelihood. Whichever hawker centre does not have enough of those economical meals, we can talk about it and we can talk to the operators. I have been to many of them and they do offer affordable options, and these are good options.

Regarding the question on incubation stalls, we have launched an Incubation Stall Programme last year, just about over a year ago. When we started, we identified 13 stalls that we pre-fitted and we offered these to aspiring new hawkers who are not sure if they are interested to join the trade; they are passionate but they are not sure if they can make it. So, we offered these stalls to them, subject to certain conditions, of course. They can rent these pre-fitted stalls for six months at 50% of the assessed market rent, and that is to allow them to try out. It is pre-fitted, so we reduce the initial capital cost.

So far, we have received some 40 applications. We have increased the number of incubation stalls to 15. Ten stalls have been taken up and we have a list of applicants now which we are processing to lease out the remaining incubation stalls. This actually complements the Entrepreneurship Programme and the Place and Train Programmes offered by the SEHC operators because many of the operators also offer training and entrepreneurship programmes for new hawkers. In fact, they have actually been relatively successful. Ci Yuan, for instance, trained 16 aspiring hawkers and 10 are still in Ci Yuan Hawker Centre, and they have converted to permanent hawkers and are doing well. One of them just got married.

Mr Deputy Speaker: Mr Liang Eng Hwa.

Mr Liang Eng Hwa: Thank you, Sir. While I can appreciate the marriage of the social enterprise model and indeed we should continue to let the model evolve, I want to ask the Minister or Senior Minister of State, whether the social enterprise model is the only way to go for new hawker centres. Is NEA open to other models as well, such as for example, MCST type, where the hawkers can come together to self-manage, or for NEA to still run the new hawker centres at least for a while and then transiting to the non-NEA-run model.

SMS Dr Amy Khor: I think we are open to any model as long as it is able to achieve the social objectives that we have set up for our new hawker centres which is about providing affordable food options, moderating food prices, ensuring that the hawkers make a decent living and building communities.

So, clearly, we are open, but I think we also need to note that whatever model that we may adopt, there will always be challenges even as there may be benefits, and therefore, whatever model we adopt, we need to give it time to settle down. Our SEHC model is a good example. We implemented it only about three years ago. Infact the last one, Pasir Ris Hawker Centre, was just opened this year. So, it is really in its infancy; it is still evolving. We had set it with the intention that we will continue to monitor, evaluate, refine and improve the model.

But having said that, the SEHCs, at the present moment, have actually resulted in many positive outcomes for both patrons as well as hawkers and we do not want to undo those achievements. Therefore, we will see how we can better calibrate and make adjustments to the model. But as I have said, I think we are open to any model because the idea really is to benefit patrons, to benefit Singaporeans, to benefit hawkers.

Mr Deputy Speaker: We are one hour into this topic. I am going to ask Assoc Prof Walter Theseira, then Gan Thiam Poh and Melvin Yong.

Assoc Prof Walter Theseira (Nominated Member): Mr Deputy Speaker, thank you, and I thank the Minister and Senior Minister of State for their patience in addressing our questions. My question is: if hawkers are self-employed, then how can they be compelled by social enterprises or by the Government to work certain hours, or to meet other conditions of work. The problem seems to be that we are expecting the hawkers to bear some of the burdens of being an employee, but without the benefits of a guaranteed and stable income, for example.

SMS Dr Amy Khor: First of all, let me say that we have actually worked with our operators. So now, one of the key changes we have made to the contracts is that they need not open more than five days. They are only required to open only five days, eight hours a day. The hawkers are small businesses, entrepreneurs. They enter into an agreement with the operators to operate a hawker stall subject to, of course, various conditions that they are agreeable to, and these are some of the conditions.

The reason why you have to implement some minimum operating hours as well as minimum number of days, really, is because we want to make sure that the hawker centres are able to provide three meals – breakfast, lunch, and dinner, throughout the day, and throughout the week – in order to ensure the vibrancy of the hawker centres. The hawker centres are built to serve the community and one of the needs of the community, as I have said, especially in newer housing estates, is to have access to these food options for the three key meals. If you do not agree to such operating hours, then it would come back to the same thing that in some existing hawker centres, when you go there, they are closed or they are opened for only half a day and it does not serve the needs of the community. So, we are not compelling them. They actually enter into the agreement voluntarily and knowingly.

Mr Deputy Speaker: Mr Gan Thiam Poh.

Mr Gan Thiam Poh (Ang Mo Kio): Senior Minister of State, I think my question has yet to get an answer, that is, cost structure between the subsidised and non-subsidised stalls, one by NEA and by another model. I would like to know, generally, what are the operating costs – what are the similar ones and what are not the subsidised ones.

SMS Dr Amy Khor: First, let me explain that for both our existing hawker centres and our new centres, the construction costs of the hawker centres, as well as the cost of upgrading and maintaining the hawker centres are not recovered through the rentals. So, there is already an implicit Government subsidy for both.

The cost structure for both existing centres non-subsidised stalls and new centres, really, is quite similar. Earlier on in my reply, I already gave a comparison in terms of rentals, that basically they are quite comparable and in line, taking into account the differences in age, stall size and so on of the hawker centres. In terms of operating costs, it is also quite similar, and I have also given you a comparison. There will be costs in terms of service and conservancy charges, table cleaning— these are the key ones. For dishwashing, what you see for instance, when you compare, some people will say, "How come it is much lower in the existing hawker centres?" That is because of the cost element of dishwashing is often not taken into account in the existing hawker centres since most of the existing centres do not have CDWs. But if you were to take that in, you have to employ somebody for say, \$1,500, just to wash dishes, or if the existing hawker centre has a CDW system, then the essential costs are actually quite similar.

Mr Deputy Speaker: Mr Melvin Yong.

Mr Melvin Yong Yik Chye (Tanjong Pagar): Thank you, Mr Deputy Speaker. I would like to ask the Senior Minister of State on hawker stalls rentals. I believe that the Senior Minister of State said that the higher end of the hawker stall rental range is around \$13,000. At about \$3.00 or \$3.50 a plate, the hawker will need to sell at least 3,000 plates just to cover the rent. If our hawker stalls are to serve the objective of keeping our food prices affordable, will the Ministry consider implementing a cap on the rental to better manage food prices. Even at half that rental, at \$5,000, you will still need sell at least 1,500 to 2,000 plates a month just to cover the rental.

SMS Dr Amy Khor: Let me correct the Member. I did not say that the top-end rental at our hawker centres is \$13,000. The range of \$4,000 to \$13,000 is, based on our survey, the rentals for coffeeshops and food courts, not hawker centres. That is very important. What I said was that the rental of our hawker centres, new hawker centres, is nowhere near to where the rentals are for food courts and coffeeshops which range, based on our survey, from \$4,000 to \$13,000 net of operating cost. The rentals for our new hawker centres, median rental, is about \$2,000 net of operating cost. As I have said earlier, what we are asking is that, to achieve our social objectives of offering affordable food prices as well as moderating food prices in the vicinity, at least one food option which is affordable, and most of these new centres have put that at about \$3.00 or \$2.80. Just one food option. We are not asking them to sell everything at budget prices. Therefore, they have a range of options. In fact, if you go to the hawker centres, there is a soup stall that I saw Kampung Admiralty, the prices ranged from \$2.80 to \$14.00 because it is premium; maybe there are scallops and all that.

Mr Deputy Speaker: Er Dr Lee, would you ask the next question? Next question, please? Question No 10.

Er Dr Lee Bee Wah (Nee Soon): Can I ask one more supplementary question, please?

Mr Deputy Speaker: Okay, I will allow one last supplementary question.

Er Dr Lee Bee Wah: Thank you, Sir. The Senior Minister of State mentioned that 50% of the surplus from the social enterprise must be ploughed back to the hawker centres or hawkers. I would like to find out what will happen to the remaining 50%? Does it go back to the company?

SMS Dr Amy Khor: Actually, to Member Melvin's question about rental cap which I have forgotten to comment on, our existing hawker centres, the non-subsidised stalls, are actually let out by tender. So, there is already a range of rental indications, and in fact we have removed the reserve rent. Therefore, even for our new hawker centres, when we evaluate the tenders, there are two things that we do. First, we get the professional valuers to assess what a reasonable market rent will be, and they actually make reference to the tendered rents of the existing hawker centres, and we also use that as a guide. So, I think that we will continue to monitor rentals to ensure that they are fair and reasonable to our hawkers so that they can make a decent livelihood.

With regard to the 50% surplus, at least 50% must go back to social benefits, the other 50%, of course, they can keep. But so far, for our new hawker centres, those that have already submitted their audited accounts, none of them had accumulated any operating surplus. It has only been one to three years. It just goes to show that just as new hawker centres need time to build up, to establish themselves, so do the operators.

Question:

Ms Rahayu Mahzam: To asked the Minister for the Environment and Water Resources (a) what is the circular economy framework in place for various waste producing sectors in Singapore including those for packaging and electronic products; (b) whether the current legislation is sufficient to sustain a circular economy in the waste sector; and (c) if not, whether there are plans to introduce further legislation.

Reply by Minister Masagos Zulkifli:

The circular economy framework is aimed at closing resource loops and creating economic opportunities by maximising resource use and minimising waste. Key elements include sustainable production and consumption, as well as managing waste as a resource, such as by promoting the 3Rs – reduce, reuse and recycle. These elements are already embedded in our existing policies and form the basis of our strategy towards becoming a Zero Waste Nation.

2 We will introduce new legislation to implement Extended Producer Responsibility, or EPR, for e-waste by 2021. EPR adopts circular economy principles by incentivising better design of electrical and electronic products to make them last longer and easier to recycle, while ensuring that these products are properly collected and recycled at their end-of-life.

3 Another example of the circular economy is the industry-led Singapore Packaging Agreement, where companies commit to reduce packaging waste through changes in packaging processes, designs or usage practices, or recycling of packaging waste. We will build on this to introduce mandatory reporting of packaging data and packaging waste reductions plans in 2020. We are also studying the feasibility of extending EPR to manage packaging waste.

4 Our industries have also adopted circular economy principles in their business models. For example, many construction companies recycle demolished concrete into aggregates which can be used to construct roads or manufacture concrete. In 2017, the recycling rate of construction and demolition waste was 99%.

5 My Ministry is working on a Zero Waste Masterplan. We will consult our stakeholders, including households, businesses and non-governmental organisations (NGOs), and invite feedback and ideas. At the same time, we can all play a part in the circular economy. Consumers can repair damaged furniture, appliances and clothes and prolong their use, or share less commonly used household items with neighbours. The industry should design products to last longer or to make recycling easier. Our NGOs can help rally the ground in this effort. With our combined efforts, we can move closer towards becoming a Zero Waste Nation.

Question:

Mr Dennis Tan Lip Fong: To asked the Minister for the Environment and Water Resources (a) whether the proposed acquisition of a substantial shareholding of Hyflux Ltd by a foreign company will have any material impact on two of our national taps (NEWater and desalination); (b) whether steps are taken to mitigate any potential impact on end-consumers and businesses in terms of water supply and pricing; and (c) whether there will be any adverse risk to our water security.

Reply by Minister Masagos Zulkifli:

PUB's key interest is to safeguard Singapore's water security and confidence in our water supply. Hyflux is currently involved in two desalination plants under Design, Build, Own and Operate arrangements, or DBOO for short. Hyflux owns Tuaspring Desalination Plant wholly via its subsidiary, and has a 30% minority stake in SingSpring Desalination Plant. Hyflux does not own or run any NEWater plants in Singapore.

2 PUB has been closely monitoring developments relating to Hyflux's debt situation and its business reorganisation. As reported in the media, Hyflux has entered into a restructuring agreement with an Indonesian consortium, SM Investments Private Limited. This is a commercial matter and restructuring discussions are ongoing. It will therefore not be appropriate for my Ministry to comment on the details. Nonetheless, Members can be assured that we will not allow our water security to be affected.

3 The DBOO model allows us to tap on private sector expertise to deliver cost effective solutions for NEWater and desalination. We have welcomed participation from both local and foreign companies.

4 At the same time, water security is critical to Singapore's survival. Where we have allowed private sector participation via the DBOO model, safeguards are in place. PUB has adequate measures to ensure DBOO plants remain in operation and supply is not disrupted. It is a top strategic priority of the Government to keep our taps flowing.

Questions:

Mr Ong Teng Koon: To asked the Minister for the Environment and Water Resources whether China's implementation of the "National Sword" policy which aims to ban the import of contaminated recyclables, has impacted Singapore's ability to recycle paper, plastic and electronic waste.

Mr Louis Ng Kok Kwang: To asked the Minister for the Environment and Water Resources whether there are plans to build a complete plastic recycling infrastructure in Singapore to cope with all our recyclable plastic waste instead of having to export it overseas.

Reply by Minister Masagos Zulkifli:

NEA is in close contact with the waste and recycling companies in Singapore, and understands that our recycling industry is able to sell their plastics and paper to overseas markets. Some of the recyclables collected in Singapore are processed locally by recyclers, such as TES and Cimelia which treat e-waste. Some local companies are also processing our plastic waste, for example A~Star Plastics and Plaspulp Union Company. We will continue to monitor the developments relating to China's ban on imports of certain unprocessed waste.

2 Meanwhile, we are building up the local recycling industry. Where possible, we want to better extract resources from waste and close the waste loop domestically. NEA is currently studying e-waste and plastics recycling solutions and technologies available in the market, and assessing their suitability for adoption in Singapore. The findings will help us further develop Singapore's recycling capability as part of our Environmental Services industry transformation efforts.

Questions:

Mr Yee Chia Hsing: To ask the Minister for the Environment and Water Resources whether there are additional measures which can be introduced to reduce the incidences of mass food poisoning or gastroenteritis.

Ms Tin Pei Ling: To ask the Minister for the Environment and Water Resources (a) what are the causes of the spate of mass food poisoning incidents in November 2018; and (b) what will the Government do to heighten awareness of and compliance to safe food handling standards.

Ms Joan Pereira: To ask the Minister for the Environment and Water Resources (a) what is the Ministry doing to step up enforcement on food and beverage outlets to ensure that they adhere strictly to hygiene practices; and (b) what guidance is the Ministry providing to these outlets to make improvements.

Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources (a) whether there is an assessment on whether the current measures and penalties in place have been efficient in improving food safety; (b) what is the total number of food establishments and caterers whose licences have been suspended for failing a hygiene inspection in the past five years and the breakdown of the number for each year; and (c) whether technology has been adopted to equip inspectors in carrying out their jobs more efficiently and effectively.

Reply by SMS Amy Khor:

In October, November and December 2018, there were 5 reported food poisoning incidents, involving Team Catering Pte Ltd, Tung Lok Catering, FoodTalks Caterer & Manufacturer, Spize Restaurant @ River Valley and Mandarin Orchard Hotel.

2 The joint investigations by the Ministry of Health (MOH), Agri-Food & Veterinary Authority of Singapore (AVA) and National Environment Agency (NEA) confirmed that there were no links between the incidents. In the case of Spize Restaurant, it was a Salmonellosis outbreak of unusual severity which suggests that the food was heavily contaminated. There was strong evidence of poor personal hygiene and food handling practices by food handlers leading to contamination of ready-to-eat food and the environment. The operator was also found to have 7 unregistered food handlers and preparing food outside of the licensed premises. In the case of Team Catering Pte Ltd, a number of possible commonly-found pathogens were identified from the human stool samples, including *Clostridium Perfringens* and enteropathogenic *Escherichia coli* and several hygiene lapses and poor kitchen habits were identified, including improper storage of knives and poor housekeeping. In the case of FoodTalks Caterer & Manufacturer and Tung Lok Millennium Pte Ltd, while the causative pathogen could not be identified for both outbreaks, several food hygiene lapses were found at their premises e.g. no proper segregation between raw and ready-to-eat food in the same chiller compartment, no provision of hand washing facilities, and cockroach infestation. For the case at Mandarin Orchard Hotel, the outbreak was caused by environmental contamination of the Grand Ballroom with norovirus – a common virus that causes gastroenteritis, which was propagated by poor environmental and personal hygiene practices such as improper cleaning of vomitus and banquet servers continuing to work while ill.

3 NEA has taken tough actions against the food operators who have violated the law. The operating licence of Spize Restaurant at River Valley Road was terminated and NEA will also press charges against the operator in Court. The operating licences of Tung Lok, as well as the ballroom and affected kitchen in Mandarin Hotel, will remain suspended until the operators have complied with the requirements imposed by NEA, which includes sanitising the affected areas, reviewing the processes and rectifying the lapses. For the lapses found at FoodTalks, NEA will be issuing summons to the operator. For selling food that is found unfit for human consumption, operators may face a penalty of up to \$10,000 for the first offence, and in the case of repeat offenders, a fine of \$20,000 or imprisonment of 3 months or both.

4 NEA and AVA have stepped up surveillance and engagement of all food operators. Advisories were issued to remind all food operators to adhere to good food hygiene and safety practices. NEA conducts regular inspections on food caterers and in 2018, NEA conducted more than 2,400 checks. On top of these routine checks, over 900 additional inspections have been conducted since last month, on food operators that provide catering services or that have substantial catering operations. NEA also conducted face-to-face

engagement with key representatives from the Association of Catering Professionals Singapore (ACAPS) and the Restaurant Association of Singapore (RAS) to further reinforce the importance of food hygiene and safety.

5 In addition, from 21 Dec 2018 onwards, staff appointed as Food Hygiene Officers (FHO) at premises suspended by NEA are required to go for training to be re-certified for the WSQ "Conduct Food & Beverage Hygiene Audit" qualification. The FHO of the suspended food establishments must be properly trained and re-certified before they can recommence operations. An average of about 110 food establishments have been suspended annually in the past five years due to hygiene lapses.

6 NEA and AVA have also been working to strengthen the overall regulatory framework for food operators in the lead up to the formation of the Singapore Food Agency. For instance, the penalty regime for food operators involved in significant food poisoning incidents will be tightened. The total composition amounts will be increased and those who commit serious hygiene offences will be prosecuted in Court. In appropriate cases, NEA will also press for deterrent sentences to be imposed by the Court.

7 Even as we operate a stringent regulatory regime, food operators must bear the ultimate responsibility to serve safe and clean food to their customers. They must ensure that their premises are kept clean, food handlers practice good hygiene and the food is prepared in a safe way for consumption. I urge all food operators to train their staff on proper hygiene practices and put in place adequate food safety measures, including ways to better monitor kitchen operations, such as using CCTV or conducting more regular checks to ensure good hygiene practices. NEA will continue to monitor the food operators closely and we are prepared to tighten the enforcement further if necessary.

8 NEA has leveraged on technology to equip officers with tablets and mobile workforce solutions, allowing them to access the licensees' information on-the-go, plan inspections efficiently and be alerted of food-related incidents quickly for swift response. We will also enhance NEA's website and the myENV app to make it easier for consumers to check the food hygiene records of the operators. We are also looking into measures to better notify the public about a food operator's licence suspension. Consumers are urged to engage only licensed caterers, and consume catered food within the stipulated 'consume by' time period. Consumers who come across poor hygiene practices in food establishments should provide feedback to the authorities for further investigation.

Question:

Mr Christopher De Souza: To ask the Minister for the Environment and Water Resources (a) what are the causes of the mass food poisonings in October, November and December 2018 from food prepared at five different places; and (b) whether rules can be implemented requiring eateries or caterers to notify the public or potential customers as to the reasons for a suspension of their licence.

Answer:

In October, November and December 2018, there were 5 reported food poisoning incidents, involving Team Catering Pte Ltd, Tung Lok Catering, FoodTalks Caterer & Manufacturer, Spize Restaurant @ River Valley and Mandarin Orchard Hotel.

2 The joint investigations by the Ministry of Health (MOH), Agri-Food & Veterinary Authority of Singapore (AVA) and National Environment Agency (NEA) confirmed that there were no links between the incidents. In the case of Spize Restaurant, it was a Salmonellosis outbreak of unusual severity which suggests that the food was heavily contaminated. There was strong evidence of poor personal hygiene and food handling practices by food handlers leading to contamination of ready-to-eat food and the environment. The operator was also found to have 7 unregistered food handlers and preparing food outside of the licensed premises. In the case of Team Catering Pte Ltd, a number of possible commonly-found pathogens were identified from the human stool samples, including *Clostridium Perfringens* and enteropathogenic *Escherichia coli* and several hygiene lapses and poor kitchen habits were identified, including improper storage of knives and poor housekeeping. In the case of FoodTalks Caterer & Manufacturer and Tung Lok Millennium Pte Ltd, while the causative pathogen could not be identified for both outbreaks, several food hygiene lapses were found at their premises e.g. no proper segregation between raw and ready-to-eat food in the same chiller compartment, no provision of hand washing facilities, and cockroach infestation. For the case at Mandarin Orchard Hotel, the outbreak was caused by environmental contamination of the Grand Ballroom with norovirus – a common virus that causes gastroenteritis, which was propagated by poor environmental and personal hygiene practices such as improper cleaning of vomitus and banquet servers continuing to work while ill.

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4 In addition to strengthening the overall regulatory framework for food operators, NEA will enhance NEA's website and the myENV app to make it easier for consumers to check the food hygiene records of the operators. We are also looking into measures to better notify the public about a food operator's licence suspension. Consumers are urged to engage only licensed caterers, and consume catered food within the stipulated 'consume by' time period. Consumers who come across poor hygiene practices in food establishments should provide feedback to the authorities for further investigation.

Question

Mr Sitoh Yih Pin: To ask the Minister for the Environment and Water Resources (a) in the past 12 months, what is the average number of foreign-registered motor vehicles being driven in Singapore on a given day, broken down by vehicle type; and (b) whether further measures will be taken by LTA to ensure that these motor vehicles comply with Singapore's regulations on the control of exhaust and noise emissions.

Reply by Minister Masagos Zulkifli

1 In the last 12 months (between November 2017 and October 2018), foreign registered vehicles made about 24 million trips into Singapore through land checkpoints, or about 2 million trips per month. About 78% are made by motorcycles, 15% by cars and the remainder by goods vehicles, buses and taxis.

2 To ensure compliance with the Environmental Protection and Management (Vehicular Emissions) Regulations, the National Environment Agency ("NEA") enforces against smoky foreign vehicles at the Tuas and Woodlands entry checkpoints. Notices of composition are issued on the spot if foreign vehicles fail the smoke emissions test. Foreign commercial vehicles emitting excessive smoke will also be turned back immediately. In addition, NEA works with the Land Transport Authority ("LTA") and the Traffic Police ("TP") to enforce against noisy foreign vehicles during joint blitzes. We will continue to look at measures to reduce emissions from foreign vehicles.

3 Members of public who spot smoky or noisy vehicles on the road are encouraged to report them to NEA via the online feedback form at: www.nea.gov.sg, myENV application or the NEA hotline.

Question:

Mr Desmond Choo: To ask the Minister for the Environment and Water Resources since the implementation of the smoking ban in the Orchard Road area (a) how many smokers have been warned; (b) what has been the response of foreign visitors; and (c) what has been the impact on shopping experience in the Orchard Road area.

Reply by Minister Masagos Zulkifli:

The Orchard Road No-Smoking Zone (NSZ) came into force on 1 January 2019, as part of the Government's long term goal of achieving a smoke-free Singapore.

2 To date, about 2,200 verbal advisories have been issued daily by the National Environment Agency (NEA) to smokers for lighting up in the newly-prohibited areas. Smokers – including foreign visitors – have been generally receptive when advised by NEA officers about the new law. Most comply by smoking at one of the more than 40 Designated Smoking Areas located within the NSZ.

3 NEA will maintain this advisory approach during the first three months of the prohibition, and will closely monitor the situation on the ground to ensure the NSZ is implemented smoothly. With the shopping belt and its main thoroughfare now smoke-free, we expect the overall shopping experience in Orchard Road to improve, as pedestrians can enjoy cleaner air and a healthier environment there.

Question:

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources whether the Ministry will consider conducting a pilot study using Sidepak and/or Dylos monitors and passive nicotine dosimeters to monitor the air quality in homes affected by prolonged second-hand smoke from their neighbours and where mediation between both parties has not been successful.

Reply by Minister Masagos Zulkifli:

SidePak and Dylos monitors are used to measure ambient PM2.5 levels. However, monitoring ambient PM2.5 levels indoors does not specifically identify smoking activity, as sources of PM2.5 can be attributed to other activities at home such as cooking and the burning of incense. Passive nicotine dosimeters measure airborne nicotine, a specific indicator of second-hand tobacco smoke, but are unable to provide real-time results. Hence, while such measuring devices are promising, they require further development before they can be used as good indicators of exposure to second-hand smoke. There are currently no plans for a study using such devices. We will continue to review the use of relevant technology for air quality monitoring.

2 The law does not prohibit smoking in residential homes as these are private spaces. Nonetheless, we recognise that second-hand smoke from residential premises can waft into neighbours' homes. We encourage smokers to be socially responsible and considerate when smoking, so as not to affect their neighbours.

3 Residents who are affected by second-hand smoke from their neighbours' residences are encouraged to discuss and resolve the issue amicably or seek assistance from the Community Mediation Centre (CMC). As a last resort, aggrieved parties can file a case with the Community Disputes Resolution Tribunals (CDRT). The CDRT have the power to order parties to attend compulsory mediation in the Courts or at the CMC, to attend counselling, or to fix the case for hearing by the Courts.

Question:

Mr Dennis Tan Lip Fong: To ask the Minister for the Environment and Water Resources (a) whether the Government monitors the ambient air quality of all civil and military airports and their vicinity and keep track of the pollution index for pollutants like nitrogen oxides, carbon monoxides, sulphur oxides, particulate matter and volatile organic compounds; (b) if it does not keep track of any of such pollutants, whether it will consider doing so; and (c) whether such data can be made available to the public.

Reply by Minister Masagos Zulkifli:

The National Environment Agency (NEA) monitors and reports the air quality in Singapore through a network of five national air quality monitoring stations across the island. These stations are representative of the ambient air quality of the five regions, within which the civil and military airports are located. Criteria pollutants, namely, sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone, particulate matter (PM2.5 and PM10), are continuously monitored and reported on an hourly basis as the Pollutants Standard Index (PSI). In 2018, the air quality in Singapore remained in the 'Good' and 'Moderate' range for 100% of the days, based on Singapore's PSI readings. The PSI reading is made available every hour on the NEA and haze websites, as well as on myENV app.

2 Additionally, NEA continuously monitors the ambient concentration of Volatile Organic Compounds (VOC), which are typically emitted by the industries. The VOC levels monitored in Singapore are comparable with the major EU, Japan and US cities.

Question:

Mr Sitoh Yih Pin: To ask the Minister for the Environment and Water Resources (a) what is the current number of subsidised and non-subsidised food and beverage stalls in hawker centres; and (b) what is the average rent paid by these subsidised and non-subsidised food and beverage stalls in the past 12 months.

Reply by Minister Masagos Zulkifli:

There are over 6,000 cooked food stalls in the 114 hawker centres owned by the Government. Of these, about 40% (2,294) of stallholders pay subsidised rent.

2 The rent for subsidised cooked food stalls is either \$192 or \$320 per month, depending on the scope of upgrading works carried out during the Hawker Centres Upgrading Programme (HUP). Rents for non-subsidised cooked food stalls are on average about \$1,300 per month as of Nov 2018.

Question Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) whether he can update the House on NEA's implementation of a smoke-free zone in the Orchard Road area; and (b) what are the challenges faced in designating smoking areas in this part of the city with high human traffic.

Reply by Minister Masagos Zulkifli

The Orchard Road No-Smoking Zone (NSZ) was brought into force on 1 January 2019, as part of the Government's long term goal of achieving a smoke-free Singapore.

2 Over the past few months, the National Environment Agency (NEA) has been actively publicising the NSZ through various platforms. Signs demarcating the boundary of the NSZ have been erected at lamp posts and dustbins, while advertisements have been put up at MRT stations and selected bus stops and on buses plying Orchard Road. Community Volunteers have been engaging the public in the NSZ to raise awareness, while publicity materials are being displayed at our points of entry and on the Singapore Tourism Board's *Visit Singapore* webpage to alert foreign visitors to the prohibition. Travel agents, tour guides and hotels have also been informed about the NSZ so that they can advise tourists accordingly.

3 Prior to implementing the NSZ, NEA had worked closely with the Orchard Road Business Association (ORBA) and building owners and managers to ensure sufficient provision of designated smoking areas (DSAs). There are now more than 40 DSAs within the NSZ, spaced about 100 to 200 metres apart. As footfall along the shopping belt is particularly heavy, efforts have been made to ensure that the DSAs are located away from the pedestrian thoroughfare. Smokers can find the location of these DSAs on the OneMap and NEA's website, the myENV mobile application, and through publicity brochures disseminated at shopping malls and tobacco retailers within the NSZ.

4 We are monitoring the use of the DSAs, and will assess the effectiveness of the NSZ in reducing the public's exposure to second-hand smoke.

Question:

Mr Dennis Tan Lip Fong: To ask the Minister for the Environment and Water Resources in respect of the supply of 8,600 quartz (instead of marble) niches when the niches were relocated from Mount Vernon Columbarium (a) whether NEA has verified that all contractual requirements have been fulfilled by the contractors during delivery/installation; (b) what punitive actions will be taken against the contractors; and (c) whether the contractors are required to provide refunds or compensation where affected families do not accept a marble replacement.

Reply by Minister Masagos Zulkifli:

The National Environment Agency (NEA) has relocated about 20,000 niches at Mount Vernon Columbarium Complex (MVC) to make way for the development of Bidadari Estate. As part of the support package for affected families, NEA offered to relocate the urn from MVC to a replacement niche at either Choa Chu Kang or Mandai columbarium, together with a marble plaque. These were offered on a goodwill basis at no cost to the affected families.

2 NEA's offer was taken up by families for about 14,500 niches. The relocation of the urns was undertaken by the NEA-appointed contractor and witnessed by NEA officers, together with the respective families. The officers had also checked the plaques before installation. Visual inspections had not shown up differences as quartz plaques look similar to marble ones.

3 When NEA was first alerted to the non-marble plaque material, NEA immediately investigated the matter and sent samples for laboratory tests. NEA found that samples from one batch of plaques were made of quartz, rather than marble. About 8,600 niches were affected.

4 For these 8,600 niches, the contractor had not delivered the goods in accordance to contractual requirements. NEA takes a serious view of this performance breach and has directed the contractor to replace the quartz with new marble plaques, unless the families choose to retain the existing plaques. The contractor will bear the costs required to make good on what should have been delivered. Pending the completion of the replacement works, NEA has withheld payments to the contractor. NEA will also be claiming against the contractor for any difference in price between the quartz and marble plaques. Learning from this incident, NEA has incorporated the requirement of laboratory verification for materials in future tenders.

5 The contractor has reached out to the affected families with the offer of a replacement marble plaque and re-installation at no cost to the family. NEA is closely monitoring the progress of the replacement works and will ensure that the contractor fulfils its contractual obligations.

Question from Mr Lim Biow Chuan: To asked the Minister for the Environment and Water Resources whether NEA can provide more assistance to hawker associations to eradicate the nuisance of pigeons and crows at hawker centres.

Answer:

Nuisance issues at hawker centres relating to pigeons and crows arise when birds are attracted to food remnants. To address this, government agencies such as the Agri-Food & Veterinary Authority (AVA) and National Environment Agency (NEA) work closely with hawkers, Hawker Associations, and Town Councils to implement preventive measures. These include public education and enforcement against pigeon feeding and littering, proper food waste management, and surveillance and bird management operations.

2. Other deterrent measures may also be implemented where required. These include the installation of bird spikes on building structures and beams to reduce perching opportunities, and nettings at the perimeter of hawker centres to prevent birds from entering. We will continue to work closely with stakeholders to manage bird nuisance issues. Hawker Associations which face difficulties with bird nuisance issues may approach NEA for support.

3. Patrons also play an important role in contributing to the cleanliness of hawker centres, thereby reducing bird nuisance. I encourage all patrons to return their crockery and trays to the tray return points when they finish dining.

Question from Mr Leon Perera: To asked the Minister for the Environment and Water Resources in the past five years, what proportion of food safety and hygiene checks performed on food service operators and caterers have been unannounced checks.

Answer:

The National Environment Agency (NEA) currently licenses more than 39,000 retail food establishments, including food outlets such as restaurants and caterers, to ensure that the food sold is prepared hygienically and safe for consumption.

2. All inspections of retail food establishments conducted by NEA are unannounced. In the past five years, NEA has conducted more than 606,000 inspections in total.

3. NEA will take strict enforcement action against retail food establishments that do not adopt proper food hygiene practices, as well as for any food hygiene lapses found. NEA will continue to monitor the situation closely and step up inspections, if need be, to safeguard food safety and public health.

Question from Prof Fatimah Lateef: To asked the Minister for the Environment and Water Resources in light of incidents of food poisoning and hygiene issues at food premises, whether there will be any added surveillance and action to be taken for less permanent establishments such as pop-up food stalls, fun fair stalls selling food, night market food stalls and bazaar food stalls.

Answer:

The National Environment Agency maintains a strict regime to ensure food safety in temporary food stalls, e.g. pop-up food stalls, fun fair stalls selling food, night market food stalls and bazaar food stalls. First, proper washing facilities, storage with temperature control and covered display showcases for food items must be provided at temporary fair food stalls. Second, NEA restricts extensive food preparation such as degutting of fish and cutting of raw meat or vegetables in temporary stalls. The sale of high-risk food items such as ready-to-eat raw seafood is also restricted Third, food handlers working in such stalls must be registered with NEA and pass the mandatory Basic Food Hygiene Course. NEA will take firm enforcement action against anyone who violates the regulations. Offenders may face licence suspension and/or a maximum penalty of up to \$10,000 for the first offence.

2. To uphold the food hygiene standards, NEA conducts unannounced inspections at the temporary food stalls. Where NEA assesses any potential risks, NEA will step up inspections as well as conduct joint operations with other agencies to curb illegal food handlers at the temporary food stalls.

3. NEA will continue to monitor the situation closely and step up inspections, if need be, to safeguard the environment and ensure public health.

Question from Mr Desmond Choo: To asked the Minister for the Environment and Water Resources in light of increasing food waste in Singapore (a) how can we engage community and partners through enhancing internal processes, public education, and partnerships to reduce food wastage; and (b) what more can be done specifically in homes, schools, workplaces and food and beverage establishments where food waste is most common.

Answer:

In 2017, about 810,000 tonnes of food waste was generated. Food waste is one of our largest waste streams and has a relatively low recycling rate. It remains one of our priority waste streams this year, the Year Towards Zero Waste, together with e-waste and packaging waste. My Ministry takes a multipronged approach to addressing food waste, which includes encouraging food waste reduction, food redistribution, and recycling.

2. Since 2015, NEA has been running a food waste reduction campaign that includes media publicity to raise awareness, and outreach programmes on ways to reduce food wastage in households. Educational materials such as the Food Waste Handy Guide, which has tips to help consumers reduce food waste, are made available online and at community road shows.

3. NEA started the "Love Your Food @ Schools" programme in April 2017, which encourages schools to minimise food waste.

4. To help the food and beverage industry reduce food wastage, NEA and the Agri-Food and Veterinary Authority (AVA) launched food waste minimisation guidebooks for food retail establishments, supermarkets, and food manufacturing establishments to provide guidance on reducing food waste across the supply chain. Guidelines on the proper handling and redistribution of unsold or excess food are also incorporated to facilitate food redistribution.

5. To promote food waste recycling, NEA supports companies through its 3R Fund, to implement projects such as the installation of on-site food waste treatment systems. NEA has so far co-funded 21 on-site food waste treatment systems. We also conducted a "Food Waste, Don't Waste!" pilot at Tampines Greenlace HDB estate, where residents segregated their food waste and disposed of it in dedicated food waste bins on the ground floor. The food waste was then recycled at Our Tampines Hub to produce fertiliser and non-potable water.

6. This multi-pronged approach has begun to yield results. Food waste recycling has increased from 13% in 2015 to 16% in 2017. Nonetheless, there is much more we can do.

7. As part of our Year Towards Zero Waste efforts, my Ministry will continue to explore measures to better manage food waste in homes, schools, workplaces, and food and beverage establishments. These measures will also be part of our inaugural Zero Waste Masterplan to be launched this year. However, the Government cannot do this alone. This is why we have set aside \$2 million this year to fund ground-up projects related to Zero Waste. We will also consult the public and engage non-governmental organisations (NGOs) to seek their views and ideas and co-create initiatives to better manage food waste.

Question from Mr Gan Thiam Poh: To asked the Minister for the Environment and Water Resources whether the Ministry will mandate developers, building owners and HDB to provide enclosed smoking rooms or pavilions in a precinct/HDB cluster, similar to what is provided in some airports and Japan, for smokers to smoke within the room and ensure that the smoke will not get into common areas affecting non-smokers.

Answer:

Smoking facilities such as smoking rooms and pavilions cannot completely eliminate the risks of exposure to second-hand tobacco smoke. Tobacco smoke contains pollutants that can seep out of these facilities.

2. Smoking facilities are also likely to become congregation points for smokers. As our housing estates are well-connected and densely built-up, it may be challenging to find 24 appropriate locations for such facilities. Moreover, the daily sight of smokers gathering at smoking facilities could inadvertently give our youth the impression that it is normal to smoke. We want to avoid this, and therefore have no plans to mandate the provision of smoking facilities in residential precincts or housing clusters.

3. Our approach to protecting residents from second-hand smoke has been to progressively extend the smoking prohibition to as many public areas as possible. Within housing estates, these include places such as sheltered walkways, exercise areas, playgrounds, and common areas of residential buildings such as void decks and lift lobbies. The National Environment Agency will continue to monitor and enforce against smoking violations at these locations.

4. We urge smokers to abide by the smoking prohibition, and strive to give up the habit for the benefit of their own health, their loved ones, and the community.

Question from Mr Muhamad Faisal Abdul Manap: To ask the Minister for the Environment and Water Resources (a) what are the median, lowest and highest rental fees for hawker stalls managed by NEA and social enterprises respectively; and (b) whether the Ministry can provide the breakdown, in percentage terms, of the operating expenses for hawker stalls operated under these two different management models.

Answer:

The stall rentals at the seven new hawker centres managed by the Socially-conscious Enterprises range from \$750 to \$3,700 a month. The median rental is \$2,000 per month. This is in line to the median rental of stalls in comparable existing hawker centres at \$1,700 per month, after accounting for the larger stall size, better-designed stalls and amenities at the new centres. The rentals of non-subsidised stalls at comparable existing centres range from \$640 to \$3,900 a month.

2. Besides rental, stallholders in all hawker centres have similar types of ancillary costs, such as Service and Conservancy Charges (S&CC) and table-cleaning fees, as part of their business operations. These costs are comparable at both new and existing centres. For example, the S&CC at the new centres are between \$110 and \$350 a month, which is within the range of \$130 to \$450 a month at our existing centres. Table-cleaning fees at the new centres are between \$300 and \$550 a month, which is also within the range of \$200 to \$830 a month at our existing centres.

3. Table cleaning services do not cover washing of dishes. Unlike stallholders in the majority of existing centres, stallholders in the new centres have access to centralised dishwashing (CDW) services and thus enjoy manpower and utilities savings. CDW services also enhance the cleanliness of the hawker centres and the rate of table turnover, which benefit both hawkers and patrons. Stallholders can focus on their cooking as they need not worry about hiring assistants to wash their crockeries. On the other hand, stallholders without access to centralised dishwashing may have to hire dishwashers which could cost up to \$1,500 a month, not to mention that these hawkers often have difficulties hiring and retaining such hawker assistants.

4. In November last year, we explained in the House on the need for hawkers to be more productive. This is to overcome the labour constraints that the hawkers will increasingly face, and can go a long way in sustaining our hawker trade to serve the needs of Singaporeans. To help the hawkers in new centres better manage costs, we are extending the Productive Hawker Centre (PHC) grants to them. From 1 Jan 2019, the stallholders will see a 50% reduction in their CDW costs for the first year and 30% for the second year.

5. As for other operating expenses incurred directly by stallholders such as utilities, manpower and raw materials, these would vary from stall to stall depending on factors such as the nature of business and market conditions.

Question by Mr Murali Pillai: To ask the Minister for the Environment and Water Resources (a) whether the Ministry can provide an update on plans to build a new hawker centre in Bukit Batok Town, in particular where will it be built; and (b) what is the expected date of its completion.

Answer:

My Ministry announced in 2015 that we would build a new hawker centre in Bukit Batok town by 2027. We will provide further details, such as the location and expected date of completion, when ready.

1. Mr Speaker Sir, I thank Members for their support and thoughtful feedback on this Bill.

FROM FARM TO FORK – ENSURING SINGAPORE’S FOOD SECURITY

2. The SFA will focus on food safety and food security. These are mutually reinforcing objectives. Food safety is a pre-requisite for a resilient food supply, and key to developing a thriving agri-food industry. Allow me to outline SFA’s priorities in these two areas, and address some of the specific comments.

3. I will start with food security.

4. Mr Ong Teng Koon referred to recent potential disruptions in our egg and seafood imports, and asked how SFA can better handle such incidents without causing alarm. The answer is that SFA will ensure our food security by developing and enhancing our three national strategies to obtain food. We call these our three “food baskets”.

FOOD BASKET ONE: IMPORT DIVERSIFICATION

5. First, SFA will build on the existing work by AVA to diversify import sources. AVA has already expanded our import sources from 140 countries in 2004 to around 180 countries today. We take for granted apples from Poland, bananas from Ecuador, and Mandarin oranges from China in our supermarkets. These are in fact the fruits of a deliberate strategy to diversify our food sources.

6. Imports will remain our largest food basket for the foreseeable future – SFA, in partnership with relevant Government agencies like MFA and ESG, will continue to diversify our food sources as Er Dr Lee Bee Wah, Mr Melvin Yong and Mr Saktiandi Supaat have suggested. This includes working with importers to organise overseas sourcing trips and business matching sessions, as well as increasing the number of farms across different countries which can export to Singapore. In fact, our officers were accrediting farms in Thailand over the Lunar New Year break while many of us Singaporeans were taking a break and enjoying good food with our families. I would like to express my appreciation to our officers who have worked hard over the years to strengthen our food security and safeguard our national security.

7. Our food importers are also a key node in the supply chain, and we must ensure that they are prepared to withstand potential shocks from climate change and geopolitical developments as highlighted by Mr Mohamed Irshad. SFA will introduce requirements for importers of key food items to adopt plans to mitigate any supply disruptions. As Mr Ong Teng Koon has highlighted, food security is fundamental to national security. In the long run, securing our food supply is also the primary way to mitigate price volatility and spikes. This is a focus of SFA, which will continue to contribute to whole-of-Government efforts to provide affordable food, accessible to all Singaporeans, as highlighted by Assoc Prof Daniel Goh.

FOOD BASKET TWO: GROW LOCAL

8. Second, SFA will intensify efforts to grow an agri-food ecosystem in Singapore as suggested by Mr Mohamed Irshad and Mr Melvin Yong, thereby reducing our dependence on imports. This requires close coordination between SFA and other Government agencies in domains such as land planning, industry development and financing, and skills training. SFA will also partner our industry stakeholders across the food supply chain to catalyse industry transformation.

9. Transforming the industry requires us to cultivate a generation of ‘agri-specialists’. AVA has been working with Institutes of Higher Learning (IHLs) in this area. One such initiative is the ‘Earn and Learn Programme’, a work study programme through which students from Temasek Polytechnic and Republic Polytechnic work at local farms and apply the knowledge and practical skills learnt in school. SFA will continue working with the industry and IHLs to enhance manpower development for the agriculture sector as raised by Mr Melvin Yong, and create meaningful value-added jobs for our future workforce.

10. Given our lack of natural resources such as land and water, the future of farming in Singapore has to be one that is technology and R&D driven, climate resilient and resource efficient with high productivity. Going forward, we expect to expand further into controlled environment agriculture in indoor vertical farming and deep sea fish farming in our waters.

11. We recognise the contributions by our existing farmers. They bring valuable experience and we will like to continue working with them to improve Singapore’s food security. We will take a pragmatic approach by helping existing farms modernise.

12. In addition to productivity, we will also prioritise the environmental sustainability of food production. As part of the MEWR family, SFA will work closely with NEA and PUB to find synergies in food production, water, waste and energy. This will ensure that our local food supply will remain resilient in the face of wider trends such as resource scarcity and climate change.

13. Together, we can become a world leader in agri-food solutions. Just like how we have turned our constraints in water to strategic advantages. Our Water Story, which Members, including Er Dr Lee Bee Wah and Ms Anthea Ong, had talked about, is well-known internationally. SFA will work together across the Government, and with industry and other stakeholders, including fellow Singaporeans, to write the Singapore Food Story.

FOOD BASKET THREE: GROW OVERSEAS

14. Third, SFA will continue supporting our companies to expand and grow overseas. These overseas-based Singaporean companies will be able to overcome land and manpower constraints, and access new and bigger overseas markets. This allows them to bring down costs through economies of scale, and reduce the price of exports to Singapore.

15. Mr Henry Kwek has also rightly identified this as an area of tremendous economic opportunity for our local companies. Especially if our companies develop expertise in highly sought-after farming technologies – resource efficient, high yield, and climate resilient.

16. Barramundi Asia, which aspires to produce the fish equivalent of Kobe beef, has expanded to Brunei, where it is developing a 6,600-hectare fish farm to export an estimated 40,000 tonnes of fish back to Singapore. I hope to see more of our local farms succeeding in overseas markets.

'DEMAND-SIDE' STRATEGIES

17. Our three food baskets are what I call 'supply-side strategies'. However, the demand side of the equation is equally important. SFA will continue to prioritise public education and outreach to complement the three food baskets as mentioned by Mr Mohamed Irshad. These include supporting local produce as suggested by Er Dr Lee Bee Wah and Mr Melvin Yong, and promoting the consumption of substitutes such as liquid eggs, and more sustainable foods such as plant-based protein as suggested by Mr Gan Thiam Poh and Mr Mohamed Irshad. I will also like to assure Mr Saktiandi Supaat that even as we allow new food to come in, SFA will take reference from global standards, such as those set by the Codex Alimentarius Commission, in permitting food additives for use in Singapore.

18. Ms Anthea Ong and Mr Melvin Yong raised an important initiative which AVA and NEA are already collaborating on – reducing food waste. In fact, food waste is one of NEA's priorities in the Year Towards Zero Waste. My Ministry recognises that Government regulations may promote the reduction of food waste, and will look further into it with our partners, taking into consideration other factors such as food safety and business costs. I urge Ms Ong, Mr Yong and other Members to continue supporting community efforts to redistribute food better so that there is no hunger even among our needy, and in the process, reduce food waste.

FROM FARM TO FORK – ENSURING FOOD SAFETY IN SINGAPORE

19. I will now move on to outline three strategies which SFA will adopt to ensure the safety of food in Singapore, an area which many Members have spoken about.

ADOPTING A WHOLE-OF-GOVERNMENT APPROACH TO FOOD SAFETY

20. First, the formation of SFA will integrate operations related to food safety which currently reside across AVA, NEA and HSA. These range from providing a single contact point for the public to provide feedback as suggested by Ms Anthea Ong, to combining contact tracing and industry engagement operations. This will allow SFA to manage more holistically across the entire farm-to-fork supply chain to pinpoint and remedy critical points, and react more quickly to food safety incidents, as raised by Er Dr Lee Bee Wah, Prof Fatimah Lateef and Mr Saktiandi Supaat.

21. These efforts over the years have strengthened coordination across Government in response to food safety threats. I thank Mr Henry Kwek for recognising efforts by the agencies to keep swine flu out of our

food supply. AVA, NEA and MOH work closely under the One Health framework and follow a protocol to respond to and address food-borne outbreaks. Information received by each agency, whether from individuals or doctors and laboratories, is tracked and analysed centrally to ensure that any unusual increase in notifications linked to food establishments is investigated promptly.

REGULATIONS TO PROTECT FOOD SAFETY AND SUPPORT INDUSTRY

22. Second, having a single agency like the SFA will support consistent administration and enforcement of the regulatory framework for food establishments balanced against supporting enterprise and job creation.

23. As Er Dr Lee Bee Wah, Mr Mohamed Irshad and Ms Anthea Ong have suggested, we can harness technology and data to make our regulatory regime more effective and efficient. Let me give an example. Joyvio, one of the largest end-to-end fruit companies in China, developed an app that tracks the product's thousand-mile journey from a vine to the supermarket shelf. With a simple scan, shoppers can tell which field the fruit came from, who was in charge of its production, what tests it went through before entering the market, and even details about the soil and water tests from the farm. This allows consumers to check that the fruit has not been contaminated anywhere along the way. Similar ideas can be applied in Singapore.

24. As suggested by Mr Gan Thiam Poh and Mr Saktiandi Supaat, SFA will also raise the level of accountability of operators and the food industry which must take greater responsibility for the hygiene standards at their premises to ensure food safety.

25. This will be complemented with robust enforcement as suggested by Mr Leon Perera. In fact, over the last five years, NEA has conducted more than 600,000 unannounced inspections of food retail outlets. Where necessary, we will enhance regulatory oversight and penalties. As Mr Mohamed Irshad has highlighted, our regulatory regime will need to evolve with changing business models, including online food sales and food delivery.

26. In addition to the emphasis on food safety, SFA will as part of its functions look into harmonising licensing standards and combining existing licences for food businesses. Our vision is for businesses across the supply chain to only have to interface with one agency. This will take time, and we will work closely with industry to put in place facilitative regulations. For example, we are looking into ways to streamline the licences for premises carrying out both central kitchen and catering operations.

27. As pointed out by Mr Henry Kwek, there is much potential to leverage the trusted food safety standards in Singapore to promote internationalisation efforts by the food industry. This is an area that SFA will continue to work with MTI and ESG on.

28. Mr Mohamed Irshad has suggested that SFA could tap on similar opportunities in the Halal food market. MUIS will primarily focus on certification of Halal food for consumption by Muslims in Singapore. SFA will support our food companies to look for opportunities in the region and the Middle East.

29. Mr Ong Teng Koon and Prof Fatimah Lateef asked about the role of SFA with regard to nutrition. HPB will continue to promote the consumption of healthy food, and SFA will provide the relevant support. Mr Leon Perera spoke about food labelling as a tool to help consumers make informed choices. AVA already imposes regulations to provide consumers with pertinent information such as ingredients and allergens. SFA will continue to work with partner agencies such as MOH and HPB on food labelling.

DEEPENING FOOD SAFETY EXPERTISE IN SINGAPORE

30. Third, forming a single agency like SFA will enable deepening of food safety expertise in Singapore. The National Centre for Food Science (NCFS), which Prof Fatimah Lateef spoke about, will be transferred to the SFA under the Bill. The NCFS will bring together more than 100 food scientists from AVA, NEA and HSA, and consolidate key competencies in food diagnostics and research on food safety. Consolidation will also eliminate the need for food samples to be tested in multiple laboratories across different agencies, with different competencies. This streamlining of processes as well as the sharing of facilities and technology will allow for greater operational, testing and cost efficiencies to be achieved. This further ensures that our food continues to be safe for consumption, and standards are benchmarked internationally. The NCFS will also develop commercial laboratories to support the food safety testing needs of food businesses as production and exports increase.

CONCLUSION

31. Mr Speaker, let me conclude. SFA will draw on the lessons learnt and results achieved by AVA, NEA and HSA, and write a new chapter in the Singapore Food Story, by bringing together stakeholders from farm-to-fork to co-create solutions to ensure and secure a supply of safe food for our people.

32. Sir, with that, I beg to move.

1. Mr Speaker, I beg to move, that the Bill be now read a second time.

FORMATION OF SINGAPORE FOOD AGENCY

2. Last July, the Government announced plans to form the Singapore Food Agency (SFA) to oversee food safety and food security from farm-to-fork.

3. Currently, the regulation of the food industry is divided among three public sector agencies. The Agri-Food and Veterinary Authority (AVA) regulates food safety before retail during import, local production and manufacturing. The National Environment Agency (NEA) regulates food hygiene at the retail level. Analysis of food samples is carried out at laboratories under the Health Sciences Authority (HSA). The SFA will consolidate regulatory oversight for these different aspects of food safety and security in a single public sector agency.

4. Singapore is not the first country to adopt a farm-to-fork model. We have studied other countries like Ireland, where a single agency is responsible for food safety along the entire food supply chain. There are merits to consolidate the responsibilities for food safety and security into a single agency. One, it emphasises the high priority and commitment that the Government places on food safety and security. Two, it allows uniform application of measures, faster response, and more efficient and effective use of resources and expertise.

5. NEA will however continue to develop and manage hawker centres as our community dining rooms. This arrangement will enable sharper focus by SFA and NEA in their respective roles vis-a-vis hawker centres.

6. HSA will continue to regulate health supplements. HPB will continue to promote the consumption of healthy food. SFA will support them from the food safety angle.

7. AVA's remaining non-food plant and animal related functions will be transferred to the National Parks Board (NParks) via the National Parks Board (Amendment) Bill 2019. The Minister for National Development will explain this transfer during the Second Reading of the National Parks Board (Amendment) Bill 2019.

ADAPTING IN A RAPIDLY EVOLVING AGRI-FOOD LANDSCAPE

8. Mr Speaker, food security is fundamental to our National Security. Let me repeat this: Food security is fundamental to our National Security. We have worked hard to ensure Singapore's food safety and security over the decades. This is critical because Singapore depends heavily on food imports. The 2018 Global Food Security Index puts Singapore as the Number 1 country in the world in ensuring that citizens have access to safe and nutritious food at affordable prices. This is testimony to the hard work by generations of our staff since AVA's early days as the Primary Production Department in pre-independence Singapore. We have done well but cannot take the current situation for granted. Let me elaborate.

9. The agriculture and food, or agri-food, landscape is changing rapidly. By 2050, global population is expected to grow another 30 percent to 9.7 billion. Global food demand is also projected to rise by 60% as incomes rise in developing countries, leading to greater demand for meat and proteins.

10. Vital resources to meet the increased food demand, such as water and energy, are increasingly scarce. The World Bank estimates that agriculture accounts for 70% of global water consumption but one-third of the world's population lives in water-stressed areas.

11. Over the longer term horizon too, climate change will exacerbate these threats. Extreme temperatures, droughts, and floods from rising sea levels will affect production yield. The UN Food and Agriculture Organisation (FAO) estimates widespread declines in crop yields of between 10 to 25 percent by 2050 due to climate change impacts. The International Rice Research Institute in the Philippines forecasts a 20 percent reduction in Asian rice yields for every degree of temperature rise. Rice becomes sterile if exposed to temperatures above 35 degrees Celsius for more than one hour during flowering. A heat wave during flowering season, like in Australia right now, would wipe out the entire year's crop! Scientists from various disciplines all mark 2050 as a watershed year when projected increase in population intersects with severe decline in crop yields due to unmitigated climate change. Competition for water, energy and consequently food will escalate conflicts if not mitigated.

12. Indeed, right here in ASEAN, one of my counterparts shared with me that the impact of climate change is already being felt and has caused more frequent and severe droughts and floods in the Mekong River

Delta, which is the 'rice bowl' of Asia. Rice production can fall by more than 50%.

13. These are real-life threats, and can hit us bad since we import more than 90% of our food. The 2007 and 2008 global food crisis, which stemmed from various factors including droughts and rising oil prices, triggered spikes in food prices worldwide, and even led to street protests in Indonesia and Bangladesh. Food producing countries like India and Brazil introduced export bans. These impacts were felt in Singapore in the form of increased prices. Fortunately, we did not face food shortages.

14. We also need to manage the risks from the growing complexity in global food supply chains. Our food undergoes multiple processes involving many players in different countries, before reaching our tables. For example, the frozen pizza in our supermarkets can have more than 10 ingredients from different sources. The pineapple could have been grown in the Philippines, the ham brined in Australia, the tomato sauce canned in the US and the flour milled in Singapore.

15. This simple example highlights the confluence of food supply and food safety, and the challenges we face. On the one hand, we get to enjoy a wide range of ingredients and cuisine. On the other hand, complex global supply chains increase the potential points of failure where contamination can enter the food chain. This makes it more difficult to identify the source of the problems when they occur. Was the cause of a food poisoning incident due to poor hygiene in the restaurant or hotel? Could it have been due to high levels of pesticides on the raw ingredients? Contaminants introduced in the manufacturing process of packing and canning? Or deterioration in quality and safety during transportation?

16. Such challenges will intensify. Complex supply chains will evolve as climate change affects production. Epidemiology has to keep up with changes in the survival and transmission patterns of foodborne diseases. In Singapore, Government agencies have worked well together to address food safety and security and we have a strong reputation. But we must ensure that our food safety and security regime is well ahead of the curve. It is in our DNA to constantly look ahead, anticipate trends, adapt and seize opportunities.

17. We will consolidate NEA and AVA's current capabilities in licensing, compliance management, investigation, and testing by HSA, in SFA. SFA will be able to holistically respond to food safety incidents wherever these occur along the food supply chain. For example, in the scenario of a food poisoning incident, a single team will oversee the entire food supply chain and manage investigations. Starting from the accreditation of overseas farms, to import, to intermediate processing by central kitchens and retailers, and finally to the proper storage and preparation at the retail outlet. This will allow SFA to respond more promptly to trace the source of contamination.

OPPORTUNITIES FOR SINGAPORE

18. Mr Speaker, amidst the uncertainties facing the agri-food landscape, our goal is to seize the opportunity for Singapore to turn our food challenges into strategic advantages. Strategic advantages to secure our food supply, transform our agri-food industry, develop our local enterprises, and provide good jobs to Singaporeans. Just like how we have turned our vulnerability in water into opportunity. Let me give a few examples.

19. First, new food production methods and techniques are emerging at an unprecedented pace. Modern food production has become more productive, sustainable and resilient to climate change. We can learn from others around the world, how they leverage on their strengths and overcome their constraints. The United Arab Emirates enjoys cheap and abundant energy, but struggles with a hot and dry desert climate where water is extremely scarce. On the other hand, water is abundant in the Netherlands, but energy is expensive and scarce. I visited a tomato farm in Dubai last month, which channels waste carbon dioxide from air conditioning back into the glasshouse to boost plant growth. To reduce water use, the farm recirculates the nutrient solution used to feed the crops. The farm is able to produce tomatoes at high yields consistently throughout the year, even when the temperature outside reaches 50 degrees. Last year, I visited Wageningen University & Research (WUR) in The Netherlands, and was impressed by their innovation in greenhouse technologies to reduce energy consumption in the cultivation of tomatoes. Their target is to produce net zero energy greenhouses.

20. Singapore suffers scarcity at both extremes – scarcity of water and energy. We must develop our own approach to agriculture, which accounts for our deficiencies in water and energy and to add to this complexity, also land. Technology now allows us to solve this conundrum.

21. Our future farms will be different from the farms that we are familiar with today. Rather than back-

breaking physical toil under the sun, new-age farmers will work indoors in an environmentally controlled enclosure – much like the Domes at the Gardens by the Bay! Instead of shovels and hoes, they will operate computers controlling autonomous robots that plant seeds and harvest crops. With the right crops, these farms operate at much higher productivity, and can sustain good jobs. Indeed, such technological innovations apply not just to land-based farming, but even aquaculture where we can increase the yield and improve the quality of our local seafood. The working environments will be almost indistinguishable from the offices or automated production lines many of us work in today!

22. In addition to regulatory oversight of the food industry, SFA will partner businesses to transform our food industry. We must seize opportunities in the agri-food sector to further enhance our food supply resilience. We must sow the seeds now for Singapore's development into an agri-food hub. In time to come, we will harvest the benefits – a strong stable of local enterprises which can export sustainable urban food solutions to cities around the world, good jobs which will appeal to Singaporeans, and a secure supply of safe food for Singaporeans.

23. Second, the emergence of new and novel food products. These have the potential to provide us with a safe and sustainable supply of food, without compromising on taste or health. One example is plant-based protein with meat-like texture and taste from companies such as Beyond Meat and Impossible Foods. These new food products have a smaller environmental footprint compared to conventional meat products, and could potentially be scaled up to meet future food demand. Another example is the cultivation of insects, such as the black soldier fly, for animal feed. This will require us to make a conscious effort to position Singapore as an agri-food hub – from facilitative regulations that encourage innovation, to creating the necessary R&D ecosystem, and growing a pipeline of Singaporean talent.

MAIN ELEMENTS OF THE BILL

24. Mr Speaker sir, let me now highlight some of the main elements in the Singapore Food Agency Bill.

25. Part 2 of the Bill establishes SFA as a body corporate with a structure similar to major statutory boards. Clauses 5 and 6 lay out SFA's functions and powers, which are drawn from existing provisions in the AVA and NEA Acts. These include developing the food industry, regulating food safety across the supply chain, and regulating street hawking and trade fairs.

26. Parts 3 to 6 covers governance matters such as the appointment and decision making procedures of the SFA, personnel matters including the appointment of the Chief Executive, and financial provisions of SFA. The provisions are aligned with the requirements in the Public Sector (Governance) Act 2018.

27. Part 7 of the Bill contains miscellaneous provisions necessary for the administration and enforcement of the Bill. In particular, clause 43 will protect against the improper use of accreditation, certification and inspection marks that are administered by SFA. This includes schemes to be administered by SFA, and third party testing, inspection and certification services. This is to ensure that all licences and products carrying such marks meet SFA's stringent standards, in order to facilitate the growth of the local farming and food export industries.

28. Part 8 contains the provisions that transfer the relevant food-regulatory undertakings, including assets, liabilities and employees, from AVA, NEA and HSA to SFA. Once the transfer takes place, the AVA Act will be repealed by clause 55.

29. Part 9 of the Bill makes related and consequential amendments to other Acts.

30. First, with the consolidation of food safety functions in a single agency, and the transfer of non-food related functions to NParks, some legislation become obsolete and are being repealed. Clause 56 repeals the Cattle Act as that becomes obsolete with similar powers provided for under the Animals and Birds Act, Sale of Food Act, and Environmental Public Health Act (EPHA). Clause 59 will repeal provisions in the Fisheries Act relating to the prohibition, regulation, or control of piranha or any other dangerous species of fish. NParks will take over this function from AVA, and draw powers from the Animals and Birds Act. The regulation of stage shows under the EPHA will be abolished, as this is already regulated under the Public Entertainments Act administered by the Singapore Police Force.

31. Next, Clause 62 amends the functions of the NEA in the National Environment Agency Act to remove food-related functions since these are transferred to SFA.

32. Clauses 57 and 61 further make consequential amendments to the Environmental Public Health Act (EPHA) and the Infectious Diseases Act (IDA) respectively to transfer powers from NEA's Director-General of Public Health to SFA's Director-General, Food Administration, called DG FA. DG FA will administer Parts 4 and 9 of the EPHA that relate to the safety of food and drinking water for consumption, and the licensing of retail food establishments, markets and hawkers. DG FA will also administer sections 38 and 39 of the IDA which relate to the supply of food and water to vessels.

33. The EPHA will also be amended to provide powers, to both the Director-General of Public Health and the DG FA, to modify the conditions of a licence after giving notice to the licensee. This is to facilitate further reviews to extend the duration of licenses issued under the EPHA.

34. Clauses 58, 59, 64 and 65 make consequential amendments to the Feeding Stuffs Act, Fisheries Act, Sale of Food Act and Wholesome Meat and Fish Act respectively to transfer the administration of the acts from the Director-General, Agri-Food and Veterinary Services to DG FA.

35. Clauses 59, 64 and 65 make other related amendments to the Fisheries Act, Sale of Food Act, and Wholesome Meat and Fish Act, respectively to provide the Minister to make regulations requiring records on imports and food stocks to be kept and supplied to DG FA upon request. This will allow DG FA to monitor the supply of fish, meat and other food items to ensure a secure and reliable food supply in Singapore. These powers will extend to food businesses, fisheries and persons involved in fish cultivation, and importers of food in Singapore. DG FA will also be empowered to take into consideration the ability of importers of food items, such as meat and fish, to provide a secure and reliable supply when granting licences, and to impose license conditions to this end. This will enable DG FA to work with importers of key food items to adopt plans, including preventive strategies, to mitigate the impact of supply disruptions.

36. Mr Speaker, Sir, as I mentioned earlier, food security is fundamental to our national security. Members will recall that only last December, Malaysia had announced that it was considering limiting or stopping egg exports, and restricting exports of certain types of seafood. This will not be the last time that Singapore faces possible disruption to our food imports. We must therefore continue to diversify our food import sources and not be over-reliant on any single source. With the formation of SFA, we will continue to strengthen Singapore's food security and reduce our vulnerability to external volatility and price hikes. SFA will also continue to partner other Government agencies to ensure basic food items remain affordable.

37. Clause 60 amends the Health Promotion Board Act to better delineate the food functions between SFA and HPB. HPB's role is to encourage and facilitate healthier food choices in Singapore.

38. Clause 63 abolishes the exclusion of land used for agriculture from being treated as a development, for the purposes of the Planning Act. This paves the way for SFA to work closely with URA to better develop land in Singapore that will be used for agricultural purposes.

39. Clause 64 makes a related amendment to the Sale of Food Act to enable regulations to prescribe the circumstances when trademarks may or may not be used in relation to any particular food or its advertising. This will support existing work by the Formula Milk Taskforce led by SMS Koh Poh Koon, in particular to ensure that labelling and the provision of information are done in a manner that protects consumer interests. The implementation details will be finalised by the Government agencies supporting the Taskforce.

40. Part 10 of the Bill provides for saving and transitional arrangements. These will cover AVA's financial statements for financial year 2018, and appeals made before the commencement of SFA and pending when the amendments take effect. As in other Bills, the Minister is conferred power to make regulations setting out additional provisions of a saving or transitional nature.

CONCLUSION

41. Mr Speaker, in conclusion, this Bill provides for the reorganisation of Government to further our efforts to ensure and secure the supply of safe food for Singapore. As the lead agency for food-related matters, SFA will be well-placed to work closely with all stakeholders from farm-to-fork to transform the agri-food industry, seize opportunities in the future food landscape, and provide good jobs for Singaporeans.

42. Sir, I beg to move.

Question from Mr Gan Thiam Poh: To ask the Minister for the Environment and Water Resources (a) what is the number of feedback received from residents about the ashes/smoke produced by the burning of paper offerings in large metal cages since the regulation took effect; and (b) whether the Ministry will work with religious organisations and vendors of large incense burners to use latest technology in the design of such burners so that the emission of ashes/smoke can be minimised.

Answer:

The National Environment Agency (NEA) works closely with stakeholders such as the Town Councils, building managements and religious organisations to encourage responsible burning of joss paper and incense. HDB estates display educational materials such as posters and banners to advise the public to use the joss paper burners provided and to burn joss papers in small quantities to minimise smoke. Town Councils have also adopted joss burners that can burn more cleanly. Feedback on joss paper and incense burning has been declining, from about 1100 instances of feedback in 2015 to about 500 in 2018.

2. As for large-scale burning of religious offerings, NEA works with stakeholders to minimise the emission of smoke and fly ash. This includes reducing the scale of burning, locating the large metal cages and burners away from dense residential areas, and improving the design of the burners. For example, NEA has introduced eco-friendly burners with a cyclone dust collection system at Mandai Columbarium. The Kong Meng San Phor Kark See Monastery has also installed an eco-friendly burner with an ash filtration system to filter out fly ash.

3. We encourage the public to be considerate when burning joss paper and incense so as to keep our environment clean and safe.

Question from Mr Murali Pillai: To ask the Minister for the Environment and Water Resources (a) what are the considerations that led to the identification of the industrial area along Bukit Batok Street 23 as one of the four funeral parlour sites to be developed in the next 10 years; and (b) what are the mitigation measures that will be put in place to minimise the impact on residents living nearby.

Answer by Minister Masagos:

The National Environment Agency (NEA) will be launching four new funeral parlour sites for development over the next 10 years or so. This is to meet the growing demand for after-death facilities and services as our population ages. The demand for wake spaces is expected to rise in tandem with the increase in resident deaths, which is projected to double to around 40,000 annually by 2040.

2. The sites were carefully studied and identified through an inter-agency planning process. They are distributed across Singapore to provide better accessibility for bereaved families and their visitors. The sites were selected after considering factors such as development plans for the surrounding area, the capacity of the road network to support the anticipated traffic and accessibility to public transport.

3. The site in the industrial area along Bukit Batok Street 23 will cater to the demand for funeral parlour services in the western part of Singapore. The site is surrounded by industrial developments, and is located next to an existing columbarium.

4. NEA will require the proposed funeral parlour operator to put in place measures to minimise impact on the residents and other nearby stakeholders. These measures can include barriers such as plantings and setback from the road to keep funeral activities discreet, and the provision of eco-friendly burners to minimise smoke emissions. Rituals and funeral processions will be confined within the site as far as possible, to minimise disturbance. The relevant agencies have assessed that the road network in this area is able to support the funeral parlour development, and will require the operator to provide sufficient parking facilities within the site. NEA will also work with the other agencies and the operator to reduce the impact of hearses when they move in the area. This can include ensuring accessibility via different routes and avoiding roads within residential estates as far as possible.

5. As a small and densely-populated city state, there will always be competing demands for space to meet Singapore's various development needs. From time to time, we may have to make adjustments to accommodate these developments. Through careful planning and by taking mitigation measures, the Government will make the best effort to minimise potential dis-amenities arising from these developments.

Supplementary Questions and Responses

Mr Murali Pillai:

Mr Speaker Sir, I thank the Honourable Minister for his detailed answer to my questions. I have a few supplementary questions.

First, may I ask whether distance from the housing estate is a factor to be considered in deciding which funeral parlour sites should be zoned? And if so, why is it that the Bukit Batok site was chosen given that the nearest housing estate is about 200 metres away from the proposed site?

The second question I have is whether in relation with the other three funeral parlour sites, are the housing estates as close or are they further?

The third question I have is in relation to mitigation measures. I am glad to hear that there are proposals to consider designating hearse routes. May I ask whether hearse routes could be designated? Thank you.

Answer:

On the question on hearse routes, when we put out the tenders for the operators to come and build and design, we will put this as part of the requirement. We also advise them on the best routes to take, to avoid residents and HDB estates as far as possible.

The 200m was not the exact reason why we did it. As I mentioned, for the Bukit Batok site, there is a dearth of such facilities in the western region. If you look at the map, the nearest one is in Choa Chu Kang. It is not so accessible, very far for many people and when you don't have a car, it is quite difficult to get there. So we

think it is useful to have one there.

Secondly, the site (in Bukit Batok) is surrounded by industrial buildings, shielded away from public view. Even so, when the operators come to build, we will ask them to build enough shielding so that the noise, disamenities or even sight can be mitigated.

Er Dr Lee Bee Wah:

Sir, I have one supplementary question. Among the four sites selected, one of them is in my constituency. I would like to ask Minister whether there would be consultation with residents before the design is finalised in order to address concerns of residents? Because surely it will have an impact on my residents who are living in Meng Suan Estate.

My parliamentary colleague also asked about the hearse route, in fact there have been a lot of feedback from residents who share that there are many using the route that pass by Meng Suan estate. So I think, as far as possible, try reducing using that route and perhaps can come from another side of Mandai Road.

Answer:

I thank the Member for her clarification. I think one of the important things that we want to recognise is that after-death facilities are important social infrastructure. We, as Singaporeans living in HDB estates, are very used to seeing funeral wakes at void decks, and now perhaps more frequently than before. This is one big hearted society –we have never minded seeing either funerals or weddings right below where we live. And as you know, where funerals are conducted, even weddings, there are disamenities and we have tolerated them for a long, long time, ever since we have had HDB flats. And I think we should keep that sense of accommodation, that sense of respect for people who need this in times of bereavement.

At the same time, there are also people who want to choose other options where they perhaps want a quieter place to grieve for their loved ones. We also want to make sure the religious beliefs and cultural practices are also being met.

Given all that and the fact that like I mentioned earlier, that the number of resident deaths is likely to double, we have to prepare now. We have to make sure that we provide for the spaces and give ample notice to everyone who is in a way affected by the presence of such social facilities.

We will definitely consult the advisers as well as the grassroots to help us communicate with the residents, and at the same time, to get feedback and concerns that they might have and try as far as possible to mitigate the disturbances and disamenities that consequently arise from building such facilities.

Question from Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources (a) in each year of the past five years, how much plastic waste did Singapore produce; and (b) of this amount, how much were (i) incinerated (ii) recycled locally and (iii) exported to recyclers overseas respectively.

Answer:

Singapore generated 832,200 tonnes of plastic waste in 2013, 869,000 tonnes in 2014, 824,600 tonnes in 2015, 822, 200 tonnes in 2016 and 815,200 tonnes in 2017.

2. Of the plastic waste generated, Singapore recycled 6% to 11% of it across the different years, with the rest being incinerated.

3. In 2017, about 4% of the plastics collected for recycling were processed in our local plastic recycling facilities. The rest are sorted and exported for recycling.

Question by Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources what are the countries that Singapore's plastic waste that are meant for recycling exported to in 2017, 2018 and this year respectively.

Answer:

Across all three years, plastics collected for recycling that were not processed in our local plastic recycling facilities were sorted and exported to countries in Southeast Asia and the wider Asian region, such as China, India, Australia and South Korea.

Question by Mr Louis Ng Kok Kwang: To asked the Minister for the Environment and Water Resources what percentage of local cleaners are directly hired by food and beverage establishments such that they do not fall under the progressive wage model.

Answer:

We do not track the number of local cleaners being hired directly by food and beverage (F&B) establishments. The Progressive Wage Model (PWM) applies only to local cleaners employed by cleaning businesses. The model does not apply to cleaners hired directly by F&B establishments, as unlike outsourced cleaners, they are not subject to the effects of cheap sourcing that had depressed wages. Employers are nonetheless encouraged to upgrade their worker's skills and implement productivity-based wage progression in accordance with the key tenets of the PWM.

2 The Government will continue working closely with the Tripartite Cluster for Cleaners to ensure that the PWM for the cleaning sector remains relevant and aligned with the industry's transformation goals.

Question by Mr Louis Ng, MP for Nee Soon GRC: To ask the Minister for the Environment and Water Resources (a) what current percentage of cleaning companies apply the progressive wage model to their foreign cleaners; and (b) whether the Ministry will start collecting such data if it does not currently do so.

Answer:

The Progressive Wage Model (PWM) was introduced to address the effects of cheap-sourcing that had depressed wages for local cleaners hired by cleaning businesses. While the PWM is mandatory for these cleaners, it is not applicable to foreign cleaners, who are typically hired on different terms, with employers bearing other related expenses such as additional levies and accommodation arrangements.

2. The PWM is intended to sustain productivity-driven wage growth for resident low-wage workers, hence the collection of related data focuses on local cleaners. Nonetheless, as at 31 Jan 2019, about 23% of licensed cleaning businesses employing foreign cleaners were paying wages at or above the levels stipulated under the PWM to their foreign cleaners.

3. We encourage more employers to upgrade their workers' skills and implement productivity-based wage progression in accordance with the key tenets of the PWM, regardless their workers' citizenship.

Question by Ms Joan Pereira, MP for Tanjong Pagar GRC: To ask the Minister for the Environment and Water Resources (a) how does the Ministry ensure that lorries that carry sand do cover them up to prevent spillage on the roads while moving; and (b) for lorries that are found not to have done so, what are the penalties that are imposed on them.

Answer:

Sand or other materials spilt from improperly covered lorries on public roads can endanger the safety of motorists and dirty our environment.

2. The National Environment Agency (NEA) engages sand suppliers and commercial transport companies to remind their drivers to be vigilant in keeping sand covered during transport. Commercial transport companies are also reminded to inspect their lorry fleets regularly for faulty cargo flap covers.

3. From 2016 to 2018, NEA took more than 450 enforcement actions against drivers for transporting sand and other materials without proper cover. Under the Environmental Public Health (Public Cleansing) Regulations, persons conveying sand or other similar materials along a public road by vehicle without adequate cover face fines of up to \$1,000 upon conviction for a first offence. Additionally, under the Environmental Public Health Act, persons who drop or spill the same on a public road would also be liable for fines of up to \$2,000 upon conviction for a first offence.

4. Members of the public who witness sand spillage on public roads should report the incident to NEA.

Question by Mr Desmond Choo: To ask the Minister for the Environment and Water Resources with regard to the methane fumes incident at Pasir Gudang (a) what is the environmental impact on Singapore; (b) whether there is an adverse impact on our fisheries; and (c) what are the early detection systems put in place to alert Singaporeans.

Answer by Minister:

1 According to media reports, since 7 March 2019, more than 3,000 Johoreans fell ill as a result of illegal dumping of chemical waste into Sungai Kim Kim, a river in Pasir Gudang. Hazardous fumes caused severe symptoms including nausea, shortness of breath and vomiting. Thousands needed immediate medical attention and many, including children, were admitted to hospitals for treatment. All 111 schools in the Pasir Gudang district were closed on 13 March 2019 for more than 2 weeks.

2 Throughout this period, our agencies have been closely monitoring the situation and putting in place precautionary measures to guard against any potential pollution impacts arising from the illegal dumping of chemical waste at Sungai Kim Kim in Pasir Gudang. We have not detected any pollution impacts on Singapore's air and water quality or water supply.

3 The National Environment Agency (NEA) continuously monitors the ambient concentration of a variety of Volatile Organic Compounds (VOCs) at our air monitoring stations, including at four stations located in the north-eastern region of Singapore. These include benzene, toluene, and xylene, as well as other common VOCs from industrial emissions which are also closely monitored by other environmental agencies such as the United States Environmental Protection Agency (USEPA).

4 NEA has not detected any elevated levels of VOCs. The 24-hour Pollutant Standards Index (PSI) has also been in the Good to Low-Moderate range, while the 1-hour PM_{2.5} readings remained in the Normal range. The Singapore Civil Defence Force (SCDF) has also deployed its portable stand-off chemical gas detectors at the northeast region of Singapore to detect toxic chemicals, and has not detected any toxic chemicals in the air.

5 For water quality, NEA's continuous buoy-based coastal water quality monitoring sensors deployed along the Straits of Johor have not detected any unusual variation in the key physical, chemical, and microbiological water quality parameters. NEA has also taken the additional step of collecting water samples at Pulau Ubin and its vicinity to test additional parameters, including compounds Malaysia has identified due to the chemical waste dumped in Sungai Kim Kim. These compounds have not been detected in our water samples. NEA has also not detected any anomalies in the quality of the waters at our recreational coastal beaches.

6 PUB's online sensors have shown that the water quality of Johor River, our waterways and reservoirs in the north and north-eastern part of Singapore, as well as the water supply is within normal variations. On-site inspections and water quality checks have also shown no abnormalities. As a precautionary measure, PUB has installed oil booms at the outlet drains and estuaries along the north and north-eastern coast of Singapore. This incident has no impact on our water supply as the chemical dumping location is outside of our Johor River catchment area, where part of our water supply comes from.

7 There have been no reports of unusual fish mortality at our local fish farms in the Straits of Johor. Singapore Food Agency (SFA)'s tests of seafood samples from these fish farms for compounds such as polycyclic aromatic hydrocarbons (PAH), VOCs, and heavy metals have not detected any anomalies.

8 We will continue to monitor the situation and provide updates if there are any significant developments. We will also continue to step up our checks and enforcement, to protect our environment and safeguard the health and safety of Singaporeans.

Answer by Minister:

I thank the member for his call for all Singaporeans to use water prudently. While we continue to plan ahead and invest in infrastructure and R&D to ensure our water security, we must sustain our push for water conservation. The costly but necessary investments in our water infrastructure will be for naught if we do not manage our water demand. We need to continue to work hard to encourage all Singaporeans to use water prudently.

2. We believe that such good habits are best cultivated from young. Since 2016, PUB has worked with schools to organise Water Rationing Exercises in the month of March, as part of Singapore World Water Day. This year, approximately 47,000 students from 116 schools, ranging from pre-schools to tertiary institutions, participated in these exercises. This is the largest number of participating schools to date. In addition, PUB worked with the Ministry of Education to incorporate water conservation topics in the curriculum. These help to reinforce the value of water amongst the students and the need to “Make Every Drop Count”.

3. For our larger community, PUB takes a multi-pronged approach to encourage water conservation and empower individuals to better manage their water usage. PUB has been carrying out Automated Meter Reading trials, most recently in Punggol and Yuhua. As part of the trials, residents were able to access their water consumption data in near real-time through a mobile app, as well as participate in various water conservation themed games. These have helped to encourage the residents to change their water usage behaviour and adopt good water-saving habits. As the trials have shown encouraging results so far, PUB is exploring how this system can be progressively implemented nationwide.

4. PUB has also put in place a mandatory water efficiency labelling scheme, or MWELS, to help consumers make more informed purchasing decisions. We have set minimum water efficiency standards for water fittings and appliances. To further drive the use of more efficient water fittings under the MWELS, the minimum efficiency standards for all fittings will be further raised to 2-ticks from today, 1 April 2019.

5. The responsibility of water conservation does not fall on households alone. Businesses must also play a part. For the non-domestic sector, large water users are required to prepare and submit Water Efficiency Management Plans, which help them to better understand their water usage and identify ways to enhance their water efficiency. PUB supports businesses implementing water-efficient projects through the Water Efficiency Fund. PUB is currently working with the Singapore Environment Council to develop a Green Labelling Scheme for commercial dishwashers, commercial washer extractors and high pressure jet machines in Singapore, to encourage businesses such as hotels, F&B outlets

and town councils to purchase water efficient equipment for their business operations.

6. Water is a scarce resource that should not be taken for granted. I urge everyone to do our part to use water wisely, so that we can continue to enjoy it for years to come.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) whether Singapore has received any updates on the Johor government's efforts to manage their hotspots and, if so, what are these; (b) how can the health and well-being of Singapore's residents be safe-guarded against the long-term exposure to haze pollutants; and (c) whether there are plans to conduct outreach programmes to allay concerns and provide regular updates on the haze situation arising from hotspots in Johor.

Question by Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources (a) what specific sensors are there in place in Punggol to measure the level of volatile organic compounds in the air; and (b) whether there has been an increase in the measured levels since the chemical waste dumping incident in Pasir Gudang.

Answer by Dr Amy Khor:

1 Members of this house would be aware of the environmental pollution incidents in Johor over the last two months.

2 In February, the National Environment Agency (NEA) detected hotspots of fires with smoke plumes in Southern Johor through satellite remote sensing. The Department of Environment (DOE) Johor, subsequently alerted NEA to fires at two landfills in Bandar Tenggara and Tanjong Langsat, as well as a fire at Punggai in the area of an oil palm plantation. The resultant smoke plumes, blown by the prevailing northeasterly winds, affected both Johoreans and Singaporeans with intermittent burning smells over the past few weeks. While most of the fires have been put out, NEA continued to detect hotspots in Southern Johor.

3 NEA monitors the ambient air quality in Singapore through a network of real-time ambient air monitoring sensors across Singapore. These sensors continuously measure the key air pollutants, namely, sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone, particulate matter (both PM2.5 and PM10). The concentrations of these air pollutants are used to compute the Pollutant Standards Index (PSI) over a rolling 24-hour period.

4 Since June 2016, NEA has introduced bands and descriptors for the 1-hour PM2.5 concentrations, as a guide to help the public better assess the current air quality. The 24-hour PSI and the 1-hour PM2.5 readings in the 5 regions of Singapore and corresponding health advisory are available to the public on the NEA website and myEnv mobile application. Members of the public can use the information as a guide to plan their activities. Between early-February and mid-March when the hotspots were detected in Johor, the 24-hour PSI readings remained within the Good to Moderate range, and the 1-hour PM2.5 levels remained in the Normal range.

Illegal Dumping of Chemical Waste into Sungai Kim Kim, Pasir Gudang

5 According to media reports, since 7 March 2019, more than 3,000 Johoreans fell ill as a result of the illegal dumping of around 20 to 40 tonnes of chemical waste into Sungai Kim Kim, a river in Pasir Gudang. Hazardous fumes caused severe symptoms including nausea, shortness of breath and vomiting. Thousands needed immediate medical attention and many were admitted to hospitals for treatment. Some were in critical condition and had to be placed under intensive care. Young and vulnerable children were among the worst affected. The authorities closed all 111 schools in the Pasir Gudang district on 13 March 2019 for more than 2 weeks.

6 Singaporeans watched with deep concern and were saddened by this serious environmental violation, where toxic chemicals were dumped into the river, with little regard for the people who live in the surrounding areas. The chemicals detected in the air samples from Sungai Kim Kim and its vicinity contained chemicals such as benzene which is carcinogenic. The Malaysian media has also reported illegal dumping of chemical waste at other sites in Pasir Gudang.

7 According to the Malaysian authorities, they have cleaned up a 1.5km polluted stretch of Sungai Kim Kim in Pasir Gudang. More than 900 tonnes of soil and 1,500 tonnes of polluted water have been removed. The Malaysian authorities have worked expeditiously to contain the problem, in view of the impact to the environment and to public health. I wish a speedy recovery for all those affected, and in particular the children. Singapore stands ready to provide assistance to the Malaysian authorities if needed.

8 Throughout this period, our agencies have been closely monitoring the situation and putting in place precautionary measures to guard against any potential pollution impacts arising from the illegal dumping of chemical waste. We have not detected any pollution impacts on Singapore's air and water quality or water supply.

9 NEA continuously monitors the ambient concentration of a variety of Volatile Organic Compounds (VOCs) at our air monitoring stations, including at four stations located in the north-eastern region of Singapore. These include benzene, toluene, and xylene, as well as other common VOCs from industrial emissions which are also closely monitored by other environmental agencies such as the United States Environmental Protection Agency (USEPA).

10 NEA has not detected any elevated levels of VOCs. The 24-hour PSI has also been in the Good to Low-Moderate range, while the 1-hour PM2.5 readings remained in the Normal range. The SCDF has also deployed its portable stand-off chemical gas detectors at the northeast region of Singapore to detect toxic chemicals, and has not detected any toxic chemicals in the air.

11 For water quality, NEA's continuous buoy-based coastal water quality monitoring sensors deployed along the Straits of Johor have not detected any unusual variation in the key physical, chemical, and microbiological water quality parameters. NEA has also taken the additional step of collecting water samples at Pulau Ubin and its vicinity to test additional parameters, including compounds Malaysia has identified due to the chemical waste dumped in Sungai Kim Kim. These compounds have not been detected in our water samples. NEA has also not detected any anomalies in the quality of the waters at our recreational coastal beaches.

12 PUB's online sensors have shown that the water quality of Johor River, our waterways and reservoirs in the north and north-eastern part of Singapore, as well as the water supply is within normal variations. On-site inspections and water quality checks have also shown no abnormalities. As a precautionary measure, PUB has installed oil booms at the outlet drains and estuaries along the north and north-eastern coast of Singapore. This incident has no impact on our water supply as the chemical dumping location is outside of our Johor River catchment area, where part of our water supply comes from.

13 There have been no reports of unusual fish mortality at our local fish farms in the Straits of Johor. Singapore Food Agency (SFA)'s tests of seafood samples from these fish farms for compounds such as polycyclic aromatic hydrocarbons (PAHs), VOCs, and heavy metals have not detected any anomalies.

14 Environment pollution is a cross-border issue that requires collaboration between the authorities of both countries. These include the provision of early warnings, and environmental monitoring data and guidelines. NEA and SCDF have been in contact with their respective Malaysian counterparts – DOE Johor and the Johor Fire and Rescue Department (BOMBA) – to obtain regular updates on the situation there.

15 We will continue to monitor the situation and provide updates if there are any significant developments. We will also continue to step up our checks and enforcement, to protect our environment and safeguard the health and safety of Singaporeans.

Question by Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources (a) what is the impact of the recent challenges facing Hyflux on our water supply; (b) what contingency plans are there in place, in particular whether PUB has the operational capacity to take over the desalination plant; (c) what is the extent of private sector involvement in our water provision; and (d) whether any review should be done in light of what has happened to Hyflux.

Answer by Minister:

1 I thank the Member for his question. I know that many Singaporeans are concerned about what the ongoing Hyflux restructuring means for our water supply.

2 Water is an existential issue for Singapore. PUB's priority has been and will always be to ensure Singapore's water security. Over many decades, we have diversified our water sources and built up our four national taps. NEWater and desalinated water are integral to our water security, as they are weather-resilient and can supply water even during dry spells.

3 As part of our plan to build up our desalination and NEWater capacities for our water security, the Government has partnered the private sector to design, build, own, and operate some of our desalination and NEWater plants. Today, we have five NEWater plants and three desalination plants; out of these, three of the NEWater plants and two of the desalination plants, including Tuaspring, are based on a Public-Private Partnership, or PPP, model. The remaining three plants, as well as all our other water supply assets, are owned and operated by PUB.

4 The PPP model has been useful in allowing us to tap on private sector innovations and cost efficiencies to deliver water services more effectively. To ensure that water security is never compromised, PUB has put in safeguards as part of the PPP contracts. Even though PUB does not interfere with the business decisions made by the concession companies, PUB monitors the performance of the plants under the PPP model to ensure that the concession companies can meet their contractual obligations to PUB. Where there are issues, PUB will require the concession companies to rectify them, failing which, PUB may exercise its rights to terminate the PPP contracts and take control of the plants. We do not exercise these termination rights lightly but will not hesitate to do so when it becomes necessary to safeguard our water security.

5 As PUB continues to operate its own desalination and NEWater plants, PUB has the operational capabilities, experience and manpower to take over and operate the private plants, should the need arise.

6 Hyflux is currently involved in two PPP projects with PUB: the SingSpring Desalination Plant (SSDP) and the Tuaspring Integrated Water and Power

Project (TIWPP). SSDP is owned by SingSpring Trust, which is majority owned by Keppel Infrastructure Trust, with Hyflux owning a minority stake. The SSDP is not affected by Hyflux's debt and business reorganisation, nor is it subject to the moratorium that has been imposed by the court.

7 As for the TIWPP, it is owned by Tuaspring Pte Ltd, or TPL, a wholly-owned subsidiary of Hyflux. Let me briefly recap the events leading up to today. In 2010, PUB called an open tender for a 70 million gallons per day desalination plant, to be completed by 2013. In its tender bid, Hyflux proposed a different business model – one of an integrated desalination and power plant. Hyflux made a business decision to build the power plant that has a capacity significantly more than what the desalination plant needed, with the intention of selling excess power to the national power grid.

8 Hyflux's bid met PUB's requirements for constructing and operating a desalination plant and was the most competitive bid among the submissions. PUB also took into account Hyflux's expertise and track record. Thus, PUB awarded the tender to Hyflux in 2011. As with other such PPP projects, PUB built in safeguards in the Water Purchase Agreement, or WPA, signed with TPL.

9 Since 2017, TPL has been experiencing difficulties fulfilling its contractual obligations under the WPA. These include a failure to keep the plant reliably operational as required. More recently, it has also failed to produce financial evidence to demonstrate its ability to keep the plant running for the next six months. PUB gave time to TPL to try to sort out its problems but PUB's concerns have been growing over time. To safeguard our water security, PUB issued TPL with a default notice on 5 March 2019 to require TPL to remedy the defaults within the default notice period. If they failed to do so, PUB will terminate the WPA and take over the desalination plant. This is to ensure that a critical asset remains in safe hands, and avoids uncertainty over the operations of the desalination plant. Ultimately, PUB's actions are based on our overriding objective of ensuring Singapore's water security and that water continues to be reliably produced at the plant to meet the needs of Singapore and Singaporeans.

10 The purchase price for the desalination plant will be determined by an independent valuer in accordance with the WPA. Based on current valuation, the purchase price is negative and TPL will hence have to pay PUB a compensation sum. TPL itself has stated that there is a high likelihood for this. The desalination plant has been and will likely continue to lose money for the next few years. In addition, PUB would have to incur costs to make good the plant and ensure that it operates reliably for its remaining lifespan.

11 However, given TPL's current financial position, PUB is unlikely to recover the compensation sum from TPL. PUB has therefore indicated that it is willing to waive the compensation sum and purchase the desalination plant at zero dollars.

12 Let me be quite clear therefore: PUB's actions do not weaken either TPL or Hyflux, and do not disadvantage those who have invested in Hyflux. Indeed, it is quite favourable to TPL. TPL has in fact noted in its letter to PUB on 20 March 2019 that if PUB terminates the WPA, it would alleviate the pressure on the rest of the Hyflux Group. It positively impacts Hyflux's value and hence the value of the Hyflux shares being offered. In its announcement on 26 March 2019, Hyflux further stated that SM Investments Pte Ltd, the prospective investor of Hyflux, had concerns over working capital requirements post-investment and that PUB's actions should alleviate such concerns.

13 The current situation with Hyflux does not mean that we should dismiss the PPP model altogether as our other PPP projects are working well. The safeguards that PUB has built into the PPP contracts have worked well to ensure our water security. In fact, TPL provides an example of how these safeguards are robust and have served their purpose. That said, we are always studying ways to strengthen the safeguards and enhance our operations, and we will continue to do so.

14 Let me assure members of the House and all Singaporeans that PUB will always act to ensure Singapore's water security. Water is an existential issue for Singapore. Water security is integral to Singapore's national security. PUB's recent actions reinforce that. We will never allow Singapore's national or water security to be compromised.

15 Thank you.

Question by Mr Desmond Choo: To ask the Minister for the Environment and Water Resources in light of the increasing number of mass food poisoning cases (a) whether the Ministry has detected systemic issues in our food hygiene framework; (b) whether the current training and enforcement regime is adequate; and (c) what are the Ministry's plans to prevent future cases.

Answer by Minister:

The Singapore Food Agency (SFA) takes a serious view of food safety. SFA will take enforcement action against operators who fail to adhere to food hygiene and safety regulations, and for any food hygiene lapses found.

2 SFA conducts regular inspections on a risk-based approach. From January 2018 to March 2019, more than 95,000 inspections of food operators were conducted to ensure compliance with food hygiene and safety. In particular, more than 3,700 checks were conducted on food caterers - a category of food business that poses higher food safety risks.

3 The Government is paying close attention to the mass gastroenteritis incidents reported between November 2018 and March 2019. Joint investigations by the Ministry of Health and SFA thus far found that poor food handling practices, the lack of environmental cleanliness both in the food preparation and common areas, and poor personal hygiene practices were the main causes of these outbreaks. Gastroenteritis can be caused by eating contaminated food, or coming in contact with an infected person or an environment contaminated by viral gastroenteritis.

4 On poor food handling practices, SFA has taken enforcement actions for the lapses found and required operators to rectify the lapses. SFA has stepped up surveillance and engagement of all food operators, particularly for food caterers supplying food to pre-schools, and during festive seasons. Advisories are issued periodically to remind food operators to ensure that their food handlers observe good food hygiene and safety practices, and that their Food Hygiene Officers (FHOs) fulfil their duties to ensure good food hygiene and safety practices, and adherence to time-stamping requirements.

5 Food handlers and FHOs working at premises that have been suspended due to food hygiene and safety lapses are required to undergo re-training and be re-certified for Basic Food Hygiene Course (BFHC) and WSQ "Conduct Food & Beverage Hygiene Audit" programme respectively. SFA will continue to work with the industry to build a strong food safety culture among food business operators through strengthening their food safety management systems as well as competencies of food handlers and FHOs.

6 At the same time, SFA is taking steps to strengthen the regulatory regime for food hygiene and safety. For a start, heavier penalties will be imposed on food operators involved in significant food poisoning incidents. Total composition amounts will be increased and food operators who commit serious food hygiene and safety offences will be prosecuted in Court. In appropriate cases, SFA will also press for deterrent sentences to be imposed by the Court.

7 A multi-prong approach to incorporate good food hygiene and safety practices as well as good environmental and personal hygiene to prevent and control infection is important to mitigate gastroenteritis. In the recent spate of outbreaks in pre-schools, SFA and the Early Childhood Development Agency issued an advisory to emphasise the need to maintain environmental cleanliness and put in place infection control measures. This includes reinforcing good personal hygiene practices in every individual to prevent the spread of diseases and to protect oneself from acquiring infections. For instance, areas with vomitus must be properly cleaned with bleach to disinfect, and children and pre-school staff who are sick should stay at home so as not to spread infection.

8 Fundamentally, food safety is a joint responsibility across the industry, consumers and the Government as food can be contaminated at any point along the food supply chain. While SFA continues to be vigilant and ensures that regulatory measures are in place and properly enforced, the industry and consumers must also play their part to upkeep high standards of food, environmental and personal hygiene at all times.

Question by Mr Desmond Choo: To ask the Minister for the Environment and Water Resources how can the Ministry work with our financial institutions and funding bodies to divert more support for environmentally sustainable projects while reducing exposure to those with adverse impact on the environment.

Answer by Minister:

MEWR recognises that our financial sector plays a key role in advancing our environmental objectives. We work closely with the Monetary Authority of Singapore (MAS) to promote green financing in Singapore and to increase the financial sector's awareness of environmental risks and opportunities.

2 The Government has taken a pragmatic approach through the adoption of international standards, market-led best practices and capability-building in the development of green financing in Singapore. There has been progress on various fronts.

i. In 2015, the Association of Banks in Singapore (ABS) issued the Guidelines on Responsible Financing. Our local banks have all adopted these guidelines to evaluate their borrowers' Environmental, Social and Governance (ESG) risks and help borrowers improve their sustainability profiles. Most recently, in April 2019, the local banks announced their decision to cease the financing of new coal-fired power plants.

ii. The Singapore Exchange (SGX) introduced the "Comply or Explain" Sustainability Reporting Guide for listed companies, beginning from the financial year ending on or after 31 December 2017. The inaugural sustainability reports by first-time reporting companies have progressively been published.

iii. To encourage the issuance of green bonds, MAS introduced a Green Bond Grant Scheme in 2017, which helps to defray the cost of certifying sustainability oriented bonds as green bonds. This Scheme leverages international green bond standards to promote convergence and harmonisation with regional and international markets. Over \$4 billion of green bonds have been issued to date.

3 The Government also supports capability-building initiatives as they are key to companies understanding and incorporating ESG risks and opportunities across their core businesses. For example, MAS is working with insurers to anchor ESG research, modelling capabilities and underwriting teams in Singapore to catalyse the development of innovative ESG products.

4 These are encouraging developments. MEWR will continue to work with MAS to support our green financing efforts and steer the broader conversation on sustainable development. This will guide efforts in priority areas such as climate mitigation and adaptation and resource efficiency, as we transition to a resource-efficient and low-carbon future.

Question by Mr Alex Yam Ziming: To ask the Minister for the Environment and Water Resources (a) whether he can provide an update on Phases 1 and 2 of Project Wolbachia in the control of the *Aedes aegypti* mosquito vector; (b) how long will the Phase 3 field study last; and (c) whether Project Wolbachia can be accelerated in light of the increased incidents of dengue infections in the first quarter of 2019.

Question by Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources (a) what are the causes of the sudden spike of dengue cases in the first quarter of 2019; (b) what are the measures in place to detect dengue cases early; and (c) what is the Ministry's plan to reduce dengue cases especially during the dengue peak seasons.

Answer by SMS Amy Khor:

The National Environment Agency (NEA) has reported 2,200 cases of dengue in the first quarter of 2019. This was more than three times compared to the same period in 2018, but below the number of cases reported during the epidemic years of 2013 and 2014. Neighbouring countries have also reported increases in dengue cases in recent months. Contributing to this situation is a persistently high *Aedes aegypti* mosquito population in the community, as detected by the NEA Gravitrap surveillance system.

2 As a regional transport hub, Singapore is vulnerable to the transmission of infectious diseases. NEA and the Ministry of Health (MOH) have put in place a robust surveillance system to detect dengue and other vector-borne diseases. This system comprises vector surveillance, virus surveillance and dengue case surveillance. NEA has an island-wide network of 50,000 Gravitrap traps to monitor the mosquito population, and will add another 14,000 Gravitrap traps in the second half of 2019. Data from this network guides NEA's vector control efforts, allowing officers to quickly zero in on the areas with high mosquito population.

3 NEA's laboratory-based virus surveillance system monitors dengue virus serotypes and provides early alerts when there is a serotype switch. Historically, such switches have preceded large dengue outbreaks. Further, NEA, together with the National University of Singapore, has developed a model which helps us to forecast dengue incidence. This allows NEA to coordinate an effective pre-emptive response to impending dengue outbreaks.

4 NEA anticipates an increasing trend of dengue cases in the warmer months ahead, and has taken concerted efforts to stem dengue transmission. First, NEA, together with various agencies represented in the Inter-Agency Dengue Task Force, have stepped up checks and conducted more than 224,000 inspections in the months leading up to the peak dengue season. About 2,900 instances of mosquito breeding were removed.

5 Second, NEA brought forward the launch of the 2019 National Dengue Prevention Campaign to 7 April 2019. Together with Grassroots Advisers and leaders and Dengue Prevention Volunteers, NEA has been raising awareness that clean and stagnant water in homes are potential breeding habitats for mosquitoes, and galvanising the community to step up dengue prevention efforts. More than 8,500 volunteers have been trained to conduct patrols and house visits to share dengue prevention tips with residents.

6 Technology and innovation is another key pillar in dengue prevention efforts. NEA is conducting trial releases of male Wolbachia-carrying *Aedes aegypti* mosquitoes to further suppress the urban *Aedes aegypti* mosquito population in the community. NEA has successfully completed the Phase 1 and 2 field studies for Project Wolbachia - Singapore. The Phase 1 field study was conducted from October 2016 to December 2017, and a 50% suppression of the urban *Aedes aegypti* mosquito population was achieved. More importantly, this initial phase provided NEA with valuable data on the behaviour of the Wolbachia-*Aedes* mosquito. This has helped NEA to design more effective release strategies for Singapore's high-density and high-rise city environment.

7 As a result, the Phase 2 field study, conducted from April 2018 to January 2019, saw a significantly higher level of dengue vector population suppression of 70 to 80%. In this phase, NEA expanded the size of the study sites, and released male Wolbachia-*Aedes* mosquitoes at higher floors, in addition to releases at the ground floor. The results showed that a larger release site yielded improved population suppression results.

8 The Phase 3 field study has started in February 2019. NEA has further expanded the study sites at Nee Soon East and Tampines West by 1.6 to 2.2 times. NEA aims to determine if suppression of the *Aedes*

aegypti mosquito population can be sustained in larger areas, and if a smaller number of male Wolbachia-Aedes mosquitoes can be released at each residential block to maintain the suppression. NEA is also developing automation for male Wolbachia- Aedes mosquito production and release, to ensure scalability of the technology.

9 NEA will evaluate the Wolbachia-Aedes technology carefully and rigorously before deploying it on a large scale. NEA will continue to provide regular updates on the progress of Project Wolbachia.

10 I would like to take this opportunity to thank all our stakeholders, local Advisers, grassroots leaders and volunteers, for your efforts. We continue to see many cases of mosquito breeding in homes. All it takes is a small amount of water the size of a 20-cent coin for mosquitoes to breed. With a short breeding cycle of seven days, keeping the mosquito population in check requires the joint effort of every individual and stakeholder in the community to eradicate mosquito breeding habitats by practising good housekeeping and doing the 5-step Mozzie Wipeout. The government alone cannot prevent dengue transmission in Singapore. We must remain vigilant and work together to keep dengue at bay.

Question by Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources (a) what is the impact to Singapore in the event of a prolonged stoppage of water treatment operations at the Johor River Waterworks; and (b) what are Singapore's obligations to provide treated water to Johor under such a scenario.

Question by Dr Lily Neo: To ask the Minister for the Environment and Water Resources (a) how often has the raw water quality been unacceptable for our water treatment plants in Johor since they have been in operation; (b) how did that affect the supply of water to Singapore and Johor; and (c) what is the mitigation plan going forward.

Answer by Minister Masagos Zulkifli:

I would like to reiterate the written reply that I had issued yesterday in response to Mr Seah Kian Peng's question. PUB will shut down its Johor River Waterworks when the Johor River is affected by pollution upstream of our waterworks. Johor also has water treatment plants along the Johor River, upstream of the Johor River Waterworks, and will shut down the plants when pollution occurs upstream of them.

2. Since 2017, there have been seven pollution incidents along the Johor River which caused PUB's Johor River Waterworks to be temporarily shut down. These incidents have been traced to illegal discharges from premises such as palm oil mills and chicken farms within the catchment area. These pollution incidents typically cause disruptions ranging from several hours to several days. So far this year, there have been two pollution incidents, with the most recent one on 4 April 2019, where there were high ammonia levels in the Johor River.

3. Given the importance of the Johor River to the water supply of both Singapore and Johor, we have expressed our concern over the frequent recurrence of pollution incidents to Malaysia, both at the federal and state levels. Most recently at the Singapore–Malaysia Leaders' Retreat in April, Prime Minister Lee raised concerns over pollution in the Johor River and the severe impact of pollution incidents on both countries.

4. Under the 1962 Water Agreement, Singapore is entitled to draw 250 million gallons per day (mgd) of water from the Johor River, while Johor is entitled to buy treated water up to 2% of the total quantity of water we import to Singapore on any given day, or about 5 mgd when Singapore draws its full entitlement. In practice, we have been selling Johor 16 mgd of treated water, which is in excess of their entitlement, at Johor's request. We do so on a goodwill basis without prejudice to our rights under the 1962 Water Agreement. When we are unable to import any water from Johor due to pollution, Singapore has no obligation to supply treated water to Malaysia.

5. During these pollution incidents, PUB works closely with the Johor authorities to flush the polluted water column from the Johor River. Such collaboration between PUB and its Johor counterparts has helped us to manage the pollution incidents. PUB conducts stringent water quality tests to ensure that the raw water from the Johor River is suitable for treatment before resuming abstractions and operations. During such temporary disruptions, PUB steps up production at desalination plants and local waterworks to meet Singapore's demand.

6. Nevertheless, pollution incidents along the Johor River impact the water supply of both countries, and remain a serious concern. We will continue to engage our Malaysian counterparts on the need for them to take measures to prevent future pollution incidents along the Johor River.

Question by Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources (a) what are the numbers and locations of Smart Gravitrap traps that are deployed as part of a trial since late 2018; (b) what are the data collected by the traps and whether they are useful in improving dengue control in Singapore; and (c) whether such traps will be introduced nationwide on a permanent basis.

Answer by Minister Masagos Zulkifli:

The National Environment Agency (NEA), together with local start-up Orinno Technology Pte Ltd, has developed a “Smart Gravitrap” prototype. The Smart Gravitrap is similar to a standard Gravitrap, and is able to attract and trap female Aedes mosquitos looking for sites to lay their eggs. In addition, the Smart Gravitrap captures the mosquito’s flight signature to identify its species and gender, and transmits this information to NEA. This allows NEA officers to conduct data collection and analysis remotely, reducing the reliance on manpower to manually collect data from Gravitrap traps.

2. NEA is currently preparing for a six-month pilot trial of the Smart Gravitrap prototypes at two construction sites in the second half of 2019. The data collected from this trial will help to further guide the design of the Smart Gravitrap, as it moves into the product development phase. NEA will review the results of the trial before deciding on the operational plans for Smart Gravitrap traps.

Question by Ms Cheng Li Hui: To ask the Minister for the Environment and Water Resources (a) whether PUB has the required manpower to operate and maintain Tuaspring Pte Ltd; (b) what will be the operating model envisaged for Tuaspring over the long term; and (c) whether there will be cost implications to PUB.

Answer by Minister Masagos Zulkifli:

To safeguard Singapore's water security, the PUB, Singapore's National Water Agency, issued a 30-day notice to Tuaspring Pte Ltd (TPL) on 17 April 2019 to terminate the Water Purchase Agreement (WPA) between PUB and TPL.

2. After the termination of the WPA, PUB will take over, own, and operate the Tuaspring Desalination Plant (TSDP), similar to the Tuas Desalination Plant which PUB currently operates. PUB has the operational capabilities, experience, and manpower to operate the TSDP. PUB's immediate focus is to put in place the necessary measures and upgrading works to restore TSDP's ability to produce desalinated water reliably. PUB is working through the implementation details with TPL to facilitate a smooth handover.

3. PUB will have a better estimate on the costs of operations after taking over the TSDP. PUB will always act to ensure Singapore's water security and will not allow it to be compromised.

Question from Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources whether the Ministry is keeping a close monitoring on the development of the recent air pollution incident in Pasir Gudang and whether it will affect Singapore given the close proximity.

Question from Mr Pritam Singh: To ask the Minister for the Environment and Water Resources in light of the Pasir Gudang chemical spill in March 2019 (a) how does the air and water quality in Sengkang, Punggol, Pasir Ris and Pulau Ubin compare with other parts of Singapore from 2008 to 2018, particularly during the northeast monsoon seasons; and (b) what contingency plans are there in the event of an environmental disaster in Johor affecting residents in the aforesaid areas.

Reply by Minister Masagos Zulkifli:

The National Environment Agency (NEA) monitors and reports the air quality in Singapore through a network of five national air quality monitoring stations across the island. These stations are representative of the ambient air quality of the North, South, East, West and Central regions. Criteria pollutants, namely, sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone, and particulate matter (both PM2.5 and PM10), are continuously monitored and reported on an hourly basis as the Pollutant Standards Index, or PSI. In addition, NEA monitors the coastal water quality continuously through buoy-based monitoring sensors deployed in eight locations around Singapore, including the Straits of Johor. This is supplemented by monthly collection samples from 48 sampling points around Singapore.

2. From 2008 to 2018, the air and water quality in the northeast region were comparable to the rest of Singapore, including during the northeast monsoon season.

3. The air and water quality in Singapore have not been affected by the recent pollution incidents in Pasir Gudang. The ambient levels of Volatile Organic Compounds - VOCs - in the northeast region were also well within safe limits. The Singapore Civil Defence Force (SCDF) also deployed portable standoff chemical gas detectors in the northeast, and did not detect any toxic chemicals in the air.

4. NEA and SCDF are in contact with Malaysia's Department of Environment, orDOE and Fire and Rescue Department (BOMBA) on this latest incident, and will continue to monitor the situation and provide updates if there are significant developments.

5. Our agencies have put in place precautionary measures to guard against any potential pollution impacts arising from chemical incidents, including those from transboundary sources. NEA's existing air monitoring stations in the northeast region are able to measure the ambient concentration of a variety of VOCs including benzene, toluene, and xylene in the parts per billion range. These capabilities and with the support of SCDF's portable detectors should allow us to detect a transboundary plume and to alert our population accordingly.

Question from Mr Chong Kee Hiong: To ask the Minister for the Environment and Water Resources in view of the recent dengue situation, what assistance measures can be offered to home owners, especially the elderly, who are unable to check on areas beyond their reach such as gutters.

Reply by Minister Masagos Zulkifli:

As of 29 June, there were over 6,100 reported dengue cases in 2019, which is about four times the number of cases in the same period in 2018. We are entering the traditional peak dengue season and a national collective effort is critical to stem the transmission of dengue.

2. Inspections conducted by the National Environment Agency (NEA) showed that 60% of all *Aedes aegypti* breeding habitats detected were in homes. This proportion was even higher in dengue clusters, with 74% of breeding habitats detected in homes. Therefore, home-owners play a crucial role in keeping dengue at bay.

3. I urge all residents to take immediate action to eradicate potential mosquito breeding habitats by practicing the 5-step Mozzie Wipeout regularly, and stepping up housekeeping measures. All residents living in cluster areas should also cooperate with NEA officers to facilitate checks and carry out indoor misting in homes.

4. Community support is an integral part of the national effort to raise awareness and drive action on the ground. NEA, together with Dengue Prevention Volunteers, works closely with Grassroots Advisers, Neighbourhood Committees (NCs) and Residents' Committees (RCs) to reach out to residents. NCs and RCs can assist households with elderly members to check their homes and remove stagnant water to prevent mosquito breeding.

5. Households can take preventive measures such as avoiding the use of flowerpot plates for ornamental plants. Home owners with roof gutters that are difficult to access can engage pest control operators to check for stagnant water and apply Bti insecticide, if they are unable to do so themselves. A typical Bti briquette can remain effective for about 30 days.

6. NEA is stepping up efforts to stem dengue transmission. Over 440 dengue prevention events have been organised since the launch of this year's National Dengue Prevention Campaign in April. However, the government alone cannot prevent dengue transmission in Singapore. I encourage everyone, including our silver generation, to be an advocate of dengue prevention and to remind our family members and neighbours to join in this national effort.

Question from Mr Desmond Choo: To ask the Minister for the Environment and Water Resources over the last three years (a) what has been the trend of mosquito breeding by households and commercial entities; (b) how many cases of repeat offenders have there been; and (c) whether the current level of enforcement and severity of punishment sufficient to deter offenders and better prevent the spread of dengue.

Reply by Minister Masagos Zulkifli:

Between January and May 2019, the National Environment Agency (NEA) conducted more than 372,000 inspections which uncovered about 6,500 instances of mosquito breeding. About 900 enforcement actions were taken against households, including 3 repeat offenders. Another 950 enforcement actions were taken against other premises, which include construction sites and commercial premises. The total number of enforcement actions taken for mosquito breeding has generally increased between 2016 and 2018.

2. To safeguard public health, NEA will not hesitate to take enforcement action against anyone found to be breeding mosquitos. NEA last reviewed the penalty regime in 2016 to impose a fine on all households detected with mosquito breeding, and not just those found with breeding within active dengue clusters. Under the Control of Vectors and Pesticides Act, owners whose premises are found with mosquito breeding may be fined up to \$5,000 or imprisoned for a term not exceeding 3 months or both, with heavier penalties for subsequent convictions. NEA will monitor the enhanced regime to ensure that the penalties for mosquito breeding are appropriate and have sufficient deterrent effect.

Question from Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources whether the Ministry will consider having (i) designated areas for recycling bins at each HDB block, which will make recycling more convenient and (ii) a waste bin beside each recycling bin to reduce the contamination rate in our recycling bins.

Reply by Minister Masagos Zulkifli:

Making recycling more convenient is indeed part of the approach that my Ministry and the National Environment Agency (NEA) are taking to improve recycling rates. Every HDB block is currently provided with a recycling bin, and all new Build-to-Order flats launched since 2014 have a recycling chute next to the waste chute, making recycling as convenient as the disposing of general waste. In addition, as suggested by the Member, NEA is working with the Public Waste Collectors and the Town Councils to progressively demarcate the location of recycling bins. NEA is also working with other stakeholders on the ground, including the Town Councils, to ensure that sufficient general waste bins are available.

2. Besides reviewing the infrastructure needed to better support recycling, public education is key in reducing the contamination rate of our recyclables. This is why my Ministry and the NEA launched a #RecycleRight campaign as part of the Year Towards Zero Waste to raise awareness of what can and cannot be recycled. We are also working with our 3P partners to redesign the recycling bin labels to reflect what can and cannot be recycled more clearly, and to emphasise that food and liquids should not be thrown into the recycling bins as they would contaminate the recyclables.

Question from Mr Saktiandi Supaat: To ask the Minister for the Environment and Water Resources (a) whether he can provide an update on Singapore's efforts and strategy in ASEAN to lead and boost the green economy and counter climate change; and (b) whether the Ministry will consider working with other agencies to build a bigger climate financing ecosystem here via incentives and lowering bank capital requirements for climate-friendly investments.

Reply by Minister Masagos Zulkifli:

Located in a region with long coastlines and heavily-populated low-lying areas, ASEAN Member States (AMS) are vulnerable to the impacts of climate change. ASEAN's efforts to tackle climate change have been directed toward sustainable development and the building of smart and efficient cities, which also support the growth of a green economy.

2. ASEAN cooperation on climate change is under the purview of the ASEAN Working Group on Climate Change (AWGCC). As Chair for the period 2017 to 2019, Singapore works closely with AMS and international development partners to drive the implementation of the AWGCC Action Plan (2016 – 2025), which covers climate adaptation and mitigation, capability building, climate finance, and cross-sectoral coordination. AMS are currently working on 18 projects and activities endorsed by the AWGCC. Singapore also launched the Climate Action Package at the Special ASEAN Ministerial Meeting on Climate Action last July, to provide training and capacity building for participating countries to take climate mitigation and adaptation measures, which in turn also help to make their economies more resilient.

3. Singapore has also been driving action at the city level. One of our key initiatives as ASEAN Chair last year was the establishment of the ASEAN Smart Cities Network (ASCN), a collaborative platform for AMS to work towards smart and sustainable development. Singapore will continue to support Thailand as the current Chair of ASEAN to advance this work under its "Advancing Partnership for Sustainability" agenda.

4. However, Governments cannot tackle climate change alone. We need to mobilise private capital to support sustainable development and facilitate the region's transition to a low-carbon and climate resilient economy. My Ministry works closely with the Monetary Authority of Singapore (MAS) to promote sustainable financing in Singapore and the region. Let me outline our efforts in three key areas.

5. First, non-bank financing solutions like green bonds can play a bigger role in the financing of green investments. MAS introduced the Green Bond Grant Scheme in 2017 to spur the use of capital markets instruments for green financing and to promote the adoption of standards for green investment products. The grant helps to offset the cost of obtaining an external review to ensure that the green bonds are aligned with internationally accepted standards. In February this year, the grant scheme was expanded to include social and sustainability bonds, and renamed the Sustainable Bond Grant Scheme (SBGS). To date, over SGD 6 billion of green bonds have been issued in Singapore. MAS has also lowered the minimum issuance size requirement for the SBGS, which will allow more qualifying issuers to access the grant.

6. Second, MAS is working closely with banks to strengthen their management of environmental risks and support sustainable financing. Over the past years, the banks have been enhancing their relevant policies and processes. In April this year, our local banks announced their decisions to cease financing of new coal-fired power plants, and are working with their customers to make the transition to cleaner forms of energy production. As a member of the Network for Greening the Financial System, MAS works closely with our international counterparts to develop best practices for banks to manage environmental risks and seize opportunities. These international forums are studying the use of capital and other regulatory requirements to promote sustainable financing. As capital requirements are intended to ensure that banks have sufficient capacity to withstand losses, any reduction in capital should be justified by lower risks posed by exposure to sustainable financing.

7. Third, MAS is working with local and international partners to strengthen the capability and capacity of the financial sector to support sustainable financing activities. For example, MAS has signed a Memorandum of Understanding with the International Finance Corporation, which aims to raise the awareness and knowledge of green bonds through capacity building workshops. The continued growth of sustainable financing requires a coordinated and collective effort involving the financial sector, businesses, the Government and civil society. My Ministry will continue to work closely with the MAS and other government agencies to support our sustainable financing efforts and drive climate action in Singapore.

Question from Mr Christopher de Souza: To ask the Minister for the Environment and Water Resources what steps is Singapore taking to (i) address climate change (ii) prioritise green and sustainable living and (iii) reduce food waste in Singapore.

Reply by Minister Masagos Zulkifli:

A clean, green and liveable environment is necessary for Singaporeans to lead healthy lives. We pursue sustainable development by taking a long-term and integrated approach to planning and implementation.

2. The Sustainable Singapore Blueprint (SSB) charts out the measures and targets to support sustainable development. These include planning for parks and green spaces in housing estates, enhancing public transport, and introducing eco-friendly features in HDB flats, such as rooftop greenery, solar panels, dual chutes for recycling and smart metering. These features are being implemented progressively, and will also be incorporated in new sustainable districts such as Punggol Digital District, Jurong Lake District and Tengah Estate.
3. The Sustainable Singapore Blueprint goes beyond hardware to also cover "heartware". My Ministry works closely with other Government agencies and community partners on ground-up initiatives that help make Singapore an endearing and liveable home. Residents can participate in environmental programmes such as litter picking, recycling, and energy and water conservation activities.
4. However, our sustainable development journey is not without challenges. Climate change is a key existential threat for Singapore and we are taking concerted action to tackle it. To meet our Paris Agreement goals, we have a suite of measures to reduce greenhouse gases across all sectors of the economy. This includes incentivising the adoption of energy efficient technologies and cleaner forms of energy. We also implemented a carbon tax this year to further our transition towards a low-carbon economy.
5. To provide a sound scientific basis for planning and climate adaptation, we established the Centre for Climate Research Singapore in 2013. We are also taking steps to protect Singapore against climate change impacts. For example, we have invested in technologies such as NEWater and desalination, as well as in new drainage infrastructure to strengthen our water supply and flood resilience.
6. But we cannot combat climate change through the efforts of the Government alone. That is why Singapore designated 2018 the Year of Climate Action to encourage collective climate action in the community. To date, more than 340,000 individuals, organisations and institutions have pledged to reduce their carbon footprint.
7. The production and consumption of goods account for the bulk of global greenhouse gas emissions. It is therefore critical that we produce and consume sustainably, and strive towards a zero-waste nation.
8. We designated 2019 the Year Towards Zero Waste to galvanise the public and stakeholders to practise the 3Rs, and adopt circular economy approaches that keep resources in use for as long as possible. We will launch the inaugural Zero Waste Masterplan this year, which outlines our strategies to tackle the priority waste streams of e-waste, food waste and packaging waste, supported by R&D and industry development.
9. A combination of measures is used to tackle packaging waste and e-waste, including public campaigns, voluntary agreements and regulatory requirements on producers. We recently launched the "Say YES to Waste Less" campaign with 59 partners across more than 1,600 outlets, to encourage consumers to use reusables such as reusable bags and reduce the use of disposables.
10. To reduce food waste, our approach includes raising awareness of food waste reduction, and promoting excess food redistribution. Since 2015, the National Environment Agency (NEA) has been running a food waste reduction campaign to encourage everyone to "Buy, Order or Cook Just Enough". Educational materials such as the Food Waste Reduction Handy Guide are shared online and at road shows. We also work with interest groups and NGOs such as Food Bank Singapore and Food from the Heart to increase awareness and drive action in the community.
11. We have developed food waste minimisation guidebooks for food retail establishments, supermarkets and food manufacturing establishments, which guide owners and operators of food and beverage businesses to implement measures to reduce food waste across the supply chain. Guidelines on the proper handling and redistribution of unsold or excess food are incorporated to facilitate food redistribution.

12. I urge everyone to play our part in making green and sustainable lifestyle choices, so as to reduce our carbon footprint and strive towards a zero waste nation.

Question from Ms Joan Pereira: To ask the Minister for the Environment and Water Resources (a) whether PUB conducts regular checks on water meters of residents' homes to ensure that there is no leakage; and (b) what is the follow-up process when residents suspect that their water meters may be faulty.

Reply by Mr Masagos Zulkifli:

Water fixtures and fittings, such as pipes and water taps, undergo natural wear and tear and require periodic repair and maintenance. It is the responsibility of home owners to maintain these fixtures and fittings, to ensure that there is no water leakage within their homes.

2. Water meter readings are taken by SP Services, PUB's billing agent, once every two months. If SP Services detects exceptionally high or low usage, SP Services and PUB will carry out checks and investigations. If the meter is faulty, PUB will replace the meter. If the leak is suspected to involve home water fixtures and fittings, PUB will alert the home owner to look into it.

3. Residents who suspect leaks in their homes can turn off all the taps in the house and check their water meters. If the water meter counter dial is still running, there may be a leak in the home. The resident should then engage a licensed plumber to trace and repair the leak. Residents can also contact SP Services to request for the meter to be checked.

4. By 2023, PUB will install 300,000 smart water meters in new and existing premises through the first phase of its Smart Water Meter Programme. Once rolled out, residents with smart meters will have ready access to their daily water usage data through a mobile application or an online portal, and be promptly alerted to suspected leaks.

Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources (a) in 2018, how much food waste have been generated by (i) residential households (ii) food industries (iii) food and beverage outlets (iv) markets and supermarkets and (v) other sources respectively; and (b) what is the progress for implementing food waste segregation and treatment in each of these sectors.

Reply by Mr Masagos Zulkifli:

In 2018, 763,000 tonnes of food waste was generated. Of this, half was from residential households. The remainder was from other sources, which includes food manufacturers, hotels, shopping malls and hawker centres. The National Environment Agency (NEA) does not track the specific amount of food waste generated from food industries, food and beverage outlets, markets and supermarkets.

2 Food waste segregation and treatment for residential households are currently undertaken on a voluntary basis. From August to October last year, my Ministry conducted a household food waste segregation pilot at Tampines GreenLace. The initial results from the pilot were encouraging and more than 4000 kg of food waste was collected over three months. The pilot has been extended upon the request of residents and my Ministry is currently monitoring the extended pilot together with our partner Zero Waste SG.

3 For commercial and industrial premises, 23 premises have obtained funding support through NEA's 3R Fund to install on-site food waste treatment systems. Another 23 premises have been segregating their food waste and sending it for treatment at the Ulu Pandan Water Reclamation Facility, where it is co-digested with used water sludge.

4 From 2024, my Ministry will require commercial and industrial premises that generate large amounts of food waste to undertake food waste segregation for treatment. From 2021, developers of new developments where large amounts of food waste are expected to be generated will also be required to allocate space for on-site food waste treatment in their building plans. These regulations will be put into effect through the Resource Sustainability Bill that is to be introduced in Parliament.

Mr Christopher de Souza: To ask the Minister for the Environment and Water Resources (a) what measures will be in place to incentivise businesses to rely on sustainable packaging material instead of single-use plastics; and (b) what steps are being taken to deter or reduce the usage of single-use plastic containers or plastic bags in Singapore.

Reply by Mr Masagos Zulkifli:

Packaging waste, including plastics, is one of the three priority waste streams in Singapore. To tackle this issue, my Ministry and the National Environment Agency (NEA) have adopted a holistic approach to reduce the excessive use of all types of packaging, not just single-use plastics. We do not target plastics alone. The NEA conducted a life-cycle assessment of single-use carrier bags and disposables and found that substituting plastics with other types of single-use packaging materials is not necessarily better for the environment. As such, our focus is to promote the use of reusables.

2 The National Environment Agency (NEA) recently launched the nation-wide “Say YES to Waste Less” campaign to drive awareness of the impact of excessive consumption of disposables and the need for reduction. Some 1,600 premises, ranging from retailers, food and beverage establishments, supermarkets, hotels, Community Development Councils, grassroots organisations, schools and non-governmental organisations, have come forward to partner NEA. Partners commit to actions such as prompting customers to bring along reusables, encouraging them to decline disposable cutlery with online orders and displaying campaign visuals at cashier points. NEA has also launched the ‘Towards Zero Waste Grant’ to support individuals, interest groups, non-governmental organisations, grassroots organisations and corporations to initiate or scale up waste reduction and recycling initiatives.

3 Moving upstream, starting next year, NEA will require brand owners, manufacturers and importers of packaged goods, as well as supermarkets with an annual turnover exceeding \$10 million to report information on the packaging they place on the market, and their plans for reducing, reusing or recycling packaging annually. This will increase companies’ awareness of the potential for waste reduction in their business operations. Companies should take action to reduce the amount of packaging used, and minimise waste generation at source. This mandatory reporting framework will also lay the foundation for an Extended Producer Responsibility (EPR) framework for managing packaging waste including plastics, which NEA will put in place no later than 2025.

4 Besides reducing waste, we are taking actions to increase our recycling rate. For example, we are working with the industry to tap on the Towards Zero Waste Grant to roll out 50 reverse vending machines starting this year. Through this initiative, we hope to engage the public to consciously recycle used PET bottles and aluminium cans.

5 At the same time, we are developing the local recycling industry. We want to better extract resources from waste and close the waste loop through a circular economy

approach. NEA is currently studying recycling solutions and technologies, and assessing their suitability for adoption in Singapore. This may include 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. The Government will work with industry stakeholders to explore how these technologies can be applied to Singapore, such that it is both environmentally and economically sustainable. These are efforts which could help grow local enterprises and create good jobs for Singaporeans.

6 Everyone needs to play our part to reduce packaging waste, including single-use plastics. We can do this in different ways. For example, we can opt out of receiving disposable cutlery when ordering food for takeaway or delivery, or we can bring our own reusable bags and containers and take only the plastic bags we need. The support of the public, businesses and the community is key to successfully reducing our packaging waste.

Mr Desmond Choo: To ask the Minister for the Environment and Water Resources (a) whether the Ministry regulates food delivery companies; and (b) how does the Ministry work with food delivery companies to ensure that food is delivered in accordance with food safety guidelines.

Reply by Mr Masagos Zulkifli:

Food delivery companies are responsible for ensuring that the food they deliver is transported in a manner that does not compromise food safety. This includes maintaining the cleanliness of the vehicle, as well as the receptacle and equipment used for the transportation of food, and storing food at the correct temperature. Failure to do so would constitute an offence under the Sale of Food Act and the Environmental Public Health Act.

2 To ensure food safety, the Singapore Food Agency (SFA) has been engaging food delivery companies on the need to adopt good practices in food hygiene and safety. SFA will continue to monitor the industry closely and will tighten requirements to maintain food safety standards if this becomes necessary.

Mr Liang Eng Hwa: To ask the Minister for the Environment and Water Resources (a) what is the total number of smoking related complaints received in each of the past two years; (b) of these, how many were caught smoking in prohibited areas; and (c) how effective has thermal cameras been in enforcing smoking restrictions in prohibited areas.

Reply by Mr Masagos Zulkifli:

The National Environment Agency (NEA) received about 19,000 and 25,000 instances of feedback related to smoking in 2017 and 2018 respectively. In 2018, more than 30,000 tickets were issued by NEA for smoking in prohibited places, up from more than 22,000 tickets in 2017.

2. NEA has made about 90 thermal camera deployments in residential areas with persistent feedback on smoking issues since January 2019. The thermal cameras complement NEA's surveillance in smoking-prohibited places to detect unlawful smoking at common corridors, lift lobbies or staircase landings. These thermal cameras are able to detect objects emitting high heat and capture images of the smoking offence.

3. NEA uses the images captured by the thermal cameras along with other forms of evidence such as public feedback, for investigations. Thus far, about 70% of the deployments have captured smoking incidences, and NEA is investigating these cases. NEA will take enforcement action against smoking offenders whose identities have been established.

4. I urge smokers to be mindful of the health of others, and not light up in smoking-prohibited places. Families and friends of smokers, as well as the general public, can help reinforce the right social norms through reminders. Ultimately, we want to help smokers kick the habit for the benefit of their own health, their loved ones, and the community.

Ms Joan Pereira: To ask the Minister for the Environment and Water Resources whether NEA has done any study to determine the existence of a pattern of where dengue clusters form so that preventive action can be carried out.

Reply by Mr Masagos Zulkifli:

The National Environmental Agency (NEA) has conducted scientific studies to study the risk of dengue transmission across Singapore. One example is the use of big data and geographic information systems to analyse mosquito breeding and dengue transmission patterns. These studies have found that the risk of dengue transmission increases with higher population density, *Aedes aegypti* population, extent of urbanisation and historical incidence of dengue. This provides a useful guide for NEA's vector control operations. For instance, before the traditional dengue season every year, NEA deploys additional manpower to areas identified as higher risk to conduct intensive source reduction activities to remove mosquito breeding habitats.

2 Throughout the year, NEA conducts routine inspections and search-and-destroy operations guided by data collected by the *Aedes* surveillance system, which comprises 50,000 Gravitraps deployed islandwide. Developed in-house, Gravitraps are designed to attract and trap adult female *Aedes* mosquitoes, the vector responsible for the transmission of dengue, chikungunya and zika. The surveillance system shows that a persistently high *Aedes aegypti* population increases the risk of localised dengue transmission and the odds of a dengue cluster forming. An additional 14,000 Gravitraps are progressively being deployed to increase the area of coverage.

3 Everyone has a part to play in preventing the spread of dengue. Between January and June this year, about 70% of mosquito breeding habitats detected in dengue clusters were found in homes. The community must play its part and step up the eradication of mosquito breeding habitats by practising the 5-step Mozzie Wipe-out regularly. Effective source reduction by all stakeholders is key to preventing the formation of dengue clusters and disrupting the transmission cycles of the dengue virus in our community.

Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) what is being done to get the responsible parties to remove the 3,000-tonne heap of scrap rubber materials left at the Sarimbun Recycling Park; (b) whether the Ministry will issue an order for them to remove the materials; (c) how has the heap of materials affected park operations and the surrounding vegetation; and (d) whether such materials pose any health or environmental hazard.

Reply by Mr Masagos Zulkifli:

1. The scrap rubber material is located within one of the plots at Sarimbun Recycling Park (SRP). As the public has no access to the plot and SRP is sited on an old landfill, these materials do not pose any health or environmental risks. There has also been no impact on the operations at surrounding plots in SRP, or on the vegetation surrounding SRP.
2. The SRP plot where the scrap rubber material is located was leased to Morelastic Green Resources Pte Ltd. However, the tenancy was terminated in January 2019 as the company incurred substantial rental arrears. Under the tenancy agreement, it is the tenant's responsibility to remove the scrap rubber.
3. Morelastic Green Resources Pte Ltd has started clearing the stockpile since 17 June 2019 and has removed most of the stockpile. NEA will then reinstate the land, including removal of any remaining stockpile, and recover the associated costs from the company. NEA will also investigate and take firm enforcement action against any environmental public health offences committed.

Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources how much of Singapore's recyclable waste is exported to overseas processors and which countries are the largest receivers of our recyclable waste.

Reply by Mr Masagos Zulkifli:

1. Singapore recycles, on average, around 60% of our total waste generated. In 2018, about 30% of recyclable material, such as paper, plastics, glass and metal, was exported to countries including Australia, China, India, Indonesia, Malaysia, South Korea, and Thailand for processing and recycling.

2. While the bulk of recyclables are already processed locally, my Ministry recognises the need for Singapore to continue building up our local recycling capabilities. This will allow us to better extract resources from waste and close the waste loop through adopting a circular economy approach. NEA is currently studying e-waste and plastics recycling solutions and technologies available in the market, and assessing their suitability for adoption in Singapore in terms of both environmental and economic sustainability

Question: Ms Anthea Ong: To ask the Minister for the Environment and Water Resources (a) whether the five-year project launched in 2014 to measure Singapore's carbon footprint has been completed; (b) if completed, what are the findings of the project; (c) how much reduction in emissions will the carbon tax of \$5 per ton of greenhouse gas emissions is expected to be achieved given that industry is projected to contribute 60.3% of our greenhouse gas emissions by 2020; and (d) what is the expected increased carbon footprint with the impending construction of Terminal 5.

Reply by Mr Masagos Zulkifli:

1. I believe that NMP Ms Anthea Ong is referring to the study undertaken by the National Parks Board to measure greenhouse gas (GHG) emissions and removals from Singapore's Land Use, Land-Use Change and Forestry sector (LULUCF).
2. As a party to the United Nations Framework Convention on Climate Change (UNFCCC), Singapore reports our total GHG inventory across various sectors in our National Communications (NC) and Biennial Update Reports (BUR). In this regard, the National Parks Board undertook a study from 2013 to 2018 to set up a system to measure GHG emissions and removals from Singapore's LULUCF sector. Latest estimates for the reporting year 2014 indicate that the LULUCF sector accounts for about 0.1% of Singapore's net GHG emissions. Details were reported in Singapore's third BUR last year. The study also found that our nature reserves, mangroves, and trees in urban areas served as key carbon sinks that offer significant GHG removals. The BUR is subject to stringent review by international experts under the UNFCCC's International Consultation and Analysis process. Singapore has been commended for its robust, scientifically sound and comprehensive reporting standards of its LULUCF sector.
3. Singapore has comprehensive measures to reduce our carbon emissions. The carbon tax of \$5 per tonne of GHG emissions, which came into effect in January this year, is intended to send an economy-wide price signal to incentivise companies to reduce their emissions where it makes the most business sense. This tax will cover about 80% of our total GHG emissions and complements Singapore's suite of mitigation measures to incentivise emissions reduction and transition to a low carbon economy. Given that this is the first year of implementation, we are monitoring the progress of the carbon tax. We are prepared to spend more than the estimated \$1 billion that will be collected in carbon taxes over the next five years to help our industry and companies improve their carbon efficiency and reduce their emissions.
4. We are also mindful of the need to reduce our carbon emissions from new developments. Changi Terminal 5 is still in the design stage and the carbon footprint has not yet been determined. Changi Airport Group and its consultants are exploring solutions to improve the terminal's energy efficiency.

Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources in the last five years, how many companies have been prosecuted for illegal discharge of wastewater into our public sewage system and how many of these have been second-time offenders and multiple repeat offenders.

Reply by Dr Amy Khor:

1. Under the Sewerage and Drainage Act, companies have to obtain Written Approvals from PUB before they can discharge industrial used water or trade effluent into the sewers. Any discharge has to comply with stipulated quality requirements.

2. PUB has a comprehensive programme in place to tackle discharge which do not comply with quality requirements. This consists of online sensors in the public sewerage system for effective monitoring and early detection, periodic inspections of premises as well as engagement of companies to comply with the quality requirements. These efforts complement the penalty framework that PUB has in place.

3. While most companies abide by the quality requirements, PUB has prosecuted 119 companies since 2014 for illegal discharge of trade effluent into the sewers, where the discharge did not comply with stipulations. Of these, 21 companies are second-time offenders, and another 23 companies committed the offences more than two times.

4. Repeat offenders will face harsher penalties and be subjected to more frequent inspections by PUB. PUB may also suspend or revoke the Written Approval granted to the company for the discharge of trade effluent into the sewers. For severe cases where the discharge contains toxic, dangerous or hazardous substances, PUB will issue an immediate stop-order notice to prevent the company from further discharging trade effluent into the public sewers. The order will be lifted only when the company has implemented remedial measures.

5. We take a serious view of illegal discharge of trade effluent into our sewers. We will not hesitate to take enforcement action against companies that threaten the quality of our water supply.

Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) whether the Ministry will study the impact of the policy on banning single-use plastics in the UK and Ireland; and (b) what is the Ministry's assessment of the likelihood of adopting a similar ban here.

Reply by Dr Amy Khor:

1. My Ministry and the National Environment Agency (NEA) take a keen interest in how other countries manage their disposables. We will continue to study their policies and implementation outcomes, and how they may fit our local context. Our approach has been to reduce the excessive use of all types of disposables, not just single-use plastics, and to promote the use of reusables. We do not target plastics alone. The NEA conducted a life-cycle assessment of single-use carrier bags and disposables and found that substituting plastics with other types of single-use packaging materials is not necessarily better for the environment. As such, our focus is to promote the use of reusables.

2. The NEA launched the “Say YES to Waste Less” campaign last month as part of the Year Towards Zero Waste movement to drive awareness of the impact of excessive consumption of disposables and the need for reduction. Some 1,600 premises, ranging from retailers, food and beverage establishments, supermarkets, hotels, Community Development Councils, grassroots organisations, schools and non-governmental organisations have come forward to partner the NEA in this nation-wide endeavour. Partners commit to actions such as prompting customers to bring along reusables, encouraging them to decline disposable cutlery with online orders and displaying campaign visuals at cashier points. NEA has also launched the ‘Towards Zero Waste Grant’ to support individuals, interest groups, non-governmental organisations, grassroots organisations and corporations to initiate or scale up waste reduction and recycling initiatives.

3. Moving upstream, starting next year, NEA will require brand owners, manufacturers and importers of packaged goods, as well as supermarkets with an annual turnover exceeding \$10 million to report information on the packaging they place on the market, and their plans for reducing, reusing or recycling this packaging annually. This will increase companies’ awareness of the potential for waste reduction in their business operations. Companies should take action to reduce the amount of packaging used, and minimise waste generation at source. This will also lay the foundation of an Extended Producer Responsibility (EPR) framework for managing packaging including plastic waste, which NEA will put in place no later than 2025.

4. Besides reducing waste, we are also taking actions to increase our recycling rate. For example, we are working with the industry to tap on the Towards Zero Waste Grant to roll out 50 reverse vending machines this year. Through this initiative, we hope to engage the public to consciously recycle used PET bottles and aluminium cans.

5. At the same time, we are developing the local recycling industry. Where possible, we want to better extract resources from waste and close the waste loop domestically. NEA

is currently studying recycling solutions and technologies, and assessing their suitability for adoption in Singapore. This may include 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. The Government will work with industry stakeholders to explore how these technologies can be applied to Singapore, such that it is both environmentally and economically sustainable. These are efforts which could help grow local enterprises and create good jobs for Singaporeans.

6. Everyone needs to play our part to reduce packaging waste, including single-use plastics. We can do this in different ways. For example, we can opt out of receiving disposable cutlery when ordering food for takeaway or delivery, or we can bring our own reusable bags and containers and take only the plastic bags we need. The support of the public, businesses and the community is key to successfully reducing our packaging waste.

Question by Mr Christopher de Souza: To ask the Minister for the Environment and Water Resources (a) whether Singapore can be a thought-and-industry leader in how to tackle the effects of climate change, such as rising sea levels; and (b) if polders are a solution for Singapore, how can the spaces above the polders be used as work, live and play spaces.

Answer by Minister:

1 Climate change brings new and existential threats to our country. We are already experiencing impacts such as warmer temperatures, more intense rainfall and prolonged dry spells. Sea-level rise, in particular, poses significant challenges to our city state. Just like how we have tackled our other existential challenges in the past, we are planning decades ahead to overcome the effects of climate change. Building on our 'water story' of resilience and innovation, we will seek to turn constraint into strategic advantage for Singapore.

2 We must first ensure that our adaptation planning is based on robust science. We have made an early start, with the setting up of the Centre for Climate Research Singapore (CCRS) in 2013 to build up knowledge and capabilities in climate science. CCRS is one of the few dedicated climate research centres in Asia Pacific focusing on research in tropical weather and climate. CCRS works closely with our neighbours to study in detail how climate change is affecting Southeast Asia and actively organises programmes to build regional capability in understanding climate science. To deepen our understanding of sea levels around Singapore, CCRS will be launching a \$10 million National Sea Level Research Programme (NSLP) over the next five years. We will continue to develop CCRS to be a leading research centre in tropical weather and climate research in the region.

3 Sound climate science will guide us in developing robust solutions to tackle the effects of climate change. This includes learning from other countries and adapting relevant approaches and technologies to our needs. For example, learning from the Dutch, the Housing & Development Board (HDB) has embarked on Singapore's pilot polder project at Pulau Tekong, which when completed, will be used for military training. We are closely monitoring the implementation of this pilot. The lessons drawn will guide agencies on the feasibility and approach to implementing polders as a coastal protection option.

4 As a small island city state with limited resources, we face unique challenges but can turn these challenges into new opportunities and growth areas. We are 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.

5 Finally, even though we contribute only 0.11% of global emissions, we must continue to do our part. Singapore has adopted forward-looking domestic

mitigation measures, including early actions such as implementing a carbon tax; improving industrial energy efficiency; increasing adoption of solar energy; growing our public transport network; and adopting a circular economy approach to resource management. But the Government cannot do this alone – everyone must play his or her part. Only then can we be a credible partner in contributing to and shaping global agreements on climate change; and importantly, our collective efforts will ensure that we pass on a liveable and sustainable Singapore to future generations.

Question by Mr Christopher de Souza: To ask the Minister for the Environment and Water Resources what steps are being taken towards securing and investing in Singapore's long-term food security even as the world faces climate change and urbanisation.

Answer by Minister:

1 Food security is a national security issue that is closely linked to human life and health. Given that we import over 90% of our food, Singapore is vulnerable to volatilities in the global food market and disruptions in our food supplies. This vulnerability will become more acute in time, as global crop yields are estimated to decline by up to 25 percent by 2050 due to climate change impacts. With such challenges in mind, the Singapore Food Agency (SFA) was formed in April 2019 with the mission to strengthen and ensure Singapore's food security. SFA does so by pursuing three broad strategies, which we call our three "food baskets" – "Diversify Import Sources"; "Grow Local" and "Grow Overseas".

2 For our first food basket, SFA works with stakeholders such as food importers to diversify our food import sources. This ensures that we are not overly reliant on a particular country, and reduces the impact of a disruption in food supply from any one source country. To support this, SFA is accrediting more farms across different countries and geographical regions for food safety to enable them to export to Singapore, and brings importers on food sourcing trips to facilitate import tie-ups. SFA has also introduced requirements for importers of key food items, such as eggs, to adopt plans to mitigate the impact of any supply disruptions.

3 Our second food basket, "Grow Local", will help Singapore reduce our reliance on imports and buffer the impact of overseas supply disruptions. At the Committee of Supply debate earlier this year, I announced that my Ministry has set out to achieve "30 by 30", to develop the capability and capacity to locally produce 30% of Singapore's nutritional needs by 2030. This is a significant jump from our current local production of less than 10%. As SFA works with our agri-food industry to adopt new solutions to raise productivity, these solutions need to also adopt circular economy approaches, to overcome our resource constraints, such as for water and energy. This way, Singapore also becomes more climate resilient.

4 SFA is committed to partnering our food producers in this journey. New farm plots have been tendered out to those with the best concepts instead of the highest bid prices. Through the Agriculture Productivity Fund (APF), SFA supports farmers in their efforts to modernise and harness innovative, sustainable technologies and advanced farming systems. For example, APF supported Singapore Aquaculture Technologies, an existing coastal fish farm, to adopt a closed-containment aquaculture system. In a closed-containment system, the water to culture the fish is separated from the sea water, enabling

fish production to be resilient to fluctuations in external environmental conditions.

5 Furthermore, as announced in March this year, funding of up to \$144 million will be allocated from within the Research, Innovation and Enterprise 2020 (RIE2020) Plan to the Singapore Food Story Research & Development Programme. The programme was jointly developed by SFA and A*STAR to grow a vibrant and forward-looking agri-tech and food ecosystem, with one of the focus areas being sustainable urban food production. Under this, SFA partners the research community to find solutions for the gaps that current technologies cannot solve. Potential research areas include the use of smart sensors in climate-resilient farming systems in tropical aquaculture and urban agriculture.

6 This exciting vision will require us to continue to innovate. One area that is gaining interest is urban farming in alternative spaces such as vacant multi-storey carparks. This involves innovative use of spaces in the urban environment to farm, brings local produce closer to the community, reduces carbon footprint and raises awareness on the importance of food security by involving the community directly in food production.

7 For our third food basket, SFA works with ESG to support our companies to expand and grow overseas. These overseas-based Singapore companies will be able to overcome land and manpower constraints, and access new and bigger overseas markets. This will allow them to bring down costs through economies of scale, and reduce the price of exports to Singapore.

8 SFA will continue to work with agencies, industry and the community to strengthen Singapore's food security.

Question by Ms Joan Pereira: To ask the Minister for the Environment and Water Resources in view of the recent Indonesian forest fires, what measures are being taken to minimise the impact on Singapore and what is the update on the cooperative actions with neighbouring countries under the ASEAN Agreement on Transboundary Haze Pollution (AATHP).

Answer by Minister:

1. The Government adopts a multi-pronged approach to reduce the risk and impact of transboundary haze on Singapore. In Singapore, the National Environment Agency (NEA) continuously monitors the ambient air quality and has been issuing daily advisories to the public on the haze situation since 4 August this year. NEA also chairs an inter-agency Haze Task Force to monitor the haze situation closely during dry seasons and to implement action plans to mitigate the effects of haze should Singapore be affected.
2. Within the region, Singapore works closely with other ASEAN Member States to monitor hotspot activities and undertake measures to reduce forest fires. The ASEAN Specialised Meteorological Centre (ASMC), which Singapore hosts, shares meteorological and hotspots forecasts with ASEAN Member States. ASMC has also set aside \$5 million over the next 5 years to help ASEAN Member States. In addition, the lack of haze in Singapore over the last two years is in no small part due to Indonesia's extensive and continuous efforts to minimise the number of hotspots within the country.
3. Nevertheless, we have been observing persistent hotspot activities in the surrounding region in the past few weeks. Singapore is currently in the Southwest Monsoon season and the NEA is forecasting drier conditions in the coming weeks. These conditions can lead to an escalation of hotspot activities and an increased risk of transboundary haze in Singapore and the surrounding region.
4. At the recent 21st meeting of the Sub-Regional Ministerial Steering Committee (MSC) on Transboundary Haze Pollution in Brunei on 6 August, Singapore and other member countries (Brunei, Malaysia, Indonesia, and Thailand) noted the report by the ASEAN Specialised Meteorological Centre about the potential escalation of hotspot activities in fire-prone areas and increased risk of transboundary haze due to drier and warmer weather. These countries also noted that transboundary haze pollution remains a major concern for the region, and reaffirmed their readiness to enhance cooperation and coordination to address land and forest fires. Singapore has offered technical firefighting assistance to Indonesia and is ready to deploy them, as we did so in 2015, if requested by Indonesia.
5. At the same meeting, MSC member countries also reaffirmed our commitment to the objectives and principles of the ASEAN Agreement on Transboundary Haze Pollution and the Roadmap on ASEAN Cooperation

towards Transboundary Haze Pollution Control with Means of Implementation. The Roadmap serves as a strategic framework to implement collaborative actions to achieve a vision of “Transboundary Haze-Free ASEAN by 2020”. In October 2019, Singapore will be meeting other ASEAN Member States in Cambodia to take stock of the implementation of the Agreement.

Question by Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources (a) whether there are systems in place to assess indoor air quality standards in public places and work places; (b) whether there are measures to enforce certain standards of indoor air quality in public places and work places; and (c) what measures are in place to ensure that materials used in building construction are safe and do not contribute to indoor air pollution.

Answer by Minister:

1 There are measures in place to manage the indoor air quality (IAQ) in buildings. Under the Building Control Act and Regulations, building designs are required to comply with the performance requirements for fresh air intake and ventilation rate as specified in the Singapore Standard Code of Practice for Air-conditioning and Mechanical Ventilation in Buildings (SS 553). Building developers are encouraged to use green building materials, such as low emissions building products certified by the Singapore Green Building Council or Singapore Environmental Council. Indoor environmental quality and the use of green building materials are an integral part of the assessment of a building's environmental performance, to be certified under the Building and Construction Authority's (BCA) Green Mark schemes.

2 Building owners and facility managers should also take guidance from the Singapore Standard Code of Practice for Indoor Air Quality for Air-Conditioned Buildings (SS 554), which specifies good practices in managing IAQ as well as the standards and limits of IAQ parameters. Supplementing the SS 554 are the Workplace Safety and Health Guidelines on Management of Indoor Air Quality in Air-Conditioned Workplaces published by the Workplace Safety and Health Council, which provides guidance to building owners and facility managers on the implementation of IAQ management programmes in workplaces.

3 The National Environment Agency (NEA) conducts IAQ surveys in public places and monitors public feedback on IAQ. The surveys show that most of the causes of poor IAQ are linked to factors such as the use of furnishings or products with high volatile organic chemicals, and inadequate design and maintenance of the building air ventilation system. Hence, NEA has been working closely with relevant agencies to conduct educational sessions on IAQ for building owners and facility managers, to highlight the importance of building ventilation maintenance and raise awareness on choosing low-emissions furnishings or products to maintain good IAQ. NEA also assists building owners and facility managers in identifying the sources or causes of indoor air pollution in their premises, and providing advice on measures to improve IAQ.

4 Building owners, facility managers and occupants all have a role in maintaining good IAQ. Occupants can provide feedback on IAQ to building owners and facility managers to take mitigation measures. Building owners and facility managers should adopt best practices to ensure the buildings are clean and well-ventilated.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) in the past year, how many complaints regarding pet owners not cleaning up after their pets have been received; (b) how many pet owners have been identified and penalised; and (c) whether there are plans to introduce more measures.

Answer by Minister:

Not cleaning up after one's pet is irresponsible behaviour that dirties our environment and inconveniences others. In 2018, the National Environment Agency (NEA) received some 800 instances of feedback concerning pet owners not cleaning up after their pets in public areas. NEA has been investigating these cases and engaging with pet owners where possible. In the past few years, five enforcement actions were taken against errant pet owners.

2 Our main approach to tackling this issue has nonetheless been to foster a culture of responsible pet ownership. To this end, the NEA and the National Parks Board (NParks) have been working hard with community leaders and Town Councils to educate pet owners accordingly at community events, school talks and roadshows. In residential estates where there are cleanliness issues, standees reminding pet owners to clean up after their pets are also placed at prominent locations.

3 Pet owners ought to clean up after their pets in public areas. I urge all pet owners to be considerate and play their part in keeping Singapore clean.

Question by Mr Ong Teng Koon: To ask the Minister for the Environment and Water Resources (a) whether he can provide an update on the number of dengue cases observed nationally and in Woodgrove constituency in the 2nd quarter of this year; (b) what are the reasons for the high number of cases; and (c) what are the latest efforts to contain the spread of dengue.

Question by Ms Joan Pereira: To ask the Minister for the Environment and Water Resources whether the Ministry will consider expediting the trial of Project Wolbachia in the top dengue clusters given the high success rate of this project in eradicating the Aedes mosquito populations.

Question by Ms Joan Pereira: To ask the Minister for the Environment and Water Resources whether the NEA can consider allocating more resources to step up efforts in eradicating mosquito breeding habitats through surveillance and inspections.

Question by Mr Dennis Tan Lip Fong: To ask the Minister for the Environment and Water Resources what are the reasons for the continuing increase in the number of dengue cases this year despite the increase in mitigation measures such as fogging and inspections that have been taken in reported dengue clusters.

Question by Mr Ang Hin Kee: To ask the Minister for the Environment and Water Resources (a) whether the measures taken to reduce the instances of dengue fever have been yielding results; and (b) whether there are other reasons for the high number of cases so far.

Answer by Minister:

As of 24 August, 10,750 dengue cases have been reported, of which 3,892 cases were in the second quarter of this year. In Woodgrove division, 55 dengue cases were reported in the second quarter.

Causes of Surge in Dengue Cases

2 Based on the National Environment Agency's (NEA) surveillance, the surge in dengue cases this year is attributable to three key factors – an increase in mosquito population; the relatively warmer weather; and lower herd immunity in our population. NEA's Gravitrap surveillance system has shown an increase in the Aedes aegypti mosquito population by almost three times, since the last major dengue outbreak in 2013. This persistently high Aedes aegypti mosquito population increases the risk of transmission of the dengue virus. In addition, the mean temperature for the first half of this year was 0.7 degrees higher than the same period last year. Warmer temperatures result in higher transmission of dengue due to the accelerated development of the Aedes mosquito and shorter incubation period of the dengue virus. Due to our past successes in dengue prevention, the proportion of adults who have had dengue before has

progressively decreased from 59% in 2004, to 51% in 2009, and 41% in 2017. This results in lower herd immunity among our population, and a large proportion of Singapore's resident population remains susceptible to dengue.

NEA's Latest Efforts

3 NEA, together with agencies in the Inter-Agency Dengue Task Force and Town Councils, have stepped up housekeeping measures and inspections of common areas to eliminate potential breeding areas. In the first six months of the year, NEA has conducted more than 442,000 inspections island-wide and uncovered about 8,200 mosquito breeding habitats. 60% of the breeding habitats detected were found in residential premises. In dengue clusters, the proportion of breeding habitats detected in residential premises is even higher at 70%. This points to an urgent need for home and premises owners to step up their efforts to eradicate mosquito breeding habitats. NEA will enforce against premises owners found with mosquito breeding and has taken about 1,200 enforcement actions against households between January and June.

4 Since the launch of the national dengue campaign in April, 89 divisions across Singapore have organised more than 1,000 dengue prevention events and activities. Mayors, grassroots advisers, community leaders and dengue prevention volunteers have been visiting homes to share dengue prevention tips, including information on how to identify potential mosquito breeding habitats. To heighten the public's awareness and vigilance against mosquito breeding and dengue, dengue cluster alert banners, posters and notices have also been strategically placed around the estate in dengue cluster areas. Poster walkers have been deployed and dengue prevention advertorials have been displayed at high footfall areas within clusters. NEA has also reached out to the public through TV and radio commercials, as well as digital and social media platforms such as Facebook and Instagram.

5 We are seeing positive outcomes from these collective efforts. As of 24 August, we have closed 863 of the 1,021 clusters formed in 2019. The weekly number of dengue cases has also come down from a high of 664 cases in the second week of July to the current 480 cases in the third week of August. Some of the largest clusters in Woodlands, Upper Thomson, Chai Chee and Pasir Ris, have closed. I would like to take this opportunity to thank all our stakeholders, including the grassroots Advisers, grassroots Leaders, dengue prevention volunteers, town councils and residents, for your efforts.

Additional Initiatives and Resources

6 NEA will continue to work with our partners to enhance the efforts in dengue control. From the second half of 2019, NEA will progressively deploy an additional 14,000 Gravitraps to new HDB blocks and landed estates. This will augment NEA's current network of 50,000 Gravitraps, and enhance our surveillance capabilities. The Gravitraps surveillance system allows NEA to prioritise its resources and deploy officers to focus on areas with high mosquito

population.

7 In addition, since 25 August, NEA has partnered with People's Association (PA) to step up dengue outreach. 5,000 volunteers from PA grassroots organisations and Community Emergency and Response Team (CERT) will work hand in hand with dengue prevention volunteers to conduct house visits and distribute dengue prevention leaflets.

8 Another new initiative by NEA is the sharing of information on areas with relatively higher *Aedes aegypti* adult mosquito population on its webpage, to facilitate targeted action by key stakeholders, community partners and residents. The information aims to increase awareness of dengue risk in areas with high mosquito population which might not yet be dengue clusters, so that stakeholders can pre-emptively take measures to reduce potential mosquito breeding habitats and avoid the formation of new dengue clusters.

Project Wolbachia – Singapore

9 While the results from Project Wolbachia field studies have been promising, the Wolbachia technology has only been tested in small study sites in Singapore, and remains under research and development. It is important for NEA to evaluate the technology rigorously before deploying it on a larger scale. NEA's approach to Project Wolbachia is aligned with the World Health Organisation's and International Atomic Energy Agency's guidelines on developing sterile insect technologies using a phased approach. Each phase of Project Wolbachia has a clearly defined objective, to progress the study and evaluate the technology systematically. The project is now in Phase 3, which aims to determine if the *Aedes aegypti* population suppression achieved thus far can be sustained in larger areas. The release area covers 84 blocks in Yishun and 60 blocks in Tampines and is 3.7 times larger than the release area when Wolbachia first started. It also focuses on the development of automation for male Wolbachia-*Aedes* mosquito production and release, to ensure scalability of the technology. As field studies require prior systematic design, preparation and historical data for comparison, they are not suited for reacting to current dengue clusters, which are very dynamic.

10 Wolbachia technology is also not a silver bullet. It will not replace the community's efforts to ensure good house-keeping, which is still needed to keep our homes and estates free from mosquitoes and dengue. Comprehensive mosquito surveillance, source eradication of mosquito breeding habitats, and spraying of insecticide where necessary to control the adult mosquito population, continue to be Singapore's key strategies for dengue prevention and control.

Conclusion

11 We are still in the peak dengue season, which stretches from June to October. The region around us is similarly seeing an upsurge in dengue cases this year. We need to remain vigilant, and continue to work as a community to

suppress the Aedes mosquito population and keep dengue cases in check. I urge everyone to join in the collective effort to stop the dengue transmission cycle, by regularly doing the 5-step Mozzie Wipeout and to remind your family members, friends and neighbours to remove stagnant water from within and around their homes.

Question by Ms Foo Mee Har: To ask the Minister for the Environment and Water Resources (a) what are the factors contributing to this year's midges outbreak at Pandan Reservoir; (b) how different is this outbreak compared to previous ones; (c) how experience from previous outbreaks has help PUB to stay ahead of the curve in fighting the midges issue; and (d) why PUB has not been able to find a permanent solution to the occasional midges outbreaks.

Question by Ms Foo Mee Har: To ask the Minister for the Environment and Water Resources (a) what are the interventions used by PUB to counter the current midges outbreak at Pandan Reservoir; (b) how effective have these measures been in controlling the midges population and mitigating its impact to the surrounding living environment; and (c) what additional new measures are being contemplated to help the community affected by the outbreak.

Question by Mr Patrick Tay Teck Guan: To ask the Minister for the Environment and Water Resources (a) whether there are other water bodies in Singapore experiencing a midges outbreak like that at Pandan Reservoir; and (b) whether PUB is able to predict, prevent and overcome such outbreaks.

Question by Dr Chia Shi-Lu: To ask the Minister for the Environment and Water Resources regarding the persistent problems created by swarms of midges from Pandan Reservoir (a) what measures are being implemented to reduce the population of these chironomids; and (b) with rising temperatures, whether the Ministry will be considering long-term measures to prevent similar occurrences at this and possibly other reservoirs in the future.

Question by Ms Foo Mee Har: To ask the Minister for the Environment and Water Resources (a) what expertise and resources does PUB have to understand, monitor and prevent midges outbreaks at reservoirs; (b) what are the key indicators that PUB uses to predict and pre-empt an outbreak; and (c) how can residents living near reservoirs be better protected from the outbreaks.

Answer by Minister:

1. Non-biting midges, also known as chironomids, are a type of flying insect that thrive in waterbodies such as ponds, rivers and reservoirs. Midges are part of natural aquatic ecosystems and are food for fishes and birds.
2. Midges can multiply very rapidly with each female adult midge laying up to 500 eggs in the waterbodies. The eggs take a few days to hatch and become larvae which live at the bottom of the reservoir. After about two weeks, they develop to become pupae, swim to the water surface and emerge as adults. The adult midges live for only 1-2 days during which time they remain above waterbodies to mate and lay eggs to continue their life-cycle.

3. Midge emergences occur from time to time in several reservoirs including Pandan, Bedok, Punggol, Serangoon, Poyan, Tengeh and Marina reservoirs, as well as Punggol Waterway. Midge emergences have been known to occur at Pandan Reservoir since the late 1970s. Each emergence can be as brief as two weeks or as long as five months. There are several factors that determine the scale and duration of the emergences including the specific midge species and the environmental conditions such as rainfall, temperature and water chemistry at time of the emergence. We have just experienced a period of hot weather, with July being the second warmest July recorded since 1929. This unusual hot spell hastened the midge's growth process, resulting in the situation at Pandan Reservoir. With climate change, we will experience more extreme weather, which will have a corresponding response from nature.

4. Midges neither bite nor spread diseases. But they pose a nuisance to the public when they swarm in large numbers and being weak flyers, get blown by wind into the surrounding residential estates. PUB takes a comprehensive suite of measures to mitigate this nuisance factor as far as is feasible. PUB monitors for midge emergence at reservoirs with known emergence by conducting frequent checks for larvae in samples of reservoir sediment or adult midges trapped around the reservoir vicinity. At Pandan Reservoir, PUB observed an increase in midge larvae since mid-June 2019. PUB kicked in mitigation measures swiftly when the midge emergence began in mid-July 2019.

5. Similar to what I explained to this House previously in 2016, PUB's mitigation measures for midges include **increasing the frequency and dosage of the application of biological liquid larvicide** within the reservoir to kill midge larvae; and **increasing the frequency of fogging and misting** around the reservoir dyke and surrounding vegetation to kill adult midges. These methods have been proven to kill midges at the relevant stages of their life cycle. PUB has also **installed bright spotlights at the Pandan Reservoir pumping station** and turns them on at night to attract the adult midges as they emerge from the reservoir. By keeping the midges within the reservoir area, PUB can then carry out targeted and effective measures such as fogging at these spots.

6. Unlike the midge emergence at Pandan Reservoir in 2016, the current dominant midge species is considered a rare one that has not been studied in great detail. This species exhibits different behaviours from other species. For example, they hide in drains and culverts in the day and swarm above the drains in the evening.

7. PUB has adapted by adding to the usual suite of measures. They have greased the drain walls to trap the midges when they land to rest and have targeted these areas for fogging. PUB has explored the use of free-moving oily paper within drains to increase the capture rates of adult midges, which have worked very well according to feedback from residents. PUB has also extended the existing 0.5km of netting on the reservoir dyke by an additional 1km. This

netting acts as a barrier to trap adult midges and reduces the number of adult midges that would otherwise be blown to the residential estate.

8. PUB has worked closely with West Coast Town Council to engage affected residents through multiple channels such as dialogues, daily walkabouts and distribution of flyers, and has advised affected residents on the actions they can take within their premises, such as switching off their lights when not in use, as midges are attracted to light, as well as installing insect screens at their windows or drawing their curtains, if needed.

9. But at the end of the day, we have to recognise that man cannot control nature. Midges cannot be eradicated as they are part of the natural aquatic ecosystem, and will emerge to breed, especially when aided by favourable environmental conditions. Climate change will further complicate our efforts. Our reservoirs supply drinking water to the population and we have to be careful to ensure that PUB's mitigation measures, both short- and long-term, do not end up compromising water quality. However, PUB remains committed to working with the Town Councils to minimise public inconvenience caused. While PUB will continue to find more effective mitigating measures, we also seek residents' understanding and tolerance, should they find these insects in their homes.

Question by Ms Anthea Ong: To ask the Minister for the Environment and Water Resources in 2017 and 2018, what is the total amount of food waste generated in Singapore by (i) all the hawker centres (ii) all the hotels (iii) all the caterers (iv) all the meat importers and distributors and (v) all the pre-packed food manufacturers.

Answer by Minister:

In 2017 and 2018, approximately 810,000 tonnes and 763,000 tonnes of food waste was generated respectively. Of this, about half was from residential households. The remainder was from other sources, which includes food manufacturers, importers and distributors, caterers, hotels, and hawker centres. The National Environment Agency (NEA) does not track the specific amount of food waste generated from individual source categories.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) in the past year, how many reports from the public have been received and how many of such reports have resulted in prosecution of the culprit on environmental issues such as littering and dumping; (b) what is the standard protocol for NEA to handle such reports; and (c) when the identity of the perpetrator is known, how long will enforcement action take.

Question by Mr Gan Thiam Poh: To ask the Minister for the Environment and Water Resources (a) since the deployment of surveillance cameras by NEA to address the high-rise littering problem, how many of those caught were repeat offenders; and (b) whether the Ministry will look into further measures to deter such offences and explore further use of technology to bring such offenders to task.

Question by Mr Desmond Choo: To ask the Minister for the Environment and Water Resources (a) whether the Ministry can provide an update on the trend of high-rise littering over the last three years; (b) how effective have NEA's enforcement actions been in arresting the culprits; and (c) whether there are plans to further improve the high-rise littering situation.

Question by Mr Liang Eng Hwa: To ask the Minister for the Environment and Water Resources (a) whether the situation of high-rise littering in housing estates has worsened; and (b) whether there can be a greater deterrence if the public is able to report and submit visual evidence to NEA similar to how the public can now report errant PMD users.

Answer by SMS:

1 The National Environment Agency (NEA) received about 26,000 and 2,700 reports of littering and indiscriminate disposal of bulky items in public places respectively in 2018.

2 Enforcement action is taken when there is substantiated evidence. To this end, NEA first assesses whether sufficient leads are available from the feedback before investigating further. As part of the investigation process, NEA may interview witnesses and suspects, and conduct stakeouts and patrols to identify the offender and ascertain culpability. Cameras may also be deployed, where feasible, to monitor the situation and aid investigations. Once sufficient evidence against the offender is collected, enforcement action will be taken. Depending on the complexity of the case and the response time of the feedback provider and suspected offender, this process generally takes between 10 weeks to 6 months for most cases.

3 In 2018, NEA took about 39,000 enforcement actions against littering in public places, and another 30 for the unlawful disposal of bulky items in public places.

4 To the members' questions on high-rise littering in particular, more than 7,700 reports of such offences were made to the NEA between 2016 and 2018. These figures have remained relatively stable over the past few years, hovering between 2,300 to 2,800 each year. In most cases, the situation improved following outreach efforts conducted by NEA, Town Councils, and grassroots organisations to caution residents against committing such acts.

5 However, there are some who persist with such inconsiderate acts despite our education efforts. To address this, NEA has since 2012 deployed surveillance cameras with video analytics to catch offenders in the act. These cameras have contributed significantly to improving NEA's enforcement effort. Between August 2012 and December 2018, more than 2,200 offenders were caught for high-rise littering, of whom 52 were repeat offenders.

6 Stiff penalties are in place to deter high-rise littering. First-time offenders can be fined up to \$2,000 for each offence, while recalcitrant offenders face fines of up to \$10,000 or Corrective Work Order (CWO) in addition to, or in lieu of, a fine upon conviction. Last year, about 2,600 CWOs were issued. Since May this year, NEA has also introduced standees with CWO-related information during CWO sessions and revamped the design of the CWO vest which offenders don to raise public awareness about CWO, increasing the deterrent effect.

7 The public can report high-rise littering offences through various channels. Members of the public can call NEA's hotline or submit information or evidence of an offence such as photos and video footage through the myENV mobile application.

8 While we have laws to deter littering and other environmental offences, it is more important that we foster collective responsibility for our environment and cultivate positive social norms. To this end, the NEA has been working closely with the Public Hygiene Council and partners of the "Keep Singapore Clean" movement to inculcate the habit of keeping our homes and neighbourhoods clean. Significant resources are devoted to engaging a wide range of stakeholders, including residents, schools, communities, private and public organisations, as well as foreign workers. Many of them conduct ground-up activities such as litter-picking activities, beach and park clean-ups, and cleaner appreciation days, reflecting the whole-of-society approach needed to keep our public places clean. Residents should also bin their litter properly, and contact their Town Councils for assistance in disposing of bulky waste items if they are staying in public estates.

9 The Government will continue with our efforts to develop greater environmental stewardship, but we cannot do it alone. Every one of us must do our part to keep Singapore a clean, green, and sustainable home for our future generations.

A Circular Economy Approach Towards a Zero Waste Nation

1. Mr Speaker Sir, I thank Members for their thoughtful comments, useful suggestions, at times impassioned pleas and above all, unanimous support of the Bill.

Future Economic Opportunities while Managing Regulatory Impact

2. The questions posed by Members in many ways mirror the deliberations and considerations in our design of the regulatory framework. On one hand, doing more and moving faster will allow us to better care for the environment as the threat of climate change is ever growing. Members like Mr Louis Ng and Ms Anthea Ong have given various ideas that we can consider moving forward. On the other hand, we need to be mindful of costs to businesses and consumers. As highlighted by Members Er Dr Lee Bee Wah, Ms Joan Pereira, Mr Desmond Choo, Mr Douglas Foo, Mr Teo Ho Pin, Mr Henry Kwek and Mr Walter Theseira, operating and compliance costs are key concerns for businesses, more so as we enter a period of slowing economic growth. Hence, we have adopted a pragmatic approach to achieve our environmental goals, while managing the impact on businesses and consumers. Let me outline this approach.

3. First, in developing the regulatory framework, we have worked closely with economic agencies to consult over 250 companies and relevant stakeholders. Many gave us useful inputs which we have incorporated. For example, to minimise the reporting burden, NEA will centralise all reporting and submission of documents on one common online platform. NEA will also develop online reporting templates and audit procedures that will streamline processes and reduce manpower needed.

4. In response to industry feedback, we have built in greater flexibility in the implementation of these regulations. For example, producers of non-consumer Electrical and Electronic Equipment (EEE) can collect unwanted products from their customers within a reasonable amount of time after receiving their requests, instead of doing so immediately. The same flexibility is also given to retailers in providing the free 1-for-1 collection service when they deliver products to the customers.

5. Second, we have sought to minimise regulatory impact on smaller businesses. Government regulations often impact these businesses more, as they are less able to benefit from economies of scale. This is why, as asked by Mr Louis Ng, we have set thresholds to exclude smaller producers from joining a Producer Responsibility Scheme, or PRS, or reporting on their packaging use.

6. Third, we have sought to keep our regulatory framework consistent with other jurisdictions. For example, our e-waste EPR framework has incorporated best practices adapted from the systems in Sweden and South Korea and is customised to suit Singapore's context. Our economy is an open one. We import most of what we consume. Many of the companies which will be covered by this Bill also have global presence, including in countries where EPR is implemented. This will allow them to adjust more easily to our EPR system and minimise business costs.

7. Fourth, we will provide sufficient time and support for companies to adjust. As Mr Desmond Choo has suggested, we will stagger the timeline for the regulatory requirements to come into effect. For example, producers of EEE who have exceeded the threshold will have up to 6 months to join the PRS, after they register and report their put-to-market data to NEA. We are also working with industry associations to educate and assist companies with the mandatory reporting requirements for packaging waste and the implementation of their 3R plans. NEA also supports companies through grants. For example, NEA has co-funded 24 on-site food waste treatment systems at premises such as Parkway Parade, Resorts World Sentosa and InterContinental Singapore Robertson Quay under its 3R Fund.

8. Fifth, our regulatory framework must support the development of the Environmental Services Industry to take advantage of the circular economy. Besides ensuring environmental and resource sustainability, this will allow us to maximise economic benefits, by developing the local recycling industry and allowing our companies to export their solutions overseas. At the same time, greater economies of scale and the development of new solutions will help to bring down costs at the system level. According to a 2015 study by the Ellen MacArthur Foundation and McKinsey, adopting a circular economy approach could boost Europe's resource productivity by 3% by 2030 and generate cost savings of €600 billion a year. Another 2015 study by the United Kingdom's Waste and Resources Action Programme found that a circular economy has the

potential to create 1.2 to 3 million jobs in the continent by 2030. We believe that the Resource Sustainability Bill will open up new economic opportunities for Singapore companies and Singaporeans.

9. With these measures, we expect that companies will be able to cope with the new regulations. Similarly, as Ms Joan Pereira and Ms Anthea Ong have asked, we do not expect the cost that may be passed down to customers to be significant. A study on EU's EPR on Waste Electrical and Electronic Equipment (WEEE) showed that the average increase in the prices of products was about 2% after the regulation was introduced – a small fraction of the cost of the product. Producers are unlikely to raise the retail prices of their products significantly, as this will affect their price competitiveness. Moreover, as we aggregate such waste streams and extract value from them, there is potential to bring down costs at the systems level.

Addressing Points of Clarification on Regulatory Frameworks

10. I will now address specific points of clarification raised by Members on the 3 waste streams.

EPR Framework for E-Waste

11. Firstly, e-waste. Er Lee Bee Wah asked about the current e-waste collection and recycling landscape in Singapore. Based on NEA's 2016 study on e-waste disposal patterns, only 6% of our consumer e-waste is recycled. 35%, comprising bulky e-waste such as washing machines, is carted away by the deliverymen when new appliances are delivered. 24% is traded in or re-sold; another 9% is donated; and the remaining 26% is simply thrown away. This is why we are putting in place a formal EPR framework to ensure that e-waste is properly collected and recycled.

12. Mr Louis Ng and Mr Desmond Choo asked about the thresholds and coverage of producers. As I had explained earlier, we have sought to minimise regulatory impact on our SMEs. The threshold levels have been set to cover about 90% of regulated products that are put-to-market by weight. The remaining 10% of regulated products are sold by small producers with small individual market shares. We will monitor the implementation of the EPR framework, and ensure that these thresholds remain relevant.

13. Mr Teo Ho Pin, Mr Christopher de Souza, Mr Daniel Goh and Mr Henry Kwek asked how the regulatory measures will affect e-commerce in Singapore. The regulations will cover all Singapore-registered producers, regardless of the channels through which they conduct their business. For example, laptops which Apple sells in Singapore through its online store will count towards its put-to-market tonnage. Similarly, retailers are obligated to offer a free 1-for-1 takeback when they deliver a product of the same type, even if the product is sold online.

14. However, it is difficult to impose our regulations on overseas suppliers of EEE. This is a challenge faced around the world, including established EPR systems in the European Union (EU). We will closely monitor developments in this area, and consult the local industry further on ways to bring overseas suppliers on board.

15. Nonetheless, Members may be reassured that all consumers will have access to proper e-waste collection and recycling channels, regardless of where they buy their electronic products from. This includes the network of collection points set up by the PRS operator, and contacting the PRS operator directly for takeback. We welcome companies not covered by the regulatory framework to partner with the appointed PRS operator to conduct e-waste collection programmes.

Collection Targets

16. Mr Louis Ng asked how the e-waste collection targets are set. The collection targets set by NEA are based on percentage of consumer products put-to-market by weight. In the first three years, the collection targets will be 60% of Large Household Appliances and 20% of the other consumer products put-to-market by weight. These targets were determined based on consumer e-waste disposal patterns in Singapore and referenced targets set by the EU in the early stages of their EPR implementation.

17. NEA will monitor the amount of e-waste collected and adjust the collection targets accordingly. As the EPR system is new, we will start off with lower targets, and scale them up as the system matures. Over time, we will aspire towards the 65% e-waste collection targets set by the EU for all product categories.

18. As a transitional measure, penalties for missing collection targets will not be imposed on the PRS operator in the first three years. This is because the PRS operator will need time to build up their infrastructure and collection network to optimise collection, as well as raise awareness of the producers and consumers. Even in the EU, which Mr Louis Ng has cited, member states were given a few years to meet their targets.

Informal Sector / Management of Personal Mobility Devices (PMDs)

19. Er Dr Lee Bee Wah asked about the role that the informal sector will play to support the regulatory framework. As individuals are not regulated under the Resource Sustainability Bill, the rag-and-bone men, or *karang guni men*, will be allowed to continue in their trade and collect unwanted EEE.

20. In fact, NEA is seeking to integrate the informal sector into the e-waste collection network that will be established by the PRS operator. This is important given that waste, particularly e-waste, contains hazardous substances and needs to be disposed in a proper manner. The tender documents for the PRS operator will specify that applicants must demonstrate an understanding of how the informal sector currently operates, and develop a plan to integrate them into the collection network. For example, the PRS operator could conduct training for the *karang guni men*, or engage them as logistics provider in the collection network. The appointed PRS operator must follow through with their plans as part of their licence conditions.

21. Er Dr Lee also asked about the management of unwanted Personal Mobility Devices (PMDs) in view of the policy to disallow the use of non-UL2272 certified PMDs on public paths from July 2020. NEA is supporting LTA to develop solutions to allow the public to dispose of unwanted PMDs safely and conveniently, and to ensure the collected PMDs are properly recycled. NEA is assisting LTA with the set-up of designated PMD collection points. When the Bill comes into effect, we will require all producers of PMDs to join the PRS.

Developing the Local Recycling Industry for E-waste

22. Er Dr Lee also rightly highlighted the importance of growing our local e-waste recycling capabilities. Currently, while there is sufficient recycling capacity for ICT equipment and televisions, Singapore faces limitations in recycling large appliances such as refrigerators and washing machines. The EPR framework will play a pivotal role in developing the recycling industry, by financing and driving the demand for recycling services, and by aggregating e-waste into more viable volumes. This will encourage entrepreneurs to enter the market and set up recycling plants and facilities in Singapore. In fact, we are already seeing interest. Several recyclers, both local and overseas, have indicated interest to expand or set-up facilities to recycle large household appliances, batteries and lamps. NEA has been working with relevant agencies to support these interested companies.

Economic Opportunities and Good Jobs for Singaporeans

23. The development of our local recycling industry will not just allow Singapore to meet our recycling needs. As Mr Desmond Choo has pointed out, it has the potential to create economic opportunities and good jobs for Singaporeans. Take TES Singapore, a local e-waste recycler which has expanded to more than 30 locations worldwide, as an example. TES Singapore is currently building a new facility to treat lithium-ion batteries from Electric Vehicles, which is a covered product subjected to EPR under the Bill. As the treatment process involves chemical extraction, new jobs for engineers with specialised skills in this field will be created.

24. Mr Deputy Speaker, the EPR framework for e-waste will indeed bring many benefits to Singapore. More importantly, it will drive resource sustainability by incentivising producers to redesign their products to last longer and for easier recycling. This helps shift mind-sets towards the circular economy approach and sustainable consumption, which Ms Anthea Ong and Mr Christopher de Souza have both emphasised the importance of.

Mandatory Packaging Reporting Framework

25. Mr Deputy Speaker, Sir, I will now cover the mandatory reporting framework for packaging, including plastics.

Obligated Producers and Packaging Coverage

26. Under this framework, companies that import packaged products or use packaging in the course of their business, will be required to submit their packaging data and their plans to reduce, reuse, or recycle to NEA. This covers all packaging introduced along the supply chain, from manufacturing to repackaging, to door-to-door delivery and the point of sale. Packaging introduced by Singapore-registered companies through online platforms to the consumer market will also be captured. For a start, these requirements will apply to brand owners, manufacturers and importers of packaged goods, as well as supermarkets with an annual turnover of more than \$10 million.

Threshold for Mandatory Reporting of Packaging

27. Mr Louis Ng and Mr Dennis Tan asked how this threshold was determined. As explained in my opening speech, the threshold has been set at more than \$10 million in annual turnover for a start, to minimise the impact on micro and small enterprises. The reporting requirements will cover about 4,500 medium and large enterprises in Singapore who put packaging on the market. As we gain experience, we will review and adjust the exemption thresholds to ensure that these are meaningful and effective, when we implement the EPR framework for packaging including plastics, which we will put in place no later than 2025.

28. Er Dr Lee, Mr Louis Ng and Mr Ong Teng Koon asked if we should introduce reduction targets for packaging waste, including penalties for non-compliance. Our approach is to allow companies the flexibility to set their own targets for their 3R plans. We cannot take a one-size-fits-all approach, as the use of packaging is dynamic and varies across sectors and companies, which Mr Henry Kwek has also highlighted. Companies may have different approaches in implementing 3R initiatives which can help them save on costs. They also need time to build up their capability. This is also why we will not penalise companies for failure to fulfil their plans, but instead recognise those who do well and share best practices to level up all companies.

29. NEA will support companies in developing their 3R plans to reduce, reuse and recycle packaging. NEA is working with companies who have successfully implemented 3R initiatives under the Singapore Packaging Agreement to come up with best practices, potential initiatives and key performance indicators, or KPIs to aid companies in developing their 3R plans. NEA is also working with the industry to develop a capability-building programme for companies that will include the sharing of best practices and recognition for companies' zero waste efforts, which were also suggested by Mr Kwek and Professor Lim.

Developing our Local Plastics Recycling Capabilities

30. We are also building up our local plastics recycling capability to better extract resources from plastic waste. Our vision is to close the plastic waste loop locally where feasible, especially given the tightening restrictions on the transboundary movement of recyclables which various Members have highlighted. NEA is currently studying recycling solutions and technologies, and assessing their suitability for adoption in Singapore. For example, this includes 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. This will go hand in hand with the EPR framework for packaging waste that we will establish no later than 2025. The recycling facilities will allow Singapore to turn our plastic waste into higher value products locally, while the EPR will consolidate and ensure sufficient feedstock for the plants to operate in an economically viable manner.

Mandatory Segregation and Treatment of Food Waste

31. I will now address the points raised by Members on the mandatory segregation and treatment of food waste.

Thresholds to Determine Buildings Required to Segregate and Treat Food Waste

32. Er Dr Lee and Mr de Souza asked about the type of buildings that will be covered under this framework. For a start, the requirement to segregate and treat food waste will apply to certain hotels, malls and industrial developments that are large generators of food waste. NEA is currently conducting food waste audits at commercial and industrial premises with food establishments. The information gathered from these audits will help determine the thresholds for large food waste generators.

Benefits of Food Waste Segregation and Treatment

33. Mr Liang Eng Hwa asked about the benefits of on-site segregation and treatment of food waste. While there are costs associated with the installation of on-site food waste treatment systems, businesses are able to reap cost savings from reduced waste disposal costs. Typically, the payback period of a 1-tonne per day on-site food waste treatment system is 5 years. In addition, there are other benefits, such as a cleaner environment, increased value of dry recyclables due to less contamination by food waste, and potential resources generated through the treatment process. Grand Hyatt, for example, saves around \$100,000 a year by treating its food waste into organic fertilisers for the hotel's landscaping purposes.

34. Mr Daniel Goh asked about the options to treat food waste. Food waste can be converted into biogas and compost. Both are useful products and the choice would depend on factors such as the availability of off-takers and economies of scale.

35. Er Dr Lee and Mr Liang have asked if the mandatory segregation and treatment of food waste will be onerous for building managers to implement. We have worked closely with relevant stakeholders in developing the food waste measures and will continue to support them in the implementation. To help the industry better understand and comply with the requirements, NEA has published on its website a list of possible on-site food waste treatment systems that companies can consider using. Building managers of existing premises also have the flexibility to choose the treatment solution that best suits their operations, including off-site treatment at the upcoming Tuas Nexus.

36. We will continue to adopt relevant learning points from successful food waste segregation policies in overseas jurisdictions such as EU Member States, Japan and Taiwan that focus on requiring businesses to segregate food waste for separate collection.

37. Mr Liang, Mr Goh and Mr de Souza also asked if we intend to extend mandatory food waste segregation and treatment to residential areas. We have no plans to do so and we will focus our regulatory measures on facilities that are large generators of food waste. This is consistent with the practices in most other jurisdictions, such as the EU and Japan, where food waste segregation and treatment measures are targeted primarily at commercial and industrial premises. Nonetheless, we will continue to work with the community to identify suitable opportunities to reduce and recycle food waste.

Reducing Food Waste at Source by Businesses and Community

38. As mentioned by Mr Liang Eng Hwa and Ms Cheng Li Hui, NEA has been actively promoting the reduction of food waste generation at source through campaigns and engagements in the communities. Everyone should do our part. As NEA's campaign tagline says: Let's buy, order or cook just enough! Mr Douglas Foo highlighted NEA's series of food waste minimisation guidebooks for food retail establishments, supermarkets and food manufacturing establishments. Similarly, we have also developed a "Guide to Implementing Environmentally-Friendly Best Practices for Events" for the public sector to reduce food waste, as suggested by Mr Dennis Tan. This guide has been shared with public agencies. We will continue to work with them to encourage adoption of the best practices when organising events. The guidebooks share best practices and highlight technologies such as smart bins that can measure, identify and track food waste through sensors and image recognition technology. One such system was developed by a Singapore start-up Good for Food, which Mr Louis Ng and Mr Walter Theseira mentioned.

39. Ms Anthea Ong and Mr Daniel Goh advocated having a Good Samaritan Law, which could encourage the donation of excess food to charities. This is a useful idea and I have asked the SFA and NEA to conduct industry and public consultations to study this further. We should also learn from countries such as the US, Canada and Italy which have implemented such laws. Our approach will have to strike a balance between

managing food waste and ensuring that any food donated is safe for consumption, particularly in our tropical climate.

Everyone Has a Part to Play

40. The Resource Sustainability Bill is a big stride that the Government has taken to catalyse the transition to a circular economy and enhance our Climate, Resource and Economic Resilience. Tackling climate change in a resource-constrained future is such a massive challenge that our fight needs bigger weapons. The shift from a voluntary to mandatory approach in ensuring resource sustainability is not something the Government takes lightly, but only after careful consideration and consultation. The Government cannot do this alone. We need businesses, organisations and individuals to come on board with innovative and effective solutions.

Businesses have been taking the lead

41. We are therefore heartened that many businesses here have taken the lead to implement circular solutions in their value chain. Fuji Xerox, for example, has adopted a closed-loop system where parts and materials are recovered and reused. This has allowed Fuji Xerox to save around 30% of new materials used in manufacturing their products. Nestlé Singapore has saved 2000 tonnes of packaging used for its MILO® products by changing the packaging design and optimising production practices. Not only is this good for the environment, it has also helped Nestlé Singapore to reduce business costs.

42. We are also seeing more packaging-free grocery stores, such as UnPackt. These stores encourage customers to bring their own containers, and allow them to buy what they need instead of a pre-packaged amount. They also offer more competitive prices as going without packaging has reduced the cost of products by some 10%. FairPrice has also started adopting similar practices. FairPrice Vivocity, the largest FairPrice in Singapore, now offers packaging-free grains, nuts, spices and pasta for shoppers to buy loose quantities of these products. This is probably the “nude” zone that Mr Louis Ng is recommending supermarkets to have. We are encouraged by these efforts and welcome more businesses to embrace such practices and go “nude”.

Harnessing the Strength of the Youth and 3P Partners

43. Another key stakeholder is our community. We are harnessing the strength of our youth and our community partners to co-create solutions. Since March this year, MEWR, together with the National Youth Council, has been engaging youth leaders on our environmental policies and programmes. Through their lens, we hope to better understand youth perspectives on climate change, environment and sustainability issues, and empower them to lead ground-up initiatives. For example, the Climate SG Alliance, formed by 18 corporates, educational and civil society leaders, has been promoting education in schools on waste minimisation and educating the community on recycling right. MEWR will also convene a Citizens' Workgroup comprising Singaporeans from diverse backgrounds to co-create solutions that will improve the way we recycle at home. The #RecycleRight Workgroup will kick off its first session on 21st September, and we are looking forward to the ideas from the Workgroup.

Workgroup to Tackle Excessive Consumption of Single-use Plastics

44. We are also keen to co-create solutions to tackle the excessive consumption of single-use plastics. I believe this is an issue that has seized the hearts and minds of many Singaporeans, including of course Members of this House. My Ministry and the NEA are equally concerned. We have been monitoring how other countries manage their single-use plastics. Many have adopted regulatory measures to curb the generation of plastic waste. Plastic bag charges in jurisdictions such as Hong Kong, Ireland, the UK, and the Netherlands, have indeed shown a reduction in consumption of plastic bags.

45. Singapore's approach to addressing excessive consumption of single-use plastics such as plastic bags needs to take into account our unique urbanised, high-rise living context. Most of the plastic bags that Singaporeans bring home from the shops and supermarkets are not “single-use”. We reuse them for other purposes, such as carrying wet items, before eventually using them to bag waste for disposal. This has become a way of life for Singaporeans and ensured that our waste disposal is clean and hygienic. All our waste, including plastics, are safely incinerated. They do not cause the landfill problems that many other

countries that rely on landfills suffer from. A single-use plastic bag may be used for 30 minutes but will be left in the landfill for more than 30 years. We remove any litter that enters our waterways with litter traps and flotsam removal craft and conduct beach and underwater clean-ups. All these measures prevent any litter, including plastics, from ending up in the sea.

46. We all share the goal of tackling climate change and protecting our environment. Nevertheless, Singaporeans have expressed differing views on how to deal with single-use plastics. A recent REACH survey on public sentiment towards disposable plastic bags showed that 9% preferred a ban, 21% a charge and 69% preferred greater public education to reduce usage. For now, the majority of Singaporeans seem to prefer an educational approach to encourage people to consume less.

47. The Government will continue to engage the community and businesses, and listen to their views and feedback. We should take a pragmatic approach and find an inclusive solution that works for Singapore and Singaporeans. This is why we have decided to set up a Citizens' Workgroup for Singaporeans from diverse backgrounds to come together to discuss and identify the way forward for us to collectively tackle the issue of excessive consumption of single-use plastics in Singapore. I note that NTUC FairPrice will run a one-month pilot to charge for plastic bags at seven of its outlets as well as undertake a consumer sentiment survey to gain insights on consumer behaviour. The announcement has elicited strong reactions on social media. We urge Members of this House and the public to support NTUC FairPrice and the trial. I encourage other major supermarket chains like Dairy Farm, Sheng Siong and Prime to do their part too. The insights gained could also help inform recommendations made by the proposed workgroup. We will consider all options and I welcome Members to share their views and ideas too.

Conclusion

48. Mr Deputy Speaker, let me conclude. The Resource Sustainability Bill is a major milestone in Singapore's sustainability journey and a pivotal framework for climate and environmental protection. It will allow us to use our resources and grow our economy sustainably. It will also catalyse innovative circular business models and position our companies to seize opportunities in the region and beyond for waste treatment, recycling or remanufacturing. While change can be catalysed strategically at the level of businesses, community and civic organisations, our individual efforts are important too. We can all make small changes in our daily lives and contribute to protecting our environment. So let us all be part of the solution to secure our collective future.

49. Mr Deputy Speaker, I beg to move.

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". Mr Speaker, Sir, before I begin, I would like to acknowledge the presence of 31 individuals from our 3P sectors, who are here in this house for the reading of this bill.

Zero Waste Masterplan

2 Just last week, my Ministry launched Singapore's inaugural Zero Waste Masterplan, a critical achievement in this Year Towards Zero Waste. This is a limited print edition of the Masterplan. In the spirit of Zero Waste, you can access the Masterplan at our website, towardszerowaste.sg. The Masterplan draws on ideas and contributions from a vast array of the population. It lays out our strategies and policies to close our resource loops via a circular economy approach and to achieve our vision of a Zero Waste Nation. The Resource Sustainability Bill will give effect to the policies and targets outlined in the Masterplan.

3 The Masterplan also marks an important milestone in Singapore's sustainable development journey over the last five decades. Back in the 70s, my family wrapped our household waste in newspapers. Food waste was manually collected in little buckets outside our homes and used as swill in our farms, and in return, we received some eggs. From time to time, we experienced the waft of interesting odours.

4 Today, things are very different. Waste disposal is clean and hygienic, and we make use of pneumatic technology to convey waste from our chutes to a collection point for subsequent disposal. "Clean and green" has become synonymous with Singapore. And we have also demonstrated that environmental protection can co-exist with economic growth. Indeed, we were ranked Asia's most sustainable city in the 2018 Sustainability Cities Index and second in the 2018 World Economic Forum's Global Competitiveness Index.

5 We have come a long way, but we must do more to ensure that the next generation continues to enjoy a liveable and sustainable home. Doing our part for the environment is even more critical now as we seek to address climate change. Someone has said that we should never argue about climate change – it always turns into a "heated debate", if you pardon the pun.

6 But climate change is no joking matter. As highlighted by PM in his recent National Day Rally Speech, climate change is undoubtedly a massive existential challenge confronting our next generation. To tackle climate change, we need a paradigm shift – from the 'take-make-throw' linear model to the circular economy where resources are used over and over again. Efficient waste disposal is necessary, but our goal must first and foremost be to reduce, reuse and recycle; in other words, zero waste. This is the core of the Resource Sustainability Bill.

Tackling the Challenges of Climate Change in a Resource and Carbon Constrained World

7 What we produce, consume, and throw away all have an impact on the climate. According to the Intergovernmental Panel on Climate Change (IPCC) Special Report released last year, current rates of human activity may lead to 1.5°C of global warming above pre-industrial levels by as early as 2030. We must therefore change our current patterns of production and consumption to reduce emissions and limit global warming. Our zero waste efforts will play a key role. They will help cut down on carbon intensive activities along the supply chain, and reduce the amount of heat-trapping emissions we put into the atmosphere.

8 We face a second challenge. Global economic growth is driving resource consumption at an unsustainable rate. Studies show that we are at the limits of Planet Earth's ability to fulfil our resource needs.

9 Take lithium, for instance, which is used in batteries for electric cars, laptops and smartphones. Demand for lithium has tripled in the last decade. Companies which rely on lithium to make batteries, along with cobalt and nickel, warn of impending shortages of such critical materials. The message is clear and ominous. If we do not change our habits, there will simply not be enough resources to sustain our way of life.

Achieving Climate, Economic and Resource Resilience through a Circular Economy Approach

10 Mr Speaker, it is to confront these challenges that my Ministry is working to build up a three-fold resilience for Singapore.

11 First, climate resilience. We must address the existential threats of climate change, especially rising sea

levels, and cope with rising temperatures and extreme rainfall patterns. We are building up our knowledge of climate science to guide our actions to protect Singapore. We are also stepping up efforts to reduce carbon emissions and mitigate climate change. Apart from how we transform our industry, transport and energy sectors to pursue sustainable production and consumption, our zero waste efforts are key.

12 Second, resource resilience. We must overcome global resource constraints, and ensure a safe and secure supply of critical resources such as water, food and other materials. Closing resource loops and turning waste into resource will reduce our vulnerability to global supply shocks. One way that this can be done is through urban mining. A research group from Tsinghua University in China has found that recovering resources like gold, copper and other metals from e-waste is 13 times cheaper than mining them. In the process we do not need to go back to nature to exploit and restore it. The World Economic Forum estimates that 50 million tonnes of e-waste, equivalent to 120,000 jumbo jets, are produced globally each year. Of this, only 20% is recycled. Imagine the potential in urban mining, as precious metals can be mined from e-waste, and energy from food waste. What more if NewSand can be “mined” from incineration bottom ash! We can then “save” Semakau and extend its useful life beyond 2035. Figuratively speaking, we can look at Semakau not as a landfill for trash but as a treasure island right in our very own backyard.

13 Third, economic resilience. For Singapore companies to continue to thrive in the future economy, they must adapt to the growing constraints on carbon and other resources. Globally, a number of businesses are already taking the lead to adopt a more circular supply chain. This could entail using recycled materials as raw materials, extending the life-cycle of products or recovering resources from products at the end of life. Unilever has introduced post-consumer recycled waste materials into products such as dishwashing liquid bottles, with some of their brands using 100% recycled PET packaging. Similarly, automobile companies like General Motors and BMW are working with renewable-energy storage suppliers to create an aftermarket for end-of-life batteries for electric and hybrid vehicles.

14 These new business models will open new economic opportunities and create good jobs for Singaporeans. Preliminary studies have estimated that if Singapore recovers and reuses materials from e-waste, we can reap a net benefit of \$40 million. This includes indirect benefits such as helping our companies export overseas and creating jobs.

15 Singapore must adopt a circular economy approach to build these 3 resiliencies and sustain future growth. We must make every effort to close our resource loops and reuse our resources for as long as possible. This is not new to us. We have done so for water, and even for waste streams such as construction and demolition waste. This is the approach we must also take for other resources.

16 Mr Speaker, it is in this spirit that we move this Bill.

Closing Resource Loops: Beginning with Our Three Key Waste Streams

17 Mr Speaker, the Resource Sustainability Bill will, for the first time, put in place a systems-level approach that mandates key responsibilities to enable re-use and recycling nation-wide. This will complement and support the voluntary efforts of our people and private sectors.

18 The Bill will bring our regulatory framework upstream. It will send economic signals to producers such as manufacturers and importers to take into account the cost of environmental externalities. It also encourages innovation and the 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.

19 We will target the three priority waste streams of electrical and electronic waste, or e-waste, packaging waste including plastics, and food waste. Let me explain why we are focusing on these waste streams.

20 E-waste generation is growing exponentially with rising affluence. Singapore generates about 60,000 tonnes of e-waste annually, yet very little is recycled. This translates to each person throwing away the equivalent of six mobile phones every month. Such waste may contain heavy metals and other hazardous substances, and improper disposal may lead to the contamination of our environment and harm public health. Precious metals like gold are also being thrown away. We will introduce the Extended Producer Responsibility or EPR approach to e-waste by 2021, to ensure the proper handling and extraction of resources from e-waste. This will mandate producers of covered electrical and electronic equipment (EEE) to be responsible for the collection and proper treatment of their e-waste. All producers of covered EEE will need to register with NEA. Producers which exceed the prescribed threshold will need to join the Producer

Responsibility Scheme (PRS) and finance the collection and recycling of e-waste. In return, the PRS operator will be responsible for meeting e-waste collection targets set by NEA.

21 To minimise the regulatory impact on smaller players, we have set thresholds to exempt smaller producers, which supply about 10% of the consumer products that are put-to-market in Singapore by weight, from joining the PRS. This means that producers of 90% of the consumer products put-to-market in Singapore will be subject to the EPR framework. We will monitor the implementation of the EPR framework, and ensure that these thresholds remain relevant.

22 The next priority waste stream is packaging waste, including plastics. We generate large amounts of this - around a third of the total domestic waste disposed of in Singapore. Almost all of this packaging material is incinerated. This ensures that the environmental impacts are managed effectively, and our packaging, including plastics do not end up in the sea, mangling creatures such as cute baby dugongs in Thailand. However, we ought to do more to reduce and recycle packaging. External forces are also changing the economics of the recycling industry. China's ban on the import of plastic waste has shifted the trade patterns of plastic recyclables. As a result, our plastics recycling rate, which hovered around 10%, dropped to 4% in 2018. We cannot continue with business as usual. We can and must do more to better manage packaging, including plastics.

23 As a start, next year, we will implement mandatory reporting of packaging data and plans to reduce, reuse or recycle packaging, including plastics. The requirements will apply, for a start, to companies with an annual turnover above \$10 million. This will cover approximately 4,500 medium and large enterprises in Singapore who put packaging on the market. Micro and small enterprises will be exempted. This reporting will focus management attention on the packaging that companies are placing on the market and spur reduction efforts that will save them costs. This will lay the ground for an EPR framework for packaging waste, which will be put in place no later than 2025, if not earlier.

24 Third, food waste is a major waste stream with high generation tonnage and low recycling rates. In 2018, we generated 763,000 tonnes of food waste. Of this, only 17% was recycled. From 2024, we will make it mandatory for the owners and occupiers of commercial and industrial premises which generate large amounts of food waste, to segregate their food waste for treatment.

25 We will also require owners and occupiers of new buildings which are expected to be large food waste generators, to treat food waste on-site. In preparation for this, we will require developers of new buildings which are expected to be large food waste generators, to make provisions for on-site treatment of food waste, in development plans submitted from 2021. These new requirements will ensure that food waste from large food waste generators is diverted for treatment or converted into useful products, such as compost and animal feed, instead of being incinerated. This will also reduce odour and pest nuisances at the premises, and reduce the contamination of recyclables by food waste, allowing for greater resource recovery.

26 We will complement the regulatory frameworks with other measures. These include educational campaigns, co-creation efforts with the community and grants to support ground-up initiatives. For example, NEA launched the "Say YES to Waste Less" campaign in June as part of the Year Towards Zero Waste movement to reduce the excessive consumption of disposables and packaging and encourage the use of reusables. NEA has also launched the 'Towards Zero Waste Grant' to support individuals, interest groups, non-governmental organisations, grassroots organisations and corporations to initiate or scale up waste reduction and recycling initiatives. A vibrant Zero Waste ecosystem will encourage our citizens to reduce, reuse and recycle. Our regulatory measures will be key in incentivising producers to play an active role in building this Zero Waste ecosystem with us.

Key Features of the Bill

27 Mr Speaker sir, let me now highlight the main elements of the Resource Sustainability Bill.

28 Part 3 of the Bill establishes the EPR framework for e-waste. Clause 8 requires producers as defined in the Bill to register with NEA in order to supply regulated products, and Clause 12 requires larger producers above a threshold to join a Producer Responsibility Scheme (PRS) before they can supply regulated consumer products. For producers of regulated non-consumer products, Clause 13 requires them to collect any of such products upon request by customers at no charge.

29 Clause 14 requires retailers to offer a 1-for-1 collection of an unwanted product at no charge when retailers deliver a product of the same type to a customer. Clause 15 requires large retailers to provide in-

store collection of e-waste. Retailers are important stakeholders in this EPR framework for e-waste, and are often the interface with consumers.

30 To ensure that e-waste is properly managed and disposed of, Clauses 16 and 17 lay out restrictions on the collection and disposal of e-waste to ensure proper treatment.

31 The next part of the Bill, Part 4, establishes the mandatory reporting framework for packaging, including plastics. Clause 20 requires producers of specified packaging that fulfil the threshold criteria to report on the packaging they introduce onto the Singapore market. They will also be required to submit plans to NEA to reduce, reuse or recycle packaging under clause 21. As mentioned earlier, the threshold criteria will, for a start, be set at an annual turnover of above \$10 million.

32 Part 5 establishes the mandatory segregation of food waste for treatment for buildings which are large generators of food waste. Clause 25 requires occupiers of a prescribed building to segregate their food waste and dispose of it in a facility provided by the building manager, who will be obligated to provide such facilities under clause 26. Clause 27 requires the building managers of prescribed buildings to also ensure the treatment of all food waste.

33 Part 6 covers the requirements on operators of the PRS. They are fundamental in any EPR framework as they establish the network for public collection of the regulated waste, and ensure that the waste collected is properly treated and recycled. Clause 28 will require operators of the PRS to be licensed. Clauses 30 to 32 empower NEA to determine the conditions of the licence and to take necessary actions to ensure effective operation of the PRS. As NEA will be providing the licensee with certain information submitted by obligated producers for the purpose of the EPR, clause 36 makes it an offence for the licensee or former licensees to disclose any confidential information received from NEA. This will ensure the confidentiality of data to safeguard the interests of producers.

34 Part 7 contains the provisions necessary for the enforcement of the Bill. Clauses 37 to 40 empower authorised officers to request for information and documents from any person, and enter any non-residential premises to investigate or monitor compliance with the provisions of the Bill. Clause 41 penalises anyone who hinders an authorised officer in the performance of his or her duty.

35 Part 8 contains miscellaneous provisions necessary for the administration of the Bill. As a large part of the regulations is dependent on information furnished by the obligated persons, clause 42 makes the provision of any false or misleading information an offence. To safeguard information, clause 43 prohibits NEA from disclosing any confidential information or document except in accordance with the clause.

36 The penalties laid out in the Bill are in line with other similar legislation, such as the Energy Conservation Act and the Environmental Public Health Act.

Conclusion

37 Mr Speaker, it is clear that business as usual in the way we produce and consume is not sustainable. The impacts of climate change and the carbon and resource constraints we face respect no geographical or national boundaries. The Resource Sustainability Bill is an integral part of our strategy to close resource loops through a circular economy approach to mitigate and adapt to climate change. Not only will it contribute to environmental sustainability, it will also help to build up the three resiliences – climate, economic and resource. Only by doing so can we create a sustainable Singapore of tomorrow and secure our collective future for our children.

38 Mr Speaker, I beg to move.

Question by Miss Rahayu Mahzam: To ask the Minister for the Environment and Water Resources in light of the recent Singapore Climate Rally (a) what are the Ministry's plans to engage the climate enthusiasts in novel ways to raise awareness of high levels of overconsumption, waste reduction and our carbon footprint; and (b) whether the Ministry will also consider leveraging on this movement and lead the efforts in the region.

Answer by Minister:

1. Groups coming forward to raise awareness of, and taking action against climate change, is not a new development. More groups have come forward since Singapore designated 2018 as our Year of Climate Action to rally businesses, households and individuals to take collective action for a sustainable future. These include community groups, grassroots organisations, corporations, schools and non-governmental organisations (NGOs). In fact, over 800 climate action-related events were initiated and organised by our partners during the year. We have also received more than 341,000 climate action pledges from individuals, organisations and educational institutions.

2. The Government is heartened by the latest ground-up efforts by youths to generate greater public awareness of climate change. Climate change poses existential challenges for Singapore, including rising sea levels, extreme weather, and potential threats to our water and food supply. We need all Singaporeans to come on board to address these issues collectively, and with urgency.

3. To sustain the momentum for climate action, we designated 2019 as our Year Towards Zero Waste, to encourage Singaporeans to treasure our resources and make it a habit to Reduce, Reuse and Recycle. We are also nudging businesses to adopt a circular economy approach, and engage in sustainable production and consumption, so that we can reduce the amount of waste we generate. This will in turn reduce the amount of carbon emissions.

4. In July this year, we also launched the inaugural Climate Action Week, which we will be holding annually to sustain climate action. The week began with our Partners for the Environment Forum which gathered over 200 participants from the People, Private and Public (3P) sectors for discussions on climate change, and waste reduction and circular economy initiatives. This was followed by a series of ground-up activities and events organised by our 3P partners, including businesses, NGOs and youths.

5. Youths are important agents of change, and we have been actively reaching out to them and the broader community to encourage environmental stewardship. Earlier this year, MEWR worked with two youth-led environmental groups, Zero Waste SG and LepakInSG, to co-organise and facilitate focus group discussions on our inaugural Zero Waste Masterplan. The National Climate Change Secretariat also held a public consultation exercise on how Singapore can be a low-carbon global city state, which wrapped up end of last month.

6. Moving forward, we want to partner Singaporeans to co-create and co-deliver solutions to address our sustainability challenges. MEWR has convened our first Citizens' Workgroup, where 48 Singaporeans of diverse backgrounds are working together to look at how we can improve the way households in Singapore recycle. Next year, we plan to convene a second Workgroup to look at the excessive consumption of single-use plastics. We welcome youths and members of the public to join us in co-creating practical solutions to make Singapore more sustainable.

7. To broaden our outreach and engage key stakeholders, my Ministry has embarked on various collaborations with partners. One example is the Climate Action SG Alliance (CASA), which was set up in 2018 by a group of corporate and civil society leaders. The Alliance has 20 members, and includes youth-led groups such as Singapore Youth for Climate Action. CASA has initiated a series of projects to galvanise businesses and public to take action for the environment. Two members of the Alliance, Sembcorp and Eco-Business, just recently released a new video to raise awareness of the contamination in our blue recycling bins, and to educate the public on how to recycle right. Many of our partners have also engaged the public on climate action through activities such as movie screenings, dialogues and festivals. To encourage more ground up initiatives, we have provided support for projects related to waste reduction and recycling through our 'Towards Zero Waste Grant', which was announced at the start of the year. We encourage individuals, interest groups, NGOs, grassroots organisations and corporations to apply for the grant.

8. Singapore's efforts to address climate change goes beyond our shores. We participate actively and constructively in international negotiations at the annual Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). In July 2018, we convened the first ever Special ASEAN Ministerial Meeting on Climate Action (SAMCA). This October, we will also be hosting the United Nations' Intergovernmental Panel on Climate Change (IPCC) meetings for the first time. To help build

our community's understanding of key issues in international environmental negotiations, we have facilitated the participation of Singapore NGOs in the United Nations Environment Assembly in 2018 and 2019.

9. The government's joint efforts with our 3P partners have demonstrated that Singapore can come together as a nation to address the challenges of climate change. We must continue on this journey of sustainable development. By working together to raise awareness and take collective action, we will ensure that Singapore remains a vibrant and liveable city for our future generations.

Question by Ms Irene Quay Siew Ching: To ask the Minister for the Environment and Water Resources what is the correct disposal method for household pharmaceutical waste consisting of cytotoxics, antibiotics and controlled drugs.

Answer by Minister:

Generally, household pharmaceutical waste, including those consisting of cytotoxics, antibiotics and controlled drugs, can be safely disposed of together with household general waste. All our household waste is collected by licensed waste collectors and safely incinerated at our waste-to-energy incineration plants before the ash is landfilled at Semakau Landfill.

Question by Mr Leon Perera: To ask the Minister for the Environment and Water Resources (a) how many insect farms are currently located in Singapore; (b) what types of insects are currently allowed to be cultivated in Singapore; and (c) whether there are plans to allow for post-consumer food waste to be used for insect farming to help in recycling food waste.

Answer by Minister:

There are currently two licensed establishments in Singapore that rear insects. One of them is licensed by the Animal & Veterinary Service (AVS) as it rears insects for pet food.

2 The other is licensed by the Singapore Food Agency (SFA) as it rears insects to produce animal feed. This establishment rears Black Soldier Fly Larvae (BSFL) using waste streams from local food manufacturing companies such as okara (a by-product of soybean milk and tofu manufacturing), and spent brewery grains. The BSFL are processed into aquaculture feed for fish.

3 As part of the licensing requirements for establishments rearing insects to produce animal feed, SFA requires that the substances used to feed the insects are properly handled and traceable to ensure the safety of insect-derived animal feed.

4 Insects can be a good alternative source of feed for animals reared for food, due to their high feed conversion efficiency. This also supports Singapore's efforts to pursue circular economy approaches to reduce waste and be more environmentally sustainable.

5 However, insect farming is still a developing field. SFA is closely monitoring developments in this area, such as rearing practices, research and scientific literature, as well as relevant regulations adopted by overseas regulatory authorities. SFA will continue to refine its regulations and support for insect farming in Singapore.

Question by Mr Pritam Singh: To ask the Minister for the Environment and Water Resources when will the NEA life cycle assessment study on plastics be made public in its entirety for the use of academics, professionals and the lay public so as to promote an evidence-based approach to climate solutions suited for the Singapore context.

Answer by Minister:

The National Environment Agency (NEA) commissioned a lifecycle assessment (LCA) study on carrier bags and food packaging in September 2016, in order to take an evidence-based approach to the issue of disposables in Singapore. It was conducted by Associate Professor Kua Harn Wei from the National University of Singapore (NUS) School of Design and Environment (SDE) and his team of researchers from SDE and NUS Environmental Research Institute.

2 NEA released a factsheet on the key findings in 2018. The key findings showed that every type of material (including bio-degradable and paper materials) imposed different environmental impacts, and that consumers can reduce their impact on the environment by opting to use reusable bags and food containers, instead of disposables. We therefore encourage the public to reduce the excessive consumption of all types of disposables and to use reusables where possible.

3 NEA will work with NUS to release more information on the study, focusing on the methodologies and assumptions. This approach will enhance readability and ease of understanding by the general public. We will release the additional information when ready.

Question by Mr Gan Thiam Poh: To ask the Minister for the Environment and Water Resources (a) in the past five years, which is the most common area that residents have neglected resulting in mosquito breeding; (b) how many areas are at common areas (i) outside their house and (ii) within their house respectively; and (c) how many houses have been forced open for inspection in the absence of a response from owners/tenants.

Answer by Minister:

From 2014 to 2018, the National Environmental Agency (NEA) conducted an average of 1.3 million inspections annually, which uncovered more than 17,000 mosquito breeding habitats each year. The most common mosquito breeding habitats found in homes were domestic containers such as pails, dish trays, flower pot plates, and ornamental containers such as vases. The most common habitats detected in common areas were closed perimeter drains, discarded receptacles and gully traps.

2 NEA takes a systematic and holistic approach to arrest dengue transmission in Singapore. NEA conducts Gravitrap surveillance, regular inspections of premises for potential breeding sites, and intensive search-and-destroy operations to remove mosquito breeding habitats. Through NEA's public communication efforts and the support of grassroots organisations, most residents understand the danger of dengue transmission and have been cooperative in facilitating NEA's home inspections.

3 For premises which NEA officers are unable to gain access to, for example when no one is at home, NEA will serve a letter to the owner or occupier to arrange for another date to inspect the unit. If our officers are still unable to enter the premises at the next inspection, a legal notice under Section 35 of the Control of Vectors and Pesticides Act (CVPA) will be served to the occupiers, requiring them to open their homes for inspection at a specified time. If the owners or occupiers still fail to contact NEA and all attempts to contact the owners or occupiers via neighbours, grassroots, neighbourhood police and official records again fail, NEA will invoke Section 36 of the CVPA to gain entry into the premises to check for mosquito breeding. From 2014 to 2018, 214 homes were inspected under Section 36 of the CVPA.

4 We need to remain vigilant and continue to work as a community to prevent mosquito breeding and keep dengue transmission in check. Everyone can play a part in preventing dengue by regularly doing the 5-step Mozzie Wipeout.

Question by Mr Ang Hin Kee: To ask the Minister for the Environment and Water Resources whether the Ministry plans to align and standardise the colour codes of all recycling bins beyond housing estates to the shopping malls, hotels, offices and industrial estates for easy recall and identification as there is currently no consistency in how bins are labelled and can be confusing to users.

Answer by Minister:

Currently, owners of commercial and industrial premises have the flexibility to choose the type and colour of recycling bins and recycling bin labels used on their premises. This is to cater to the different considerations that building owners may have, such as the recycling culture and awareness level of building occupants, space availability, and the overall design and aesthetics of the premises.

2 Notwithstanding this, my Ministry and the National Environment Agency (NEA) will study further the standardising of recycling bin colours. The NEA will consult the various stakeholders involved, such as waste collectors and building owners.

Questions:

Ms Joan Pereira: To ask the Minister for the Environment and Water Resources (a) what measures will be implemented to help Singaporeans and residents cope with the worsening haze and air pollution; and (b) whether these measures will include the installation of air filter equipment in places frequented by the public, distribution of masks and public education on ways to minimise the impact on health.

Mr Alex Yam Ziming: To ask the Minister for the Environment and Water Resources (a) how successful has the 2014 Transboundary Haze Pollution Act been in mitigating the annual threat of haze; (b) to date, how many successful cases have been investigated under the Act; (c) how many cases are currently under investigation; and (d) whether our neighbouring countries have been cooperative in providing assistance for investigation requests.

Mr Alex Yam Ziming: To ask the Minister for the Environment and Water Resources in view of public feedback on the perceived "inaccuracies" of the 24-hr Pollutant Standards Index forecast currently used by NEA, whether the Ministry will consider adopting the hourly Air Quality Index now cast alongside the 1-hour PM2.5 concentration readings to assuage public concerns

Mr Charles Chong: To ask the Minister for the Environment and Water Resources what is the number of companies and individuals who have been investigated and prosecuted under the Transboundary Haze Pollution Act since commencement of the Act in 2014.

Mr Murali Pillai: To ask the Minister for the Environment and Water Resources (a) what steps has Singapore taken to promote the sustainable production of palm oil, pulp, paper and other commodities from plantations so as to disincentivise plantation owners and farmers from using the slash and burn method of clearing land that causes transboundary haze; and (b) what is the Ministry's assessment of the effectiveness of these steps.

Mr Murali Pillai: To ask the Minister for the Environment and Water Resources what steps have been identified to overcome the difficulty of gathering evidence against entities believed to have caused transboundary haze in contravention of the Transboundary Haze Pollution Act 2014.

Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources whether there are plans for the Government, businesses and the community to work hand-in-hand to distribute N95 masks to low-income and vulnerable seniors when the Pollutant Standards Index readings hits very unhealthy or hazardous levels.

Mr Christopher de Souza: To ask the Minister for the Environment and Water Resources what can Singapore do to make it commercially unviable for companies in the region to operate slash and burn tactics for clearing of land.

Dr Lim Wee Kiak: To ask the Minister for the Environment and Water Resources in light of the haze recurrence (a) whether measures and action plans implemented previously to help our neighbours are no longer effective; and (b) what is the action plan moving forward to help our neighbours prevent or reduce the hot spots for the long term.

Mr Lim Biow Chuan: To ask the Minister for the Environment and Water Resources whether NEA is able to identify any land owners in Indonesia who are responsible for the burning of forest land that causes haze and whether any prosecution action will be taken against these land owners.

Ms Foo Mee Har: To ask the Minister for the Environment and Water Resources (a) how the cost of haze pollution to Singapore can be estimated; and (b) what are the Government's estimates of previous years' cost impact arising from haze pollution on health, education and business.

Ms Foo Mee Har: To ask the Minister for the Environment and Water Resources (a) how effective has the Transboundary Haze Pollution Act 2014 been in holding companies and individuals accountable for causing haze pollution; and (b) what is the number of perpetrators who have been prosecuted under the Act.

Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) what are the haze assistance efforts extended to Indonesia this year; (b) how much of the assistance efforts have been accepted; and (c) what are the long-term collaboration plans with leaders in the region to mitigate transboundary haze.

Mr Liang Eng Hwa: To ask the Minister for the Environment and Water Resources how can the Government minimise and manage the impact of haze on the public and the Government's policy in the distribution of the national stockpile of N95 masks.

Assoc Prof Walter Theseira: To ask the Minister for the Environment and Water Resources (a) whether and to what extent the Transboundary Haze Pollution Act has been effective at addressing transboundary haze; (b) what is the progress on existing investigations under the Act of the 4 firms linked to the 2015 haze; and (c) whether the Ministry will consider strengthening the Transboundary Haze Pollution Act with financial incentives for whistleblowers who contribute substantially to the identification and prosecution of entities contributing to haze pollution.

Prof Lim Sun Sun: To ask the Minister for the Environment and Water Resources why there have been no prosecutions to date under the Transboundary Haze Pollution Act 2014 despite the ample legal and evidentiary mechanisms available under the Act.

Mr Dennis Tan Lip Fong: To ask the Minister for the Environment and Water Resources whether he can provide an update on (i) the outlook for haze affecting Singapore in the months ahead; (ii) diplomatic efforts to mitigate haze generation in Indonesia; and (iii) domestic efforts to mitigate the public health impact.

Ms Sylvia Lim: To ask the Minister for the Environment and Water Resources how has the enactment of the Transboundary Haze Pollution Act 2014 enhanced Singapore's response to transboundary haze pollution.

Ms Sylvia Lim: To ask the Minister for the Environment and Water Resources (a) what are the considerations behind NEA's decision to report air quality based on 24-hour PSI and 1-hour PM 2.5 readings; and (b) what is the Government's assessment of the utility of the above readings to the population vis-a-vis other indices or measures.

Answer by Minister:

1. Haze has affected ASEAN for years. It has been a perennial scourge in our region, affecting millions of people. Haze pollutes the air we breathe and sets back global efforts in tackling climate change. The 2015 fires in Indonesia generated nearly 1 gigatonne of carbon dioxide; more than half of the 1.5 gigatonne that was saved from the increased use of renewable energy by the whole world for that year. A study by Professor Euston Quah and Associate Professor Chia Wai Mun from Nanyang Technological University estimated that the cost to Singapore of the 2-month long 2015 haze episode was \$1.83 billion or 0.45% of our GDP, taking into account factors such as health cost, loss in productivity, and impact on tourism and business. This year, fires in Indonesia have released 360 million tonnes of carbon dioxide since August, more than Spain's emissions for the whole of 2018. Lives have been lost, and the health and livelihoods of millions impacted.

2. The Government adopts a multi-pronged approach to tackle transboundary haze and mitigate its impact on Singaporeans.

3. First, we have been undertaking diplomatic and regional efforts to tackle the haze problem. As early as April, I have written to my Indonesian counterpart to convey Singapore's readiness to assist Indonesia in tackling land and forest fires. When the haze situation in Singapore worsened in September, CEO of National Environment Agency (NEA) wrote to his counterpart on 16 September to convey concerns about the haze situation and details of the fire-fighting assets that Singapore could activate to help Indonesia deal with the escalating number of hotspots. We also sent Indonesia a diplomatic note on the same day. On 19 September, CEO (NEA) wrote again to his counterpart after Indonesia announced that it had sealed off plantations operated by several companies, including Singapore-registered ones, after detecting fires in their concessions. CEO (NEA) requested for the offences committed and further information from the Indonesian government to support NEA's investigations. We sent Indonesia a diplomatic note on 20 September

expressing our concerns over the escalation of hotspots and sought their assistance to enhance measures on the ground to prevent and mitigate the occurrence of forest and land fires. Additionally, CEO (NEA) wrote on 4 October to his counterpart to further request information on all companies suspected of intentionally burning land. We have yet to receive any response from the Indonesian government thus far.

4. Singapore is supportive of the Indonesian government's continuing efforts to suppress the forest and land fires. We recognise President Joko Widodo's personal attention and efforts in tackling this problem. The key is to prevent the fires from starting in the first place. Errant individuals and companies whose actions jeopardise the health and lives of people in ASEAN and which set back our efforts to fight climate change must be held accountable. Strong enforcement action must be taken against perpetrators and to deter others.

5. Singapore also works closely with other ASEAN Member States to monitor hotspot activities to support measures to reduce fires. For more than two decades, the ASEAN Specialised Meteorological Centre (ASMC), which Singapore hosts, has been sharing regional weather and haze outlook, and satellite information with ASEAN Member States. The ASMC plays a critical regional role. Its technical assessments and updates on the haze situation, along with the ASMC's meteorological forecasts and data on hotspot activities, support efforts to prevent, detect and fight fires. In addition, Singapore is helping fellow ASEAN Member States build their capability in haze monitoring as well as weather and climate prediction. Singapore has contributed \$5 million to the ASMC for a 5-year regional capability building programme.

6. But we also need greater urgency and political resolve, as well as closer cooperation amongst ASEAN countries and stakeholders if we are to make progress towards a haze-free ASEAN. This is why Singapore has been participating actively and contributing at all regional haze-related meetings, such as the 21st meeting of the Sub-Regional Ministerial Steering Committee (MSC) on Transboundary Haze Pollution held in Brunei on 6 August. The MSC is an annual ministerial-level meeting which is convened in the run-up to the dry season in the Southern ASEAN region. This year's meeting noted the ASMC's report about the potential escalation of hotspot activities and increased risk of transboundary haze due to drier and warmer weather. I reminded ASEAN Member States that transboundary haze remained a major concern for the region and the need for preparedness. MSC member countries (Brunei, Malaysia, Indonesia, Singapore and Thailand) had reaffirmed their readiness to enhance cooperation and coordination to address land and forest fires.

7. At the same meeting, MSC member countries also reaffirmed their commitment to the objectives and principles of the ASEAN Agreement on Transboundary Haze Pollution (AATHP) and the Roadmap on ASEAN Cooperation towards Transboundary Haze Pollution Control with Means of Implementation. The ten ASEAN countries, which are signatories to the AATHP, will meet in Cambodia on 8-9 October 2019 to take stock of the implementation of the Agreement and discuss how to further enhance its implementation. SMS Amy Khor will lead the Singapore delegation at the coming meeting. She will reiterate our concerns about the detrimental effects of haze, its impact on climate change and global emissions of greenhouse gas, and urge all ASEAN Member States to take strong action to prevent the recurrence of haze.

8. Second, recognising that strong enforcement on the ground is needed to prevent the recurrent fires, Singapore enacted the Transboundary Haze Pollution Act (THPA) in 2014 to send a strong signal that we will not tolerate the irresponsible actions of errant companies, whether Singapore-based or otherwise, that harm our environment. In 2015, NEA issued legal notices under the THPA to six companies to take immediate measures to stop the fires that caused haze that affected Singapore. Two of the companies have responded and explained that they were no longer associated with the affected lands. Upon further investigation, NEA accepted their explanation and closed these two cases. As for the other four companies, their cases are still open. A director of one of these companies was served a THPA Notice to be interviewed by NEA when he was in Singapore. When he failed to turn up for the interview, a court warrant was obtained to secure his attendance when he next enters Singapore. NEA is on the lookout for other directors of these companies, and will similarly require them to assist in the investigations when they are in Singapore.

9. Singapore therefore welcomes the Indonesian Ministry of the Environment and Forestry's efforts to pursue action against errant companies culpable for the fires, subjecting them to the full extent of the law, and pursuing necessary evidence to do so. As mentioned earlier, CEO (NEA) has written to his Indonesian counterpart to request for more information pertaining to this year's fires, so that we can investigate on our end. For this year's haze episode, NEA is closely monitoring the situation and will update as appropriate. We hope that the Indonesian government will work with Singapore and other countries in the region by sharing substantiated information that could help identify companies suspected of causing fires. Indonesia should also publish information on land ownership and concession boundaries that can help ascertain which

companies are involved. Indonesia's cooperation in this will be useful and necessary in providing the evidence of wrongdoing by any company that has contributed to haze in Singapore.

10. The THPA complements the efforts of Indonesia and other countries to hold companies to account and is not intended to replace their laws and enforcement actions. We respect the sovereignty of others but States also have a responsibility to ensure that the activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction. Given that these fires occur abroad, regional cooperation remains crucial in resolving transboundary haze pollution. We are pleased that Malaysia is also considering similar legislation. We remain committed to work with other countries to find a solution, as well as collaborate through ASEAN and other international platforms such as the UN.

11. The THPA is not a panacea or the only tool to fight transboundary haze. Although none of the investigated companies has been prosecuted yet, the THPA has nevertheless put added pressure on companies to behave responsibly. We have no plans to amend the THPA at this moment.

12. Third, consumer choices and demand play a crucial role in shaping the practices of forestry and palm oil industries. As more consumers opt for sustainable products, this will incentivise companies to adopt more sustainable practices which in turn contributes to reducing haze. For example, under the World Wildlife Fund Singapore's Southeast Asia Alliance on Sustainable Palm Oil (SASPO), efforts are being led by the industry and there is growing momentum towards adopting sustainable and responsible practices. The Singapore Environment Council (SEC) has established the enhanced Singapore Green Labelling Scheme (SGLS+) to help consumers identify sustainable pulp and paper. This certification demands full disclosure of the company's supply chain, imposes the legal sourcing of all fibre, has a zero-burning policy and includes fire and peatland management. Assessment is done through site audits, evaluation and risk assessments of companies' concession lands. As of 26 September 2019, 10 companies have achieved the SGLS+ certification. SEC will take punitive actions such as revocation of certification if there is proof of wrongdoing relating to companies of SGLS+ certified pulp and paper products.

13. Financial institutions can exercise influence over regional forestry and palm oil companies, and promote the adoption of sustainable practices through their lending and investment activities. The Association of Banks in Singapore (ABS) released a set of responsible financing guidelines in October 2015, comprising environmental, social and governance (ESG) criteria. In 2017, the ABS released the Haze Diagnostic Kit which provides best practices guidelines for member banks to assess their clients' commitments to haze risk management. To support climate-related disclosures, the Singapore Exchange introduced the "Comply or Explain" Sustainability Reporting Guide for listed companies, beginning from the financial year ending on or after 31 December 2017. Another important signal is that our investment entities do not invest in errant companies. Temasek Holdings has stated publicly that they consider ESG factors when making decisions as an investor looking to deliver returns on a sustainable basis and they fully support no burn policies for land clearance. GIC has also stated that they integrate sustainability considerations holistically into their investment processes.

14. Fourth, to provide the public with timely information to safeguard their health and well-being, NEA has been issuing daily advisories on the haze situation since 4 August this year. The daily advisories provide the forecast of the Pollutant Standards Index or PSI for the next 24 hours which could be used as the basis for major decisions, such as school closure. This is in addition to the 1-hour PM_{2.5} levels and 24-hour PSI which are updated every hour and are available online and on the MyENV mobile application.

15. During transboundary haze episodes, PM_{2.5} is the dominant pollutant and has the most influence on the PSI. The 1-hour PM_{2.5} levels provide an indicative measure of the current air quality, and is a useful indicator to guide immediate activities, such as whether or not to exercise outdoors.

16. Fifth, to minimise the impact of haze on the public, the Government has since 1994 set up a Haze Task Force (HTF), comprising 28 government agencies. This is led by NEA. The HTF convened in early May this year, before the dry season, to begin preparations for a potential haze situation. With the onset of haze in mid-September, the HTF agencies have been rolling out actions to protect the health and well-being of the public, especially the more vulnerable groups such as the elderly, pregnant women, children, and people with chronic lung and heart diseases.

17. The Ministry of Health (MOH) worked with our healthcare institutions (including public hospitals, polyclinics and nursing homes) to prepare for any increase in the number of cases of haze-related conditions and on the timely activation of haze preparedness measures. These measures include using air purifiers and fans, and reducing ambient temperature by deploying portable air coolers where appropriate. Our public healthcare institutions are also monitoring patients closely for possible health effects of the haze and will institute appropriate medical intervention where necessary.

18. In addition, all classrooms of primary and secondary schools, Ministry of Education (MOE) Kindergartens and Special Education schools have been equipped with air purifiers to enhance the well-being of students during a haze situation. Teachers will also be on the lookout for students who are unwell or have pre-existing lung or heart conditions. Contingency plans are in place should there be haze during the examinations period.

19. The HTF has also ensured that additional stocks of N95 masks are pushed out to retail shops, and there are sufficient stocks in the warehouses and government stockpiles. The Singapore Government has a national stockpile of 16 million N95 masks. The HTF has plans in place to distribute N95 masks to vulnerable and needy residents if the 24-hour PSI crosses into the "Very Unhealthy" (PSI 201-300) range. N95 masks are, however, not required for short exposure, like commuting from home to school or work, or in an indoor environment. The elderly, pregnant women and those with severe lung or heart problems who have difficulty breathing at rest or on exertion should consult their doctor as to whether they should use the N95 mask.

20. We have considered cloud-seeding but there is a lack of reliable means to validate its effectiveness for Singapore. Given our small size and the variability of winds, the induced rain, if any, may not fall directly over our island.

21. In the first half of October, the Southwest Monsoon is expected to transition to inter-monsoon conditions characterized by light and variable winds and increased showers. Some parts of the region can still experience periods of dry weather in October, and hotspot activities may persist in parts of Sumatra and Kalimantan. However, the change in wind conditions will help to reduce the risk of transboundary haze affecting Singapore.

22. NEA will continue to monitor the haze situation closely. For updates, members of the public can visit the NEA website (www.nea.gov.sg), MSS website (www.weather.gov.sg), the haze microsite (www.haze.gov.sg), mobile apps (myEnv and Weather@SG) or follow NEA Facebook (www.facebook.com/NEASingapore) and NEA Twitter (@NEAsg). For information on the distribution of hotspots detected over the past fortnight in the region, please refer to the ASEAN Specialised Meteorological Centre (ASMC) website at asmc.asean.org.

Questions:

Mr Ong Teng Koon: To ask the Minister for the Environment and Water Resources (a) what percentage of Singapore's carbon emissions is currently contributed by air-conditioning, vehicle transport, and waste incineration; and (b) how can Singapore become more efficient in these activities.

Mr Leon Perera: To ask the Minister for the Environment and Water Resources (a) what is the carbon footprint generated by the waste incineration process in Singapore; and (b) whether measures such as carbon capture and sequestration or carbonation of bottom ash are in place or being considered to reduce this.

Answer by SMS Amy Khor:

1 Singapore generated 52.5 million tonnes of carbon dioxide equivalent of greenhouse gas (GHG) emissions in 2017. The buildings and household sectors contributed around 19% of our total GHG emissions, of which a sizeable portion would have been for air-conditioning. The land transport sector contributed around 14%, and the incineration of municipal solid waste at waste-to-energy plants contributed around 3% of our total GHG emissions.

2 Singapore is fully committed to reducing our emissions under our Paris Agreement pledge. We have put in place a comprehensive suite of measures to reduce our emissions across all sectors. These measures are complemented by the economy-wide carbon tax which came into effect this year.

3 Under the Building Control Regulations, all new buildings and buildings undergoing major retrofitting are required to achieve a minimum sustainability standard. BCA's Green Mark Scheme also encourages building owners and developers to achieve higher energy efficiency, such as by reducing a building's cooling demand and adopting more efficient cooling systems. NEA has also put in place the Mandatory Energy Labelling Scheme (MELS) to encourage consumers to purchase more energy-efficient household air-conditioners, and introduced the Minimum Energy Performance Standards (MEPS) to phase out the less efficient appliances from the market.

4 In the transport sector, we aim to make public transport the preferred mode of travel in Singapore and to encourage active mobility such as walking and cycling. By 2040, we target for 9 in 10 peak period journeys to be taken using public, active and shared modes of transport, and for these journeys to be completed within 45 minutes. We have already capped the vehicle population in Singapore at zero growth, except for commercial vehicles. We also encourage the adoption of cleaner vehicles including electric vehicles, and are working with the industry to develop infrastructure for our public, shared and private transport vehicles.

5 We are diverting waste away from incineration by focusing on efforts to reduce, reuse and recycle. Under the Zero Waste Masterplan launched in August, we outlined how Singapore is adopting a circular economy approach to waste management, where resources are kept in use for as long as possible. The Resource Sustainability Act that was recently enacted gives legislative effect to the regulatory framework that we will put in place to better manage the three priority waste streams of electrical and electronic waste, or e-waste, packaging waste including plastics, and food waste. These measures will contribute not only to reducing carbon emissions and closing the resource loop for these key waste streams, but will also extend the lifespan of our only landfill at Semakau.

6 We are closely monitoring global developments in carbon capture and sequestration. There are no plans to incorporate these technologies into our current waste management infrastructure at this moment. However, we will continue to study the feasibility of such technology, taking into consideration factors such as the maturity of the technology, and the costs and benefits of applying it to the Singapore context.

7 Tackling climate change requires a whole-of-nation approach. Individuals also play a key role in our climate mitigation efforts. We can all choose to make climate-friendly choices and adopt a more sustainable lifestyle, such as setting the air-conditioner temperature at 25 degrees Celsius, practising the 3Rs (reduce, reuse, recycle), and taking public transport.

Question from Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources in light of some cities in the region conducting water rationing (a) whether Singapore will suffer the same fate; (b) what is the outlook on water adequacy in Singapore; and (c) what advice does the Ministry have for businesses and residents in Singapore.

Answer by SMS:

As the Member rightly pointed out, some cities in the region have conducted water rationing in recent months. In Thailand, rice farmers were affected by the worst drought in a decade and were forced to queue up for water for irrigation. In the Philippines, residents of Metro Manila faced water supply interruption due to falling dam water levels. In Malaysia, water rationing was conducted in certain parts of Johor in September and October, as several dams were affected by critically low water levels due to dry weather.

2 Singapore has also been affected by the dry weather from July to September. The water level at Linggiu Reservoir fell below 50% in September 2019, as PUB had to discharge more water from the Linggiu Reservoir to supplement water flowing in the Johor River, in order to meet the total abstractions of both Malaysia and Singapore from the Johor River. If the Linggiu Reservoir fails, the Johor River may suffer low water levels, which will compromise Singapore's right to abstract our full entitlement of 250 million gallons of water per day under the 1962 Water Agreement. We are following up with Malaysia on identifying appropriate and timely measures, including additional schemes, to increase the yield of the Johor River. In Singapore, you may also recall photos on social media showing the falling water levels at the Botanic Gardens Eco Lake and Bedok Reservoir due to the dry spell.

3 That said, there has not been a need for nationwide water rationing in Singapore since 1964. This did not happen by chance. Over the years, Singapore has developed a robust and diversified supply of water, as a result of our early and consistent investments in water infrastructure and research and development. We have augmented our water supply with weather-resilient sources, namely NEWater and desalinated water. Along with water from local catchment and imported water, they make up Singapore's "Four National Taps". However, the production of NEWater and desalinated water is energy intensive and costly. While PUB continues to invest heavily in technology to reduce the energy consumption, we call on everyone to use water prudently and avoid wastage.

4 To drive home the water conservation message, PUB conducts water rationing exercises with schools and the community. Earlier this March, over 100 schools undertook water rationing exercises in support of the GoBlue4SG movement, as part of the Singapore World Water Day celebration. In addition, PUB has been encouraging homes and industries to use water more efficiently, including the use of more efficient fittings and appliances, implementing water recycling projects and adopting water conservation practices. PUB refreshed its "Make Every Drop Count" campaign to profile the hard work involved in water treatment, and to remind Singaporeans that every drop of water must be used wisely. The sustainability of our water resources can only be assured if all of us treat water as a precious resource, and are committed to save water as a way of life.

5 With climate change, Singapore has and will experience more extreme weather patterns, and prolonged dry spells will affect us. Even as the government continues to invest in infrastructure and technologies to tackle the challenges posed by climate change, everyone must play their part to conserve water. Together, we can “Make Every Drop Count”.

Question by Mr Saktiandi Supaat: To ask the Minister for the Environment and Water Resources in light of plans for a large number of coal-fired and gas-fired Independent Power Producers in the region (a) how many of these projects is Singapore involved in; and (b) how can Singapore play a leading role in renewable energy financing.

Answer by SMS Amy Khor:

1 Investments into power projects in the region, as with other investments, are commercial decisions that businesses and financial institutions make to maximise their long-term risk-adjusted returns, amongst others. Nonetheless, as the financial sector increasingly incorporates Environmental, Social and Governance (ESG) considerations into their business decisions, we are witnessing a re-channelling of funds away from traditional projects to more sustainable ones such as those involving cleaner renewables. For example, in April this year, our three local banks announced their decisions to cease financing of new coal-fired power plants.

2 My Ministry supports the financial sector in making this transition, and works with the Monetary Authority of Singapore (MAS) to promote the broader green financing initiative in Singapore including increasing the financial sector's awareness of environmental risks and opportunities.

3 MAS works closely with the industry to provide guidance on managing ESG risks and support climate-related disclosures. The Association of Banks in Singapore (ABS) issued the Guidelines on Responsible Financing in 2015 to support responsible lending by banks, particularly in industries with higher ESG risks, including the energy industry. The Singapore Exchange (SGX) introduced a "comply-or-explain" regime for sustainable reporting for all listed companies, beginning from the financial year ending on or after 31 December 2017.

4 To spur the use of capital markets instruments and promote the adoption of standards for green investment products, MAS introduced the Green Bond Grant Scheme in 2017. The grant helps to offset the cost of obtaining an external review to ensure that the green bonds are aligned with internationally accepted standards. To date, over SGD 6 billion of green bonds have been issued in Singapore. The grant scheme has been expanded in February this year to include social and sustainability bonds, and renamed the Sustainable Bond Grant Scheme.

5 My Ministry will continue to work closely with all stakeholders to build on these efforts and develop Singapore's competitive edge, not just in renewable energy financing, but across green financing.

Question from Mr Dennis Tan Lip Fong: To ask the Minister for the Environment and Water Resources (a) how is NEA working with funeral professionals to ensure that our departed loved ones are treated with dignity when taken into their care; (b) whether there has been any recent consultation with the industry on enhancing present regulations and practices; (c) whether any enhancements are expected; and (d) whether there are plans for a legislative and regulatory framework to govern the industry and to protect bereaved families.

Answer:

The National Environment Agency (NEA) regulates funeral parlours to ensure that these facilities meet specific public health requirements. As part of the regulatory regime, NEA conducts periodic inspections of funeral parlour premises. NEA also engages the funeral services industry regularly on issues related to after-death services.

2 Earlier in the year, NEA had conducted a round of environmental hygiene inspections of all 21 licensed funeral parlours with embalming facilities. Following these inspections, NEA issued a circular to remind licensed operators of their responsibilities under the licensing conditions, along with advice on the appropriate handling of the deceased.

3 Beyond ensuring environmental public health, after-death services should be provided in a manner that is in accordance with religious practices and cultural preferences, and accords dignity to the deceased and comfort to bereaved families. In August this year, as part of continuing efforts to improve standards, NEA had engaged funeral directors and funeral parlour operators to seek their views on how the provision of after-death services could be enhanced. NEA is reviewing the suggestions from this engagement. We will continue to work with the Association of Funeral Directors Singapore, funeral directors and funeral parlour operators, in consultation with religious groups, to enhance the standards of after-death facilities and services in Singapore.

Question from Dr Teo Ho Pin: To ask the Minister for the Environment and Water Resources whether the Ministry can provide details on how Singapore's car industry disposes of car batteries and what measures are in place to ensure that batteries and chemicals are not disposed off indiscriminately into our water catchment areas.

Answer:

There are three main types of car batteries in the market today. They are lead acid batteries for regular cars, and lithium-ion and nickel metal hydride batteries for electric and hybrid cars.

2 Lead acid batteries contain lead which is harmful to the environment and human health, and acid which is corrosive. Spent lead acid batteries are classified as Toxic Industrial Waste (TIW) under the Environmental Public Health (TIW) Regulations. They are required to be collected and disposed of by Toxic Industrial Waste Collectors licensed by the National Environment Agency (NEA). Lead acid batteries that have reached their end-of-life are usually removed from cars at workshops and collected by licensed Toxic Industrial Waste Collectors. These collectors must adhere to safety practices in the collection and transportation of the lead acid batteries, and are prohibited from disposing of the batteries indiscriminately, such as in general waste bins, public areas or water catchment areas.

3 Lithium-ion and nickel metal hydride batteries from electric and hybrid cars are typically removed from cars at workshops, car dealerships or scrapyards, and sold to local e-waste recyclers or exported for resource recovery treatment.

4 In 2021, the NEA will implement the Extended Producer Responsibility (EPR) approach to manage e-waste, which will cover lithium-ion batteries and nickel metal hydride batteries. Under the EPR framework, producers who bring the products to market are responsible for the collection and proper treatment of their waste. The Resource Sustainability Act will give effect to the EPR framework.

5 In the case of lithium-ion batteries and nickel metal hydride batteries, authorised dealers and parallel importers of electric or hybrid cars will be the designated producers. These producers will be required to provide free take-back and disposal services for all end-of-life batteries, or engage an operator who will organise the collection of batteries from scrapyards, workshops, and dealerships, and ensure that the collected batteries are properly disposed of at licensed e-waste recyclers. NEA will also impose recycling requirements that all e-waste recyclers must meet. They include requirements for the proper handling and treatment of e-waste as well as material recovery targets. NEA is working closely with Land Transport Authority (LTA) and industry stakeholders on the operational details.

Question from Mr Desmond Choo: To ask the Minister for the Environment and Water Resources (a) whether photographs or video recordings of high-rise littering and feeding of pigeons can be used to prosecute perpetrators; and (b) if so, how can the Ministry work with the community and law enforcement agencies to bring more culprits to task.

Answer:

1 The National Environment Agency (NEA) deploys surveillance cameras with video analytics to catch high-rise littering offenders. These cameras have helped improve NEA's enforcement efforts, leading to more than 2,200 offenders being caught since deployments began in 2012.

2 The National Parks Board (NParks) similarly installs cameras and conducts surveillance at identified feeding hotspots to curb pigeon feeding. It also works with Town Councils to put up notices to solicit information about feeding activities in order to carry out targeted enforcement operations.

3 Members of the public can submit photos and video-recordings of high-rise littering and pigeon feeding incidents to NEA and NParks respectively to aid the agencies' investigations and enable more targeted enforcement operations against such offences.

4 While there are laws against high-rise littering and pigeon feeding, it is more important that we foster collective responsibility for our environment and cultivate positive social norms.

5 To this end, NEA works closely with grassroots leaders and community organisations to address feedback and raise awareness among residents by distributing advisories against high-rise littering during home visits and promoting graciousness and civic-mindedness at community events. It also collaborates with the Public Hygiene Council and partners of the nationwide "*Keep Singapore Clean*" movement to inculcate the habit of keeping our homes and neighbourhoods clean. NParks and the Town Councils have also been working together to educate residents about the issues caused by pigeon feeding through advisories, posters, and outreach events.

6 The Government will continue to enforce against high-rise littering and curb pigeon feeding, but we cannot do it alone. Every one of us must do our part to keep Singapore a clean, green, and sustainable home for our future generations.

Question from Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources (a) how does the Ministry ensure that the food delivery process and carrier bags comply with hygiene standards; and (b) whether the Ministry will consider requiring all food delivery workers to attend compulsory food hygiene and handling courses.

Answer:

Food delivery companies are responsible for ensuring that the food they deliver is transported in a manner that is safe to eat and does not compromise food safety. This includes maintaining the cleanliness of the vehicle, as well as the receptacle and equipment used for the transportation of food, including carrier bags; and storing food at the correct temperature. Failure to do so would constitute an offence under the Sale of Food Act and the Environmental Public Health Act. The Singapore Food Agency (SFA) has been engaging food delivery companies on the need to adopt good practices in food hygiene and safety.

2 Food delivery workers are not directly involved in the preparation of food, such as the washing and cutting of raw food, and the processing of ready-to-eat food. Therefore, there is no requirement for them to attend and successfully complete the Basic Food Hygiene Course. Nonetheless, SFA will continue to closely monitor the industry and will tighten requirements to ensure food safety if this becomes necessary.

Question from Mr Mohamed Irshad: To ask the Minister for the Environment and Water Resources whether the Ministry has plans to directly install or encourage the installation of more water dispensers and water coolers in shopping centres, public transport stations and office buildings, to reduce the consumption of bottled water.

Answer:

My Ministry encourages the installation of water dispensers and coolers in Singapore. This supports Singapore's Zero Waste efforts by reducing the consumption of bottled water, and also supports our War on Diabetes. According to latest figures compiled by the Singapore Food Agency, we import about 17 million bottles of water per month from Malaysia alone. Given that water from the tap in Singapore is perfectly safe to drink, we can and should definitely do more to reduce consumption of bottled water.

2 The National Environment Agency (NEA) has installed water dispensers in all 26 MEWR-owned hawker centres which NEA operates, and will do so in all our upcoming new hawker centres. NEA is also working with the Ministry of Health (MOH) and Town Councils on providing water dispensers in the HDB-owned hawker centres, as the common areas in these centres are managed by the Town Councils.

3 Owners of other premises are also encouraged to install water dispensers and water coolers. For example, under the Green Mark for Healthier Workplaces scheme which Building and Construction Authority (BCA) and the Health Promotion Board (HPB) jointly developed, companies are awarded points for providing water dispensers in office premises. HPB's Singapore HEALTH Award also recognises companies for such efforts to create a healthier workplace.

4 My Ministry also encourages all event organisers to use water dispensers and reusable cups instead of plastic bottles. Event organisers may refer to the "Best Practice Guide for organising environmentally-friendly events" that is available on the Towards Zero Waste website.

Question from Ms Cheryl Chan Wei Ling: To ask the Minister for the Environment and Water Resources what long-term measures will be introduced to curb the extensive amount of packaging used in delivery of online purchases.

Answer:

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- Packaging waste is a priority waste stream identified in Singapore's Zero Waste Masterplan. We are putting in place a regulatory framework to reduce, reuse and recycle packaging under the Resource Sustainability Act.

2 Next year, we will implement mandatory reporting of packaging data and plans to reduce, reuse or recycle packaging. This includes packaging used in the delivery of online purchases. This reporting will focus companies' attention on the packaging that they are placing on the market and increase their awareness of the potential for reducing packaging use in their operations. The requirements will apply to manufacturers and importers of packaged goods, as well as supermarkets with an annual turnover of more than \$10 million. This includes Singapore-registered e-commerce companies that are also manufacturers and importers of packaged goods, as well as online supermarkets. However, it is difficult to impose our regulations on overseas e-commerce companies. This is a challenge faced around the world. We will closely monitor developments in this area and consult the local industry on ways to bring these companies on board.

3 The reporting framework will lay the foundation for an Extended Producer Responsibility framework to manage packaging waste including plastics, which will be put in place no later than 2025 or even earlier. We will also complement the regulatory framework with measures such as educational campaigns and co-creation of solutions. We will convene a Citizens' Workgroup next year to discuss and identify the way forward for us to collectively address excessive consumption of single-use plastics in Singapore. My Ministry will continue to work closely with all stakeholders to reduce the consumption of packaging waste.

Question from Ms Cheryl Chan Wei Ling: To ask the Minister for the Environment and Water Resources whether there are plans to request manufacturers to provide information to consumers on the recycling classification of their product packages or by displaying marks on their packaging to increase public awareness on how to recycle.

Answer:

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We currently have no plans to require manufacturers to provide consumers with the recycling classification of their product packaging or to display such labels on their packaging. In countries that require consumers to sort and segregate their recyclables, recycling labels are useful to inform consumers of the material that the packaging is made of. Consumers are then able to deposit the packaging in the appropriate recycling bin.

2 However, Singapore adopts a commingled approach for the collection of household recyclables under the National Recycling Programme. The public does not need to sort their recyclables according to material type. All recyclables are collected in the same bin and transported to material recovery facilities where they are sorted, baled and sent for recycling. The commingled approach makes recycling more convenient for the public, takes up less space and facilitates more efficient collection of recyclables.

3 My Ministry and the National Environment Agency will continue to work closely with all stakeholders to raise public awareness on recycling, including exploring the possibility of displaying recycling labels on packaging. We launched the #RecycleRight movement to encourage Singaporeans to recycle right. The key is to avoid contamination of recyclables through food waste and liquids. We also rolled out a redesigned recycling label for our blue commingled bins to clearly indicate examples of what can and cannot be recycled.

Question from Mr Png Eng Huat: To ask the Minister for the Environment and Water Resources (a) whether the Government tracks the amount of subsidies given to Malaysia for the supply of treated water every year; and (b) if so, what is the estimated amount of subsidies given to Malaysia since the Government started such tracking.

Answer:

Under the 1962 Water Agreement, Johor is entitled to buy treated water of up to 2 percent of the total quantity of water we import to Singapore on any given day, or about 5 million gallons of water per day based on the 250 million gallons of water we draw from the Johor River per day. The treated water is sold to Johor and at the stipulated price of 50 Malaysian sens per thousand gallons. Both Singapore and Malaysia must comply fully with the 1962 Water Agreement and neither can unilaterally change the terms of the Agreement, including the prices of raw and treated water.

2 As the member has rightly pointed out, we are subsidising treated water sold to Malaysia. The treated water price of 50 Malaysian sens per thousand gallons is only a fraction of the cost to Singapore of treating water at the Johor River Waterworks and supplying it to Malaysia, which was Malaysian Ringgit 2.40 per thousand gallons in 1997. The exact subsidies have varied over time as our cost has increased over the past 20 years due to factors such as the higher cost of materials and energy. We are, however, unable to share the amount of subsidies that have been provided over time.

3 At Malaysia's request, Singapore has been regularly supplying Johor with 16 million gallons per day, and up to 22 million gallons per day at times, of treated water. This is beyond Johor's entitlement of 5 million gallons of water per day under the 1962 Water Agreement. All treated water supplied to Johor is sold at the same price of 50 Malaysian sens per thousand gallons, without prejudice to our rights under the 1962 Water Agreement. We do so out of goodwill and in the spirit of good neighbourliness.

Question from Ms Joan Pereira: To ask the Minister for the Environment and Water Resources in light of the water level at Johor's Linggiu Reservoir falling below 50% due to the ongoing dry weather, what plans does the Ministry have to work with Malaysia to increase the yield of the Johor River, which has its water flow regulated by the Linggiu Reservoir, to ensure a sustainable water supply for both countries.

Answer:

The water level at Linggiu Reservoir has fallen from 72% at the start of 2019 to below 50% in September 2019. While the water level has since risen slightly to above 50% in October 2019, Linggiu Reservoir has been slow to recover because more water is being drawn from the Johor River than is sustainable. This is exacerbated during dry weather, as PUB needs to discharge more water from Linggiu Reservoir to support water abstractions from the Johor River by both Malaysia and Singapore. Malaysia has built water plants upstream of the JRWW, which have increased the abstraction of water from the Johor River beyond what is sustainable.

2 Singapore built the Linggiu Reservoir at a cost of more than \$300 million to enable reliable abstraction of water at PUB's Johor River Waterworks (JRWW). If the Linggiu Reservoir fails, the Johor River flows during dry periods will not be sufficient to meet the abstractions of Johor's water treatment plants and Singapore's JRWW. Singapore's right to abstract our full entitlement of 250 million gallons of water per day under the 1962 Water Agreement will then be compromised.

3 As mentioned by Prime Minister Lee Hsien Loong at the 9th Singapore-Malaysia Leaders' Retreat in April 2019, Singapore and Malaysia have an interest to work together to ensure a sustainable water supply for both sides. MEWR and PUB have been engaging our Malaysian counterparts at both the federal and state levels through regular meetings and exchanges. Both sides have noted Singapore and Malaysia's mutual interest in identifying appropriate and timely measures, including additional schemes, to increase the yield of the Johor River.

4 Singapore and Malaysia have long-standing cooperation on water issues and Singapore will continue to work with Malaysia to achieve mutually-beneficial outcomes and ensure a sustainable water supply for both countries.

Question by Mr Christopher de Souza: To ask the Minister for the Environment and Water Resources what is being done to encourage innovative solutions to climate change in the fields of entrepreneurship, engineering and the sciences.

Answer:

Climate change brings new existential threats. Singapore is already experiencing warmer temperatures, more intense rainfall and prolonged dry spells. Being an island state, we are also vulnerable to sea level rise. Just like how we have tackled other existential challenges in the past, we will plan ahead and invest in innovative solutions to reduce emissions as well as protect Singapore against the impacts of climate change.

2 We are making hefty investments in research and development (R&D) to develop 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 are working closely with industry and academic partners to develop as well as deploy innovative technologies and resource-efficient solutions that not only address our local challenges, but can also be applicable to other urban centres. For example, we are driving the adoption of super-low energy and zero-energy buildings and working closely with industry to implement more carbon-efficient processes.

3 Singapore is alternative energy-disadvantaged. Nevertheless, we are working to maximise the deployment of solar energy, our most feasible source of renewal energy. To overcome our land constraints, PUB has conducted floating solar photovoltaic (PV) cell test-bed in Tengeh Reservoir to study the performance and cost-effectiveness of ten different PV systems. Following the study, PUB has sought proposals from companies to build a large-scale floating solar PV system in Tengeh Reservoir (of at least 50MWp), and deploy two smaller systems in Bedok and Lower Seletar Reservoirs. We are also studying and developing technologies in other areas, including studying the potential of “clean fuels”, such as hydrogen, and carbon capture, utilisation and storage.

4 Mitigation and adaptation must go hand-in-hand as we are mindful that we are unable to reverse climate change completely. We have placed equally strong emphasis on the sciences in our adaptation plans because Singapore’s climate change policies must be based on robust climate science.

5 We established the Centre for Climate Research Singapore (CCRS) in 2013 and today, CCRS is one of the few dedicated centres in the region that focuses on research in tropical weather and climate. CCRS will set up a new Programme Office next year to drive the

formulation and implementation of our national climate science research masterplan and systematically build up climate science capabilities across our research institutes and universities.

6 To deepen our knowledge in a complex and multi-disciplinary issue like sea level rise, CCRS recently launched a call for research proposals for the National Sea Level Programme (NSLP) grant. The NSLP brings together both local and international experts to integrate and analyse various domain areas in sea level rise, and customise it to our local context.

7 To protect our coasts, low-lying areas and communities from sea level rise, we are exploring various coastal protection technologies and solutions, including learning from the experience of other countries. For example, we are building a small polder at Pulau Tekong to gain experience in operating one. Our agencies will also undertake R&D to enhance the cost-effectiveness of coastal protection solutions.

8 Even as we pursue innovative solutions, we will need to harness the collective efforts of the Government, businesses, civil society and Singaporeans to fight climate change.

Question by Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources (a) what respective percentages of (i) tetra paks and (ii) disposable plastic water bottles disposed of in a recycling bin in Singapore gets recycled; (b) whether the Ministry has conducted or knows of a life-cycle assessment that compares the carbon impact of a tetra pak to that of a disposable plastic water bottle of similar capacity; and (c) if so, what are the results of such studies.

Answer:

Used beverage cartons, such as tetra pak cartons and disposable plastic water bottles, that have been deposited in the blue commingled recycling bins provided under the National Recycling Programme are sorted by the Public Waste Collectors at material recovery facilities. About 60% of all materials collected from the blue commingled recycling bins are recycled. The National Environment Agency (NEA) does not track the specific recycling percentages for disposable plastic water bottles or used tetra pak cartons.

2 We have not conducted any life-cycle assessment that specifically compares the carbon impact of a tetra pak carton with that of a disposable plastic water bottle of similar capacity; nor are we aware of any authoritative studies on this. NEA's focus is to reduce the excessive consumption of all types of packaging, not just plastic bottles or tetra pak cartons, and to work with stakeholders to promote recycling.

Question by Er Dr Lee Bee Wah: To ask the Minister for the Environment and Water Resources (a) what percentage of non-residential buildings in Singapore are currently not Green Mark certified; (b) whether there is a system for end users and the public to provide feedback on buildings that have their air-conditioning set to temperatures lower than necessary; and (c) how does the Ministry engage these building owners on their building's ambient air temperatures.

Answer:

Buildings contribute up to a quarter of Singapore's carbon emissions. The "greening" of buildings play an important part in ensuring Singapore continues to develop sustainably and meet our international climate change commitments. Singapore is targeting to "green" 80% of our total building gross floor area (GFA) by 2030 and to date, about half of Singapore's non-residential building GFA has been greened to meet minimum sustainability standards.

2 Today, users of air-conditioning in commercial buildings are encouraged to set their indoor temperatures at around 25 degrees Celsius through voluntary schemes like the BCA Green Mark (GM) scheme. The GM scheme recognises buildings for maintaining indoor temperature in air-conditioned space at 24 to 26 degrees Celsius. Under the scheme, recognition is also given for the installation of energy efficient air-conditioning systems. The latest Third Green Building Masterplan, launched in 2014, also focuses on changing the way building tenants and occupants consume energy.

3 Aside from commercial buildings, the government also works closely with industries on cooling efficiency. Starting from 2020, NEA will set Minimum Energy Efficiency Standards (MEES) for chilled water systems in industrial facilities. This will help companies reduce their energy consumption, save on energy costs, and avoid carbon emissions.

4 To continue our efforts in combating climate change, my Ministry will work with BCA on programmes to encourage owners and tenants of non-residential buildings to reduce energy consumption and lower their carbon footprint.

Question by Ms Joan Pereira: To ask the Minister for the Environment and Water Resources (a) what building requirements do home renovation contractors have to satisfy to ensure that their structures prevent mosquito breeding; and (b) whether the Ministry will consider only granting permits for renovations when the relevant Government agencies are satisfied that such preventive measures are in place.

Answer:

Developers of new buildings and owners who undertake major renovations of their premises are required to avoid features that may result in water stagnation and become potential mosquito breeding grounds. For example, installation of roof gutters is prohibited for new developments. Trays and receptacles are not allowed to be placed beneath or on top of any air conditioning unit. Floor traps also need to be installed with anti-mosquito devices to prevent mosquito breeding in the water seal.

2 These requirements are specified in the Code of Practice on Environmental Health (COPEH). The National Environment Agency and the Building and Construction Authority will only grant technical clearances and approval for the proposed building plans respectively, when Qualified Persons appointed by the building owners or developers have ensured and declared that the building plans are in compliance with the COPEH.

3 Everyone, including residents, contractors and premises owners, has a part to play to prevent mosquito breeding. We need to remain vigilant, and continue to work as a community to suppress the *Aedes* mosquito population and keep dengue cases in check.

Question by Mr Seah Kian Peng. To ask the Minister for the Environment and Water Resources with the failure of recent UN Climate Talks (COP25), what are the implications for Singapore.

Question by Mr Christopher de Souza. To ask the Minister for the Environment and Water Resources (a) whether he will provide an update on the progress made at the 25th Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP25) which took place in December 2019; and (b) what further steps can Singapore undertake to do its part to create a more green and sustainable global environment.

Answer:

COP25 was the longest COP on record, with intensive and protracted negotiations. But Parties failed to reach an agreement on a number of issues, most notably Article 6 of the Paris Agreement – a key agenda item on carbon markets and trading, and the only remaining track that has yet to find a successful resolution since the Paris Agreement was adopted in 2015.

2 An agreement on Article 6 on carbon markets will enable countries to pursue cost-effective mitigation options beyond their shores. Put simply, it will enable countries with limited mitigation potential to buy carbon credits from countries where the cost of mitigation is lower. The latter countries are usually those with green lungs and such a system will incentivise them to maintain them. The Article 6 framework can also generate much needed funding for vulnerable developing countries to cope with the impacts of climate change in the future.

3 It is crucial that countries agree on a clear, balanced and credible set of rules that protects environment integrity and upholds the goals of the Paris Agreement. Badly designed rules may create loopholes and lead to an increase in global emissions. At COP25, we were close to an agreement, but more work remains for it to be agreed upon by all Parties. Singapore will continue to work closely with other countries, including the incoming UK COP-26 Presidency, to secure a credible outcome on Article 6 at the COP-26 in Glasgow.

4 Notwithstanding the failure to reach agreement on this key issue, we did make some progress at COP25. Countries successfully adopted the overarching decisions at COP25, which I was pleased to co-facilitate with Spain's Minister for the Ecological Transition Teresa Ribera, at the request of the Chilean COP25 Presidency. Amongst other things, the decisions recognised the role of multilateralism, at a time when it is under strain. They will serve to keep countries, with diverse interests, united in their resolve to work together to address challenges of the global commons, like climate change. They called on countries to consider the emissions gap and to submit their updated climate pledges. The decisions also acknowledged the role of climate finance by the developed countries, which is essential for concrete action. Beyond the call for action, discussions will be convened in new areas of concern like the Ocean and its climate impact.

5 While the outcome at COP25 fell short of expectations, the decisions adopted in Madrid will keep the drive to address climate change alive. The continued momentum on global

climate action is especially important for small countries like Singapore, which depend on a strong global response to tackle climate change. I was particularly struck by the support and energy of our civil society, particularly the youths, private sector representatives, and academics, who were all united in their efforts to address climate change. As we head towards the next COP in Glasgow, the challenge will be to maintain this spirit of inclusive multilateralism in order to achieve the goals of the Paris Agreement and the UNFCCC.

6 As a small low-lying state that is vulnerable to the impacts of climate change, Singapore will play our part to support the global effort to address climate change.

7 Internationally, Singapore remains committed to faithfully implementing our Paris commitments. We have committed to slow down and ultimately cap our CO2 emissions around 2030. We will update our Nationally Determined Contribution (NDC) and communicate our long-term low emissions development strategy in 2020. We will also continue to contribute to global efforts led by international organisations such as the International Civil Aviation Organisation (ICAO) and the International Maritime Organisation (IMO) to reduce emissions, as well as collaborate actively with international partners such as the UNFCCC, the UN Development Programme (UNDP), the UN Environment Programme (UNEP), ASEAN and city-networks such as the C40, to share our experiences and the use of best practices across the globe.

8 Regionally, we will continue to partner and support fellow developing countries to ramp up capacity-building and other support mechanisms to support their efforts to enhance climate action. For example, in October 2019, as part of our Climate Action Package, we co-organised with New Zealand a workshop on the Paris rulebook to help countries in the region better understand their obligations under the Paris Agreement, and to identify concrete actions and strategies that can be pursued. Next week, we will be co-organising a workshop on updating NDCs for ASEAN countries.

9 Nationally, we will continue with our efforts to develop Singapore in a sustainable and socially-inclusive way, do our part to reduce our emissions, and strengthen our climate resilience for the transition to a low-carbon future. Singapore has implemented an economy-wide carbon tax last year – the first in Southeast Asia to do so – as a key plank of our mitigation strategy. The revenue will be used to support emission reduction projects and help businesses become more resource and energy efficient. Despite limited access to alternative sources of energy, we will leverage long-term planning, innovation, and international cooperation to address climate change. By pursuing circular economy approaches, and rallying stakeholders towards sustainable growth, we can continue to create opportunities for our businesses and our people, in an increasingly resource- and carbon-constrained world. Last year, we launched a Zero Waste Masterplan and enacted a Resource Sustainability Act to design waste and wastefulness out of our economy. 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. We will continue with our sustainability efforts this year by focusing on food and how we can work together to secure a more resilient and sustainable supply of food for our citizens.

10 Climate change is an existential challenge for Singapore. To ensure that future generations can continue to enjoy a vibrant and liveable city, we must put sustainability at the centre of everything we do. Yet, climate change is not something that we can tackle by ourselves, and we will also do our part as a responsible global citizen and contribute to

international and regional efforts to address climate change and create a “greener” and more sustainable global environment.

Question by Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources (a) what is the number of misleading food labels detected in the past three years; (b) what actions have been taken against the respective food manufacturers or importers; (c) what is the percentage of food products that the Singapore Food Agency conducts random checks on each year; and (d) what more can the Ministry do to ensure products comply with food labelling requirements.

Answer:

The Singapore Food Agency (SFA) conducts regular food safety inspections to ensure that food sold in Singapore complies with our food safety standards and requirements. On average, 60,000 of such inspections are carried out in a year.

2 As part of SFA's inspection regime, SFA also carries out random sampling and laboratory testing of pre-packed food for sale in Singapore to ensure that they are accurately labelled with the name of food, ingredients, net content and source. This information is important for tracing and recall, in the event of food safety concerns such as food contamination and allergens. Proper food labelling also helps consumers make informed food choices at the point of purchase. Food manufacturers and traders must ensure that the naming of food products adhere to food labelling requirements. Companies that do not comply will be subjected to enforcement action.

3 Over the past three years, SFA has detected a total of 260 cases involving misleading food labels from its regular inspections and investigations into public feedback on possible mislabelling. Enforcement action taken against offenders include the issuance of warning letters and composition fines.

4 To promote the understanding of food labelling requirements, SFA has worked with our polytechnics to provide courses and consultancy on food labelling to the industry and public. For example, SFA has collaborated with Singapore Polytechnic on the "WSQ Follow Good Food Labelling Practices" course, which the industry and members of the public can attend. In addition, SFA conducts outreach programmes on food labelling in partnership with industry associations, such as the Singapore Food Manufacturers' Association. Information on food labels is also available via SFA's website.

5 The assurance of food safety and quality is a joint responsibility. While SFA will continue to be vigilant and ensure that regulatory measures are in place and properly enforced, the industry is responsible for adhering to food labelling requirements, and

consumers should exercise discretion when choosing food products based on the information provided on the label. Members of public who have queries on food labels may also contact the relevant companies for more information.

Question by Mr Zainal Sapari: To ask the Minister for the Environment and Water Resources (a) what is the current total number of workers and corresponding workforce profile in both general waste collection and the materials recovery sub-sectors; and (b) what are the various deciles for both monthly basic and gross wages in the two sub-sectors.

Answer:

Based on the 2016 Waste Management Industry Manpower Study commissioned by the National Environment Agency (NEA) and the Workforce Singapore (WSG), there are about 7,900 workers in the general waste collection sub-sector, and about 6,500 workers in the materials recovery sub-sector.

2 The study contains wage data for individual job functions in the general waste collection and materials recovery sub-sectors. This includes managers, supervisors, machine operators, waste and recyclables truck drivers, collection and sorting crew. The core operational roles of the workforce would be the waste and recyclables collection and sorting crew, as well as supervisors and drivers.

3 For waste and recyclables collection workers, the annual basic wages are \$11,960, \$14,040 and \$16,952 at the 25th, 50th and 75th percentile respectively. The corresponding annual gross wages are \$19,458, \$25,193 and \$31,144 respectively. For recyclables sorters, the annual basic wages are \$10,400, \$11,700 and \$14,400 at the 25th, 50th and 75th percentile respectively. The corresponding annual gross wages are \$13,173, \$16,200 and \$23,464 respectively.

4 For waste and recyclables collection supervisors, the annual basic wages are \$30,875, \$35,490 and \$38,545 at the 25th, 50th and 75th percentile respectively. The corresponding annual gross wages are \$45,935, \$52,538 and \$64,468 respectively. For sorting and recycling plant supervisors, the annual basic wages are \$22,198, \$29,300 and \$40,430 at the 25th, 50th and 75th percentile respectively. The corresponding annual gross wages are \$32,500, \$45,061 and \$57,000 respectively.

5 For waste collection and recyclables truck drivers, the annual basic wages are \$22,100, \$23,660 and \$28,860 at the 25th, 50th and 75th percentile respectively. The corresponding annual gross wages are \$36,000, \$44,476 and \$52,741 respectively.

6 The next Environmental Services Industry Manpower Study, which will cover both Cleaning and Waste Management sectors, will be commissioned by the NEA in 2020.

1. Mr Deputy Speaker, Sir, I thank Members for their comments and support of the Bill. I will now address the four broad areas brought up. First, the measures Singapore undertakes to meet our obligations under the Basel Convention. Second, the effects of the amendments on the industry. Third, our plans to develop our local recycling industry, particularly relating to plastics. Fourth, our plans to reduce excessive consumption of plastics and to close the plastic loop.

Implementing our Basel Convention Obligations

2. Ms Anthea Ong asked about our progress in implementing the Basel Convention. Since 1996, when we became a Party to the Convention, we have issued an average of 150 Basel permits a year for the transboundary movement of wastes. In 2018, NEA issued 36 import permits, 50 export permits, and 70 transit permits. The main destinations for Basel exports were Korea, Japan, France and Thailand, with most of these shipments containing e-waste intended for recycling.

3. Ms Anthea Ong also asked how we ensure hazardous waste exported under the Basel Convention is properly treated. This is covered under the Prior Informed Consent procedure, or PIC procedure, which is well established under the Convention. When companies apply to NEA for a Basel export permit, they are required to provide information on the treatment facility which the shipment is destined for. This information is forwarded to the relevant authorities in the State of Import. NEA will not issue a Basel export permit to the company until the State of Import evaluates the proposal and consents to accept the shipment.

4. We take our obligations under the Basel Convention seriously, and have taken action against companies for violations. Under the Hazardous Waste (Control of Export, Import and Transit) Act, or HWA, companies that falsely declare such wastes, or export such wastes without a valid Basel export permit, can be fined up to \$300,000. Individuals who commit such offences can be fined up to \$100,000, or imprisoned for up to 2 years, or both. NEA works closely with Singapore Customs and the Immigration & Checkpoints Authority to enforce these regulations at our checkpoints. We also enjoy a close working relationship with international counterparts and cooperate with them to investigate any suspected illegal export of waste from Singapore.

5. NEA had in fact investigated the case of Virogreen, which Ms Anthea Ong raised. In this instance, the company had correctly declared the contents of the shipment as e-waste for recycling. The PIC procedure had been followed and NEA had received consent from the relevant authority in Thailand for the import. These clarifications were carried in the same Eco-Business article.

6. Similarly, in the case reported by Reuters, which Ms Anthea Ong cited, none of the containers had been exported from or transited through Singapore. No Singapore companies had contravened the Basel Convention in any way and the two Singaporeans had not violated the HWA. The case is currently under investigation by Indonesian authorities.

7. There are currently no plans to introduce extraterritorial offences in the HWA. The Basel Convention has nearly universal membership with 187 Parties, and all our neighbouring countries are

members. Singaporeans or Singapore-registered entities who contravene the Basel Convention can be prosecuted in their country of offence.

Effects of the Amendments on Industry

8. Mr Louis Ng and Dr Chia Shi-Lu asked about the impact of the amendments on our companies. NEA had consulted the industry prior to the introduction of these amendments. Our companies understood the need for the new measures and for Singapore to comply with our international obligations.

9. We do not expect these amendments to disrupt the operations of our plastic recyclers and traders. There will not be additional regulations on the movement of most clean and homogenous plastic recyclables as these are not subjected to PIC under the Basel Convention. Mixed plastic recyclables can also continue to be exported, as long as PIC is obtained from the State of Import. To help companies comply with the requirements, NEA will guide companies through the Basel permit application procedures, particularly in the initial period after the new regulations come into effect.

10. In fact, we hope that the local recycling industry will benefit from economic opportunities as clearer regulations on the flow of recyclables develop. This will facilitate the legitimate flow of recyclables and open up new markets for our local companies. As Mr Chia Shi Lu and Ms Anthea Ong have pointed out, there are opportunities to promote a regional circular economy, in line with the vision of our Zero Waste Masterplan.

Developing the Recycling Industry in Singapore

11. Mr Deputy Speaker, I will now speak on the local plastic waste management landscape, and our plans to develop local recycling capability and capacity, which Dr Chia Shi-Lu, Mr Christopher de Souza and Mr Louis Ng asked about.

12. Plastic waste in Singapore is either recycled or incinerated. Such wastes are not landfilled. All general waste and recyclables must be collected by licensed collectors. Plastic recyclables that are segregated at source is sorted and sent for recycling either locally or overseas. On the other hand, plastic waste which is not source-segregated for recycling is incinerated with other general waste at our Waste-to-Energy plants.

13. In 2018, approximately 949,000 tonnes of plastic waste were generated in Singapore, which was about 12% of the total waste generated. 4% of the plastic waste generated was recycled. And of this, 7% was recycled locally, while the rest was sorted and exported for recycling. The plastics that are recycled are mainly post-industrial plastics that are clean and homogenous, or recyclables from households that have been sorted and baled at our Material Recovery Facilities. As we can see, packaging waste, including plastic, is generated in large quantities with a low recycling rate. As such,

we have made packaging waste a priority waste stream in both the Zero Waste Masterplan and the Resource Sustainability Act.

14. As Mr Louis Ng has highlighted, we hope to further build up our local recycling capabilities to better extract resources from plastic waste. However, I would like to clarify that we are doing this not because we contribute to the global ocean plastics problem but because we want to reduce the amount of plastics that we incinerate. Singapore does not contribute in any significant way to the ocean plastics problem. We do not landfill our plastic waste but incinerate them at our Waste-to-Energy plants. Most of Singapore is a water catchment, meaning that our waterways are dammed up and plastics are removed from the waterways before they reach our reservoirs. We have been building up our waste management resilience, which is in line with the global movement towards proper treatment and management of waste. As a small country, in the face of carbon and resource constraints, we also want to enhance Singapore's resource resilience by re-using resources for as long as possible. Hence, our vision is to close the plastic waste loop locally where feasible, and allow our plastic wastes to be recovered and converted into useful resources again.

15. At the same time, investing in new recycling technology and developing the industry will create economic opportunities and good jobs for Singaporeans. For example, McKinsey estimates a potential fourfold increase in plastics reuse and recycling by 2030, worth an estimated US\$60 billion.

16. We are studying both mechanical and chemical recycling options. Mechanical recycling uses well established technology to turn waste plastics into plastic pellets. We already have mechanical recycling plants in Singapore which treat our industrial plastic waste. These are operated by companies such as A~Star Plastics, Plaspulp Union and Ravago. Chemical recycling can potentially complement mechanical recycling. Waste plastics that are not suitable for mechanical recycling, such as used plastic bags, can be recycled into chemical feedstock through chemical recycling. We will share more on our plans to close the plastics loop at the upcoming Committee of Supply Debate.

17. Based on our consultations with industry players, the main impediments to greater recycling locally are the lack of economies of scale, and low global demand. We will require further consultations with the local industry, and economic agencies, to determine the appropriate industry size and structure to suit the Singapore market.

18. Our intent to build up local recycling capability is also a key reason why Singapore has not ratified the Ban Amendment, which Ms Anthea Ong asked about. The Amendment was first introduced in 1995 to protect developing countries from the ill-effects of hazardous waste exported by developed countries. The Amendment bans all exports from developed to developing countries, hence its name.

19. We believe that the legitimate movement of useful waste material does not just present economic opportunities for our companies, but allows Singapore to play our part in the safe handling of hazardous material in the region. For example, e-waste recycling companies in Singapore import e-waste from countries such as Japan, South Korea and New Zealand, and treat them at our licensed facilities in an environmentally-sound manner. This would be curtailed if we ratified the Ban Amendment. In fact, many OECD countries have not ratified the Ban Amendment yet, including countries with strong recycling industries such as Japan and South Korea.

20. We are also investing in research and development (R&D) to develop local recycling solutions, as Dr Chia Shi-Lu and Mr Louis Ng spoke about. The S\$45 million Closing the Waste Loop R&D Initiative supports research into new circular economy solutions. For example, it has funded a research project that is studying how plastic-embedded multi-layer films, such as potato chip packaging, can be recycled. This involves developing a chemical recycling method that can separate and individually recycle the different layers from the multi-layer film.

Reducing Excessive Consumption of Plastics

21. As Mr Christopher de Souza and Mr Gan Thiam Poh have highlighted, it is key to reduce the generation of plastic waste in the first place.

22. Last year, we introduced the Resource Sustainability Act, a landmark legislation to give effect to a regulatory framework to promote resource sustainability and support the management of our priority waste streams. This year, new regulations on the mandatory reporting of packaging data and 3R plans for packaging will take effect. As Mr Gan Thiam Poh highlighted, such regulations will force companies to be more conscious of the amount of packaging used in their products, and encourage them to identify ways to optimise packaging.

23. The mandatory reporting framework will also lay the foundation for an EPR framework for packaging waste management. The EPR framework ensures that producers are responsible for the collection and recycling of the materials that they use to package their products. This will send economic signals to companies to take into account the cost of environmental externalities of their products. It will also encourage the designing of products so that less materials are used or the products can be more easily recycled.

24. However, tackling the consumption of plastics cannot be done by the Government alone. We are working closely with various stakeholders to reduce our consumption of disposables, including plastics. For example, the NEA's "Say YES to Waste Less" campaign has partnered 1,600 premises to encourage consumers to reduce the use of disposables.

25. We also want to partner Singaporeans to co-create other solutions to reduce the excessive consumption of plastics. A Citizens' Workgroup for Singaporeans from diverse backgrounds will be formed to work on measures to tackle the issue of excessive consumption of disposables in Singapore. We will announce further details on this later this year.

26. Dr Chia Shi-Lu and Mr Christopher de Souza raised the issue of microplastics and microbeads. We have in place comprehensive measures to address microplastics. For example, the Singapore Food Agency routinely takes samples of locally available food, including seafood, for testing to ensure compliance with our food safety standards. And these standards are aligned with international standards. At the same time, we recognise that the World Health Organisation, European Food Safety Authority, and Food Agriculture Organisation have assessed that microplastics either posed a low risk to human health, or that more scientific evidence was required to assess the impact of ingesting plastic in food.

27. PUB also treats all used water at our water reclamation plants to internationally recognised discharge standards using the latest technology. This includes the removal of most microplastics. NEA has therefore assessed that no further measures are needed at this point to manage the entry of microbeads into our waste water and into our environment, until further scientific evidence emerges.

28. While we have no plans to ban microbeads in cosmetics, we encourage businesses to reduce the use of microbeads in their products. I am heartened that multinational corporations, such as Johnson & Johnson and Unilever, as well as local retailers, like Guardian Singapore and Watsons, have phased out microbeads in their products. We will continue to monitor international developments on microplastics, including microbeads in cosmetics.

Conclusion

29. Deputy Speaker, Sir, let me conclude. Plastic waste is a waste stream of concern for us, and we are tackling it through regulations under the Resource Sustainability Act, as well as other plans to reduce plastic consumption and promote plastics recycling under the Zero Waste Masterplan.

30. In addition, as a responsible member of the international community, Singapore remains committed to upholding our obligations under the Basel Convention. The Hazardous Waste (Control of Export, Import and Transit) (Amendment) Bill will enable Singapore to comply with the new controls on the transboundary movement of certain categories of plastic waste under the Basel Convention. The Bill will also allow for a more effective administration and enforcement of the Convention.

31. The amendments to the Basel Convention will provide greater clarity on plastic waste standards and better regulate its transboundary movement. In doing so, we hope that new economic opportunities will be created that the local recycling industry will seize, which will create good jobs for Singaporeans.

32. Mr Deputy Speaker, Sir, I beg to move.

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”.

Basel Convention

2. Singapore is a party to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The Basel Convention is an international treaty governing the classification and transboundary movement of hazardous and other waste to protect human health and the environment.

3. The Basel Convention does not prohibit the transboundary movement of hazardous waste. Instead, it controls the movement of hazardous waste via the Prior Informed Consent (PIC) procedure. This is in recognition of the legitimate transboundary movements of hazardous waste as defined under the Convention, such as for proper recycling or disposal. Besides controlling hazardous waste, the Convention also imposes the PIC procedure on some non-hazardous waste streams, namely household wastes and residues arising from the incineration of household wastes. These waste streams are defined as “other waste” under the Basel Convention.

4. Under the PIC procedure, exporting states that wish to export any waste stream that is covered by the Convention have to obtain prior consent from the countries receiving the waste, or the states of import, as well as the countries through which the waste transits, or the states of transit.

5. Amidst global concerns about the environmental impact of unregulated trade in plastic waste, Parties to the Basel Convention agreed last year to expand the scope of the Convention to cover certain categories of plastic waste. This extends the PIC procedure to the export of certain non-hazardous plastic waste as well as plastic waste with hazardous characteristics. However, most clean and homogeneous plastic waste which has been sorted prior to export and is destined for recycling will not be subjected to the PIC procedure. These amendments to the Basel Convention will take effect on 1 January 2021.

6. Improper disposal of plastic waste has caused severe environmental pollution, adverse health effects and contributed to climate change. As a responsible global citizen, Singapore joins the international community in supporting the amendments to the Basel Convention which will strengthen control of the transboundary movement of plastic waste.

7. As a Party to the Basel Convention, Singapore is required to implement domestic controls to regulate the transboundary movement of the covered categories of plastic waste. Singapore fulfils our obligations to the Basel Convention through the Hazardous Waste (Control of Export, Import and Transit) Act, or HWA for short. The HWA provides the legislative framework for the National Environment Agency (NEA) to ensure that Singapore complies with our obligations under the Basel Convention.

8. The Hazardous Waste (Control of Export, Import and Transit) (Amendment) Bill seeks to expand the scope of the HWA to cover the transboundary movement of certain categories of plastic waste. This will enable us to meet our obligations arising from the amendments to the Basel Convention. It also seeks to update NEA’s regulatory powers for more effective administration and enforcement of the HWA.

9. Mr Speaker, Sir, I will now highlight the key provisions of the Bill.

Amendments to introduce controls on plastic waste

10. I will start with the proposed amendments to include plastic waste within the scope of the Act.

11. Section 4 of the HWA defines “hazardous waste” and “other waste” in accordance with the Basel Convention. The definition of “other waste” is currently based on the categories of waste listed under Annex II of the Basel Convention. These are non-hazardous wastes that have to undergo the PIC procedure. The amendments to the Basel Convention will now expand Annex II to include certain categories of plastic waste which could impact the environment if not managed properly, such as mixed plastic waste. Clause 3 accordingly amends Section 4 to define “other waste” as meaning waste belonging to any category under Annex II to the Basel Convention.

12. The Schedule of the HWA reproduces the texts and annexes of the Basel Convention. Clause 7 amends the Schedule to include the categories of plastic waste covered by the amendments to the Basel Convention.

Amendments to facilitate administration and enforcement

13. I will now highlight the amendments to facilitate the administration and enforcement of the HWA.

14. The HWA is currently administered by the Director of Hazardous Waste, as appointed by the Minister. Clauses 2, 5 and 8 make various amendments to the HWA to make the Director-General of Environmental Protection, appointed under the Environmental Protection and Management Act (EPMA), responsible for the administration of the HWA instead. This is to align with the power of administration of other Acts under NEA, such as the EPMA. Consequential amendments will be made to the Second Schedule of the Insolvency, Restructuring and Dissolution Act 2018.

15. The Basel Convention allows Parties to lodge with its Secretariat, Parties’ national definitions of “hazardous waste” and “other waste” beyond the scope of the Convention. These national definitions are published on the official Basel Convention website. Section 5 of the HWA allows the Minister, through notification in the Gazette, to extend the definition of “hazardous waste” or “other waste” in the Act to include these national definitions.

16. Clause 4 adds a new subsection (1A) to section 5 of the HWA to extend these definitions to include all the latest national definitions lodged by Parties and published on the Basel Convention website.

17. Section 30 of the HWA currently provides NEA with the power to control the movement of vessels or aircrafts if there are reasonable grounds for suspecting that a vessel or aircraft is carrying hazardous or other waste that is to be exported from, imported into or transited through Singapore. Clause 6 amends Section 30 to expand NEA’s enforcement powers to cover vehicles suspected to be carrying hazardous or other waste into or out of Singapore via our land checkpoints.

Conclusion

18. In conclusion, Singapore is committed to uphold our obligations under the Basel Convention, and work with the international community to ensure that the global trade in plastic waste is carried out in an environmentally sustainable manner. The Hazardous Waste (Control of Export, Import and Transit) (Amendment) Bill will allow us to enhance our domestic controls and enforcement powers to comply with the new obligations under the Basel Convention.

19. At the same time, we recognise that the flow of clean and valuable recyclables can be legitimate, and help to support the adoption of a circular economy at the regional and global level. We will

continue to work with the international and regional community to strike a balance between facilitating the legitimate flow of such resources, and safeguarding against the unregulated or illegal transboundary movement of waste.

20. Mr Speaker, Sir, I beg to move.

1. Mr Speaker, on behalf of the Minister for the Environment and Water Resources, I beg to move, "That the Bill be now read a second time".
2. The Bill seeks to amend the National Environment Agency (or NEA) Act to expand NEA's borrowing powers.
3. The current provisions in the NEA Act limit NEA's borrowing sources to either the Government, or, with the approval of the Minister for Finance, banks or other financial institutions. Hence, NEA is currently not able to, for example, borrow directly from the capital markets.
4. This amendment will provide NEA with greater flexibility in borrowing by widening the options of funding sources, thereby optimising financing costs.
5. This is in line with the borrowing powers of other Statutory Boards such as PUB, the Singapore Food Agency, JTC Corporation and the Housing and Development Board.
6. Mr Speaker, Sir, I will now highlight the key provisions of the Bill.
7. Section 23 of the NEA Act sets out the power for NEA to borrow. Clause 2 of the Bill will repeal and re-enact Section 23 of the NEA Act to allow NEA to:
 - a. raise loans from the Government;
 - b. raise loans from another source within or outside Singapore, with the approval of the Minister for Finance; and
 - c. make financial agreements under which credit facilities are granted to the Agency for the purchase of goods, materials or things.
8. To conclude, Sir, this Bill will align the borrowing powers of NEA with those of other Statutory Boards in Singapore, to widen the options of funding sources and provide greater flexibility in borrowing. This will ensure that NEA is able to optimise the financing costs of any future borrowing.
9. Mr Speaker, I beg to move.

Mr Dennis Tan Lip Fong: To ask the Minister for the Environment and Water Resources whether the Government has any plans to reduce greenhouse emissions from our oil refining industry and, if so, what are these plans.

Reply by Minister Masagos Zulkifli:

1. Under the Paris Agreement, Singapore has pledged to reduce our emissions intensity by 36% from 2005 levels by 2030, and to stabilise our emissions with the aim of peaking around 2030. To achieve this, we have to make our economy more carbon efficient.

2. The industry sector, in particular the energy and chemicals (E&C) sector, is an important pillar of Singapore's economy. The E&C sector contributes to about 3% of our GDP and employed about 26,000 workers in 2018. However, the industry sector is also a significant source of greenhouse gas emissions, contributing about 60% of Singapore's total emissions in 2017. Around three-quarters of the industry sector's emissions are from the refining and petrochemicals sector.

3. Improving industrial energy efficiency is thus a key pillar of our strategy to reduce greenhouse gas emissions, and we have put in place a set of comprehensive measures to achieve this. From 2019, facilities in the manufacturing, power generation, waste and water management sectors which emit 25,000 tCO₂e or more annually must pay the carbon tax. The current tax rate is set at \$5 per tCO₂e for the first five years. We will review this by 2023, with the intention of raising the carbon tax rate to \$10 to \$15 per tCO₂e by 2030, taking into account international climate change developments, the progress of our emissions mitigation efforts, and our economic competitiveness.

4. In addition, since 2013, large emitters are required under the Energy Conservation Act (ECA) to submit annual energy efficiency improvement plans. From 2021, these emitters must also establish facility-wide energy management systems and conduct energy efficiency opportunities assessments, which must be submitted to the NEA. To incentivise companies to adopt more energy efficient technologies, the Government also provides funding support which has been increased from the previous cap of 30 percent to 50 percent of the qualifying costs since January 2019.

5. For the oil refineries in particular, the Government works closely with the sector to ensure that they achieve high standards of energy efficiency and adopt sustainable practices. Currently, all three oil refineries in Singapore have set up co-generation plants in their facilities. These are major investments that significantly improve the energy efficiency of the refineries.

6. Beyond particular sectors or industries, all of us have a responsibility to reduce our carbon footprint. Saving electricity, using public transport and reducing waste are good ways to cut carbon emissions. All of us can do our part to help address global warming.

Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources in light of the case of a cremation mix up (a) whether it timely for the Ministry to conduct a review of the industry's practices and standard operating procedures; (b) what are the preventive measures put in place by NEA following the incident; (c) whether NEA intends to play a bigger role in regulating funeral companies, in particular working with the Association of Funeral Directors Singapore; and (d) how often does NEA inspect and conduct checks on Government after-death facilities to ensure compliance to regulation.

Reply by Minister Masagos Zulkifli:

1. The National Environment Agency (NEA) licenses funeral parlours with embalming facilities. Regarding the wrongful cremation incident on 30 December 2019, NEA's investigation found that the licensed funeral parlour involved had not complied with the regulatory requirement to keep proper records of the deceased received into and moved from the premises.

2. NEA takes a very serious view of this incident. Funeral directors and funeral parlour operators have the professional and ethical responsibility to ensure that the deceased under their charge are properly accounted for, and handled in a dignified and respectful manner.

3. Immediately following its investigation, NEA suspended the licence of the funeral parlour on 6 January 2020 and stopped the funeral director from using Government after-death facilities. NEA is undertaking enforcement action against the funeral parlour for not keeping proper records of the deceased received into or moved from the premises. The funeral parlour and funeral director are required to rectify the lapses and improve their processes to prevent such an incident from happening. NEA will only lift the suspension when we are satisfied that all necessary measures have been put in place.

4. NEA issued a circular on 10 January to remind all licensed funeral parlours of the licensees' regulatory responsibilities to safeguard environmental hygiene; NEA has also prescribed additional measures, such as the requirement to strengthen the system of identification of the deceased and tightening of access control into and out of the premises. While many licensees already have systems and processes in place, NEA has emphasised to all of them the need to strengthen their systems and uphold high service standards. NEA's follow-up inspections showed that all licensees are complying with these new requirements. NEA will take firm action against any licensee for non-compliance, including suspension or cancellation of the funeral parlour licence in the case of egregious offences.

5. NEA is also working with the Association of Funeral Directors (AFD) to uplift the professionalism and standards of the funerary services industry. The AFD already has a Code of Conduct to guide funerary industry professionals on the conduct of their business. NEA is identifying further areas for improvement in training standards and process workflow. We will make these plans known when ready.

6. NEA operates government-owned after-death facilities, such as the Mandai Crematorium and Columbarium Complex and the Choa Chu Kang Cemetery Complex. A quality management system based on ISO standards is in place at these facilities and processes comply with regulatory requirements. NEA officers adhere to comprehensive standard operating procedures that include stringent checks of particulars and documents at each step of the cremation or burial process.

7. My Ministry and NEA are working with the funerary services industry, in consultation with religious leaders, to review how we can further improve controls and uplift the standards of the industry. I urge all funerary services industry professionals to step up and continuously improve their operations to achieve higher service standards and better accountability. If required, we are prepared to consider further regulations on the funerary services industry.

Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources with regard to the Zero Waste Masterplan (a) whether the Ministry is aware of the number of hawkers and stalls that are providing only disposable utensils for dine-in customers; and (b) whether there are measures or plans to encourage and ensure that these hawkers and stalls introduce reusable utensils for dine-in customers.

Reply by Minister Masagos Zulkifli:

1. The National Environment Agency (NEA) has been working with stakeholders to reduce the use of disposables at hawker centres managed by NEA. NEA has disallowed their usage for dine-in meals at all 7 new hawker centres, and at 5 existing hawker centres which have adopted the use of common crockery and centralised dishwashing services under the Productive Hawker Centres programme. In addition, from September 2018, NEA does not allow new cooked food stallholders who commence their tenancies at existing hawker centres to provide disposables to patrons for dine-in meals. NEA works closely with the Hawkers' Associations and our appointed operators to ensure that these stallholders do not use disposables for dine-in meals. NEA does not collect statistics on the number of stalls that provide disposable utensils for dine-in customers.

2. NEA is actively engaging the remaining stallholders to phase out the use of disposables for dine-in meals. Some concerns that stallholders commonly cite are the cost of reusable crockery and the cost of manpower required to wash crockery. On this front, we are working to introduce centralised dishwashing services at more hawker centres, and we have a grant scheme in place to defray some of the costs. We will continue to engage stallholders through the Hawkers' Associations to encourage them to switch to reusables.

3. At the national level, NEA launched the "Say YES to Waste Less" campaign in June 2019 to raise awareness of the impact of excessive consumption of disposables and the need for reduction. We are heartened that over 59 partners, covering more than 1,600 premises ranging from retailers, food and beverage establishments to supermarkets and hotels, have come forward to partner NEA in this endeavour.

Assoc Prof Daniel Goh Pei Siong: To ask the Minister for the Environment and Water Resources what action can be taken against Singaporeans involved in dumping toxic, plastics or other wastes in neighbouring countries.

Reply by Minister Masagos Zulkifli:

1. The transboundary movement of hazardous and other controlled waste is governed by the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, or the Basel Convention, which Singapore is a Party to. The Basel Convention does not prohibit the export of hazardous waste, but requires the Prior Informed Consent of the countries of import and transit. This is in recognition of the legitimate transboundary movement of waste as defined under the Convention, such as those for proper recycling or disposal.

2. The Hazardous Waste (Control of Export, Import and Transit) Act, or the HWA, provides the domestic legislative framework for Singapore to meet our obligations under the Basel Convention. The HWA requires companies to obtain a Basel export permit for the export of controlled waste, and empowers the National Environment Agency (NEA) to take regulatory action against companies and individuals who illegally export such waste. Companies convicted under the HWA may be fined up to \$300,000, while individuals may be fined up to \$100,000, or imprisoned for a term not exceeding 2 years, or both.

3. Singapore is committed to uphold our obligations under the Basel Convention. NEA has been actively engaging our local companies to increase awareness on Singapore's obligations under the Basel Convention, and works closely with the relevant authorities of the importing countries to investigate any allegations of illegal export of waste by our companies. Beyond the Basel Convention, we also remind our companies to adhere to the domestic legislation of countries that they are exporting to.

4. The Basel Convention, which currently does not cover the transboundary movement of plastic waste, will be expanded in scope to cover certain categories of plastic waste from January 2021. We are amending the HWA in line with these recent amendments to the Basel Convention. I will share more details on this at the Second Reading of the Hazardous Waste (Control of Export, Import and Transit) Amendment Bill scheduled for this sitting.

5. We take a serious view of any illegal transboundary movement of hazardous and other wastes as defined under the Basel Convention, and will not hesitate to investigate and enforce against violations. At the same time, we recognise that the legitimate flow of clean and valuable recyclables can help support the adoption of a circular economy at the regional and global level. We will continue to work closely with the international community to strike a balance between facilitating the legitimate flow of such resources, and safeguarding against the illegal export of waste.

Mr Png Eng Huat: To ask the Minister for the Environment and Water Resources in light of Malaysia's plan to reduce Johor's dependency on treated water supply from Singapore by 2022, what will be the projected impact on the price of treated water for local consumption after 2022.

Reply by Minister Masagos Zulkifli:

1. The future price of water in Singapore will need to consider all factors relevant at that time. We have not been formally notified by Malaysia that they require less treated water from Singapore. As such, it is premature for us to answer the question.

Mr Sitoh Yih Pin: To ask the Minister for the Environment and Water Resources (a) what has been the popularity and usage of the 10 "reverse" vending machines launched under the Recycle N Save Programme on 31 October 2019; and (b) whether NEA has further plans to expand the Programme beyond the planned 50 machines across Singapore by March 2020.

Reply by Minister Masagos Zulkifli:

1. The Reverse Vending Machine (RVM) pilot, introduced under the "Recycle N Save" initiative by the National Environment Agency (NEA) and F&N Foods, seeks to encourage Singaporeans to care for the environment and practise sustainability in their lives, by incentivising them to recycle their used plastic drink bottles and aluminium drink cans. The pilot has received positive response from the public since its launch on 31 October 2019. As of 12 January 2020, over 1.6 million drink containers in total have been deposited.

2. 11 RVMs have been rolled out and NEA and F&N Foods will work towards deploying the remaining 39 RVMs by end March 2020. The remaining RVMs will be deployed in a variety of locations to reach out to more users and residents in different parts of Singapore.

3. My Ministry and the NEA will continue to work with stakeholders to monitor and review the results of the pilot. We will use the findings to assess how the "Recycle N Save" initiative supports our packaging including plastic waste management roadmap, including how we can accelerate plans to establish an Extended Producer Responsibility (EPR) framework no later than 2025.

4. We will continue to work with our partners and stakeholders to encourage the public to recycle more, and to recycle right.

Dr Chia Shi-Lu: To ask the Minister for the Environment and Water Resources for the past three years, what has been the number of recorded offences for (i) smoking in the common corridors and void decks of HDB flats and (ii) high-rise littering from HDB flats related to cigarette butts and cigarette ash respectively.

Reply by SMS Dr Amy Khor:

1. Over the past three years, the National Environment Agency (NEA) issued more than 11,000 tickets for smoking along common corridors and void decks of HDB estates. This makes up about 15% of the total number of tickets issued for smoking in prohibited places during that period. I urge smokers to be mindful of the health of others, and not light up in smoking-prohibited places. Families and friends, and even members of the public, can help remind smokers to reinforce the right social norms.

2. Over the same period, NEA took more than 2,200 enforcement actions against high-rise littering from HDB flats involving cigarette litter. This makes up about 76% of the total enforcement actions taken for high-rise littering during that period. High-rise littering is an anti-social act which affects safety and environmental hygiene. I urge everyone to play his or her part to keep our common spaces clean, and ensure that Singapore remains a clean, green and sustainable home for us all.

Mr Leon Perera: To ask the Minister for the Environment and Water Resources (a) what are the reasons for the discoloured tap water in the Basic Military Training Camp (BMTC) on Pulau Tekong on 20 November 2019; and (b) what measures are being taken to reduce the risk of such incidents in future.

Reply by Minister Masagos Zulkifli:

1. PUB was alerted of discoloured tap water at some parts of the Basic Military Training Centre, or BMTC, at Pulau Tekong at 0730hrs on 20 November 2019. PUB officers were activated immediately to investigate the cause of the incident and deployed water wagons to provide temporary water supply to the servicemen on Pulau Tekong.

2. PUB also worked with BMTC to flush the water supply network on Pulau Tekong and carried out water sampling tests in the network to ensure that the water is safe for consumption and within the drinking water quality standards under the Environmental Public Health Regulations 2019 and the World Health Organisation's Guidelines. The water supply was fully restored at 2130hrs on 21 November 2019.

3. Naturally occurring minerals in the water will settle and accumulate in the water supply network over time. PUB investigated and found that these minerals in the pipes serving BMTC were churned up, thus affecting the appearance of the water. The tap water turned clear after flushing of the water supply network.

4. As a preventive measure, PUB is working with BMTC to carry out cleaning of the water mains in Pulau Tekong during the first half of 2020, when there is a break in BMTC's training schedule.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources (a) by what date will the Ministry collect carbon tax payments for 2019 emissions; (b) by what date does the Ministry plan to publish the total amount of carbon tax payments collected for 2019 emissions; and (c) whether the Ministry will consider releasing a breakdown of revenue collected from each taxable facility when the data is available.

Reply by Minister Masagos Zulkifli:

1. The Carbon Pricing Act (CPA) came into force on 1 January 2019. The CPA gives effect to the carbon tax of \$5 per tonne of carbon dioxide-equivalent (tCO₂e), to be paid using carbon credits purchased from the National Environment Agency (NEA). The carbon tax applies to facilities in the manufacturing, power generation, waste and water management sectors which emit 25,000 tCO₂e or more annually. These companies have been monitoring their emissions for the year 2019 and must submit verified emissions reports to NEA by 30 June 2020. Companies must pay their 2019 carbon tax liability by 30 September 2020.

2. The carbon tax revenues will be published annually in the Government's Budget Book, which is released in the first quarter of each year. The Government is unable to disclose company- or facility-specific data due to data confidentiality requirements as provided for in the Carbon Pricing Act.

Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources how have the recent fires in Australia affected Singapore's environment and food security.

Reply by Minister Masagos Zulkifli:

1. Singapore's air quality was not affected by the recent fires in Australia, as winds over Singapore were not blown from the Australian region. From November 2019 to January 2020, when the fires took place, air quality in Singapore was mostly in the 'Good' and 'Moderate' range. This level of air quality is comparable to the same period in previous years.

2. Similarly, Singapore's food security has not been affected by the fires in Australia. Australia is an important source of commonly consumed food items for Singapore, such as meat, milk, and sugar. While many parts of Australia experienced the fires, our food supply from Australia remained steady between November 2019 to January 2020.

3. Nevertheless, we are mindful that disruptions in food imports, including those linked to the climate, remain a possibility. Hence, the Singapore Food Agency (SFA) has been working with food importers to diversify sources across different countries and to adopt plans to mitigate against supply disruptions. Apart from this, we are encouraging Singapore companies to build food production linkages with other countries, under our grow overseas strategy. We are also intensifying efforts to boost domestic food production under our '30 by 30' vision, to locally produce 30% of Singapore's nutritional needs by 2030.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources (a) for 2019, what has been the absolute and percentage change in total carbon emissions for facilities that paid the carbon tax compared to 2017 and 2018; (b) when does the Ministry plan to publish this data if it is not yet available; and (c) whether the Ministry will consider publishing this data on a yearly basis to provide clarity on the emission impact of the carbon tax.

Reply by Minister Masagos Zulkifli:

1. The Carbon Pricing Act (CPA) came into force on 1 January 2019, giving effect to the carbon tax. The carbon tax provides an economy-wide price signal to encourage emissions reduction and the transition to a low-carbon economy. The carbon tax covers around 80% of our national emissions and applies to facilities in the manufacturing, power generation, waste and water management sectors which emit 25,000 tonnes of carbon dioxide-equivalent or more annually. These companies have been monitoring their emissions for the year 2019, and must submit verified 2019 emissions reports to the National Environment Agency by 30 June 2020. The Government is unable to disclose company- or facility-specific data due to data confidentiality requirements as provided for in the CPA.

2. MEWR publishes data on Singapore's total greenhouse gases annually in the Key Environmental Statistics, which is available on the MEWR website. We also publish more detailed information on our greenhouse gas inventory in accordance with guidelines under the United Nations Framework Convention on Climate Change (UNFCCC). Our latest National Communications and Biennial Update Report was submitted to the UNFCCC in December 2018 and this report can be found on the website of the National Climate Change Secretariat. We will be submitting the next report by December 2020, and it will similarly be made available publicly.

Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources given Singapore's small land size, what catalyst role can we play on the local, regional and international fronts to tackle climate change.

Oral Reply by Minister Masagos Zulkifli:

1. To effectively address a global problem like climate change and its impacts, we need a strong global response. This is why Singapore is a strong advocate for a multilateral, rules-based approach to addressing climate change. We work with other like-minded countries at the United Nations (UN) to push for the best possible multilateral deal on climate change. We are privileged to have played an instrumental facilitator role in these talks, which culminated with the adoption of the Paris Agreement in 2015, and the agreements on the Katowice Climate Package in 2018 and the Chile Madrid Time for Action in 2019. While not perfect, these agreements will help to establish a virtuous cycle of climate actions by all countries. The challenge is to maintain this momentum of global climate action at a time when the multilateral system is under strain. Singapore will continue our active and constructive engagement in the negotiations. We will work with other countries, including the incoming UK COP-26 Presidency, to strengthen the multilateral framework of cooperation on climate change and push for a good outcome at the next Climate Conference in Glasgow.

2. Regionally, we have taken an active role to galvanise climate action. As Chair of ASEAN in 2018, we convened the first-ever Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and Expanded-SAMCA, where ASEAN and China, Japan and the ROK reaffirmed our political commitments and discussed ways to step up regional climate action. We have collaborated with partners to improve our understanding of climate change and its impact, through research and institutions like the ASEAN Specialised Meteorological Centre, which is based in Singapore. Through our Climate Action Package, we have partnered and supported fellow developing countries to implement their Paris commitments and enhance climate action. In October 2019, we co-organised with New Zealand a workshop on the Paris rulebook to help countries in the region better understand their obligations under the Paris Agreement and to identify concrete actions and strategies that can be pursued. Just last month, we co-organised with the NDC Partnership and the UNFCCC Secretariat another workshop to discuss how ASEAN countries can update their climate pledges. We hope that

this workshop will facilitate the submission of updated climate pledges from ASEAN countries this year. Looking ahead, we will work with Vietnam as ASEAN Chair this year to sustain the momentum of climate action in the region.

3. We are also taking strong action at home. Notwithstanding our constraints in deploying renewable energy at scale, we are committed to playing our full part to tackle climate change, and transform our economy towards a low-carbon future. Singapore implemented an economy-wide carbon tax last year – the first in Southeast Asia to do so – as a key plank of our mitigation strategy. The revenue will be used to support emission reduction projects and help businesses become more resource and energy efficient. We will also push the bounds of innovation such as deploying floating solar photovoltaic systems on our reservoirs and offshore to make up for our shortage of land area to deploy them. Such innovations have given us confidence to raise our level of ambition to double our solar deployment target from 1 Gigawatt peak (GWp) beyond 2020 to at least 2 GWp by 2030. We are also greening our physical and transport infrastructure. We are aiming for 80 per cent of buildings in Singapore to be green by 2030 and for 90 per cent of peak hour commuting trips to be via public transport, active mobility or shared transport by 2040. Our Zero Waste Masterplan will transform Singapore to a Circular Economy, where materials are retained and reused in the value chain for as long as possible. This will help to reduce our carbon footprint and complement our efforts to address climate change.

4. The Government can only do so much on our own. We are therefore heartened that Singaporeans, especially our youth, understand the importance of the issue, and are prepared to take climate-friendly actions in a whole-of-nation effort to address climate change. In 2018, we had a successful Year of Climate Action rallying community groups, grassroots organisations, corporations, schools and non-governmental organisations to take action for a sustainable future. Collectively, we held more than 800 climate action-related events across the People, Private, and Public (3P) sectors — equivalent to two events a day. More than 342,000 individuals, organisations and educational institutions have pledged to take climate action. In 2019, we sustained the momentum with an inaugural Climate Action Week which featured ground-up activities organised by our 3P partners.

This year, we continue to encourage Singaporeans to work with us to co-create and co-deliver solutions to game-change climate change.

5. Climate change is an existential challenge for Singapore. To ensure that future generations can continue to enjoy a vibrant and liveable city, we will continue to put sustainability at the centre of everything we do, and work with 3P partners and Singaporeans to combat climate change and transition towards a climate resilient and low-carbon future. We recognise that by our actions alone we cannot stop climate change. But we hope that through our actions, we can play our small part to catalyse change and contribute to international and regional efforts to galvanise climate action.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources for each year from 2019 to 2023 (a) what does the Ministry project will be the absolute and percentage change in net carbon emissions in each individual year; and (b) what percentage of absolute change in each individual year does the Ministry project will be attributable to the carbon tax rate of \$5 per tonne of greenhouse gas (GHG) emissions.

Reply by Minister Masagos Zulkifli:

1 For our 2030 Nationally Determined Contribution (NDC), we have pledged to reduce our emissions intensity (emissions per dollar GDP) by 36% from 2005 levels by 2030, and to stabilise emissions with the aim of peaking around 2030. Given expected growth in economic activity and increased energy demand, Singapore's greenhouse gas emissions are projected to rise over the next few years before stabilising. Short-term year-on-year emissions projections may be affected by a multitude of factors such as unforeseen disruptions, and are thus not a good reflection of the emissions trajectory.

2 To achieve our 2030 NDC, the Government is putting in place mitigation measures to reduce emissions across all sectors, such as the industry, transport and building sectors, and ensure that Singapore continues to develop in a sustainable manner.

3 The carbon tax is not standalone. It forms part of our comprehensive suite of mitigation measures. It provides an important economy-wide price signal to spur emissions reduction, while giving companies the flexibility to take action where it makes the most business sense. The Government is prepared to spend more than the expected carbon tax revenue of about \$1 billion over the first five years to help companies improve their energy and carbon efficiency. As such, it is more meaningful to monitor the progress and impact of our mitigation package as a whole.

Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources what is the current number of "virtual" restaurants that operate by food apps in Singapore; (b) whether there have been any hygiene lapses in these shared food preparation premises; and (c) what additional measures is the Ministry taking on "virtual" restaurants to safeguard public health and prevent food poisoning.

Reply by Minister Masagos Zulkifli:

"Virtual" food businesses, also known as "cloud kitchens", are food establishments that do not have a physical store front but sell food directly to consumers through online food delivery platforms. They are licensed by the Singapore Food Agency (SFA) under the Environmental Public Health Act. There were 61 of such food businesses as of 31 Jan 2020.

2 Just like any other food establishment, "virtual" food businesses must comply with SFA's food safety requirements and standards, and ensure that the food they prepare is safe to eat. For instance, their food handlers and food hygiene officers must all be trained and certified under the Basic Food Hygiene Course and the Workforce Skills Qualifications' "Conduct Food & Beverages Hygiene Audit" programme respectively.

3 These "virtual" food businesses are also subjected to inspection and enforcement actions by SFA just like other food establishments. Since "virtual" food businesses started being licensed in 2017, there has been one food hygiene and safety offence committed which involved an unregistered food handler. Should a "virtual" food business be suspended due to food hygiene and safety lapses, its food handlers and food hygiene officers must undergo re-training and re-certification as per any other food establishment.

4 Food safety is a joint responsibility across the industry, consumers and the Government. All food establishments must play their part to upkeep high standards of food safety as well as environmental and personal hygiene at all times.

Dr Intan Azura Mokhtar: To ask the Minister for the Environment and Water Resources (a) for each year since 2009, how many drivers have been fined under the Environmental Protection and Management (Vehicle Emissions) Regulations for leaving the engines of their stationary or parked motor vehicles idling; and (b) how effective has public education been in reminding drivers to adhere to this Regulation.

Oral Reply by SMS Dr Amy Khor:

The National Environment Agency (NEA) adopts a multi-pronged approach to tackle pollution from idling vehicles. NEA carries out public outreach to engage motorists on the importance of switching off their vehicle engines when stationary. NEA works with authorised vehicle inspection centres, vehicle fleet owners and schools to disseminate educational pamphlets to raise awareness of the regulations and promote compliance. Signs reminding motorists against idling engines are installed at hotspots. NEA has also stepped up checks and increased the penalty for idling engine offences in 2016.

2 The number of idling engine offences increased from 2,000 cases in 2009 to 6,400 cases in 2016. The concerted efforts by NEA since 2016 have led to a reduction to 3,200 cases in 2018 and further down to 2,800 in 2019. The number of repeat offenders also decreased from 19 cases in 2016 to only 1 in 2019.

3 We urge drivers to do their part to protect the health of others and reduce emissions by not leaving their engines idle when stationary.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources (a) for each month from 1 January 2018, how many cars have been registered under the Vehicle Emission Schemes in the A1, A2, B, C1 and C2 bands respectively; and (b) whether the Ministry will start collecting such data if it does not currently do so.

Written Reply by Minister Masagos Zulkifli:

The Vehicular Emissions Scheme (VES) has been implemented for all new cars, taxis and newly imported cars since January 2018. It assesses vehicles on five key pollutants – carbon dioxide (CO₂), hydrocarbons (HC), carbon monoxide (CO), nitrogen oxides (NO_x), and particulate matter (PM). The VES band for the vehicles is determined by the worst-performing pollutant of the five being assessed. The quarterly registration trends under the respective VES bands show promising results in encouraging the uptake of cleaner cars.

Time Period	A1	A2	B	C1	C2
1Q 2018*	301	3,402	10,859	2,377	807
2Q 2018*	1,251	6,042	13,197	3,257	1,055
3Q 2018	85	2,778	9,322	3,909	1,250
4Q 2018	117	3,670	10,923	4,305	1,099
1Q 2019	124	5,143	10,168	3,921	1,070
2Q 2019	137	5,289	9,760	3,202	904
3Q 2019	201	4,984	8,615	2,948	889
4Q 2019	79	4,034	7,052	2,813	797
Total (2018-2019)	2,295	35,342	79,896	26,732	7,871
% (2018-2019)	2%	23%	53%	18%	5%

* Vehicles registered between 1 Jan to 30 Jun 2018 were exempted from the PM criteria under the VES. This was to give motor dealers more time to submit PM emissions information for assessment under the VES.

Mr Leon Perera: To ask the Minister for the Environment and Water Resources (a) to date, how many cases of undeclared peanut allergens have been found in food products sold in Singapore; and (b) whether any adverse health effects associated with peanut allergy have been noted from these or other cases.

Oral reply by Minister Masagos:

Food manufacturers and traders in Singapore must comply with SFA's food safety standards and requirements. These include labelling requirements where food manufacturers and traders must ensure that known allergens such as peanuts, which are found in pre-packed food products, are declared on the labels of the products.

2 From 2015 to 2018, there were no cases of undeclared peanut allergen in pre-packed food products. Since 2019, there have been five cases of undeclared peanut allergen in pre-packed food products. Upon detection, SFA issued directions to recall the products given the food safety concerns to consumers who are allergic to peanuts. SFA has not received feedback or information on adverse health effects arising from these cases.

Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources (a) how has the Ministry been dealing with the increasing number of reported dengue cases since mid-December 2019; (b) what is the current number of active dengue clusters; (c) what are the current plans and measures to reduce the number of active dengue clusters; (d) whether efforts have been stepped up to ensure Singaporeans are prepared for the dengue outbreak; and (e) whether there is a need to step up efforts to protect vulnerable groups such as young children and seniors.

Written Reply by Minister Masagos:

As of 22 February 2020, there were 110 active dengue clusters. Since the start of the year, a total of 2,894 dengue cases have been reported, with 386 cases reported in the week ending 22 February. The number of Dengue virus serotype 3 (DENV-3) cases has risen over the last three months. The monthly proportion of DENV-3 cases in January was approximately 46%, higher than the proportion of Dengue virus serotype 2 cases at 40%. We are watching very closely whether there is a potential for a serotype switch. Such a switch is historically associated with dengue outbreaks. Singapore has not had a dengue outbreak driven by DENV-3 in over two decades, hence our population's immunity to DENV-3 is low. The National Environment Agency (NEA) is monitoring this closely.

2 NEA, together with Inter-Agency Dengue Task Force partners and Town Councils, has stepped up inspections to remove potential mosquito breeding habitats. Community volunteers and grassroots leaders have also been working hard to raise awareness on dengue prevention. Of the 346 clusters notified this year, nearly 70% have been closed, with the cooperation of our partners and the community.

3 NEA has made available information on dengue clusters and areas with high *Aedes aegypti* mosquito population on the NEA website and myENV app. These are useful indicators to encourage early intervention, heighten community awareness to the risk of dengue transmission, and facilitate targeted action by stakeholders and residents. From Jan 2020, NEA started distributing flyers to alert residents living in areas with high *Aedes aegypti* mosquito population. Dengue cluster alert banners have also been put up in cluster areas to update the residents and members of the public of the latest dengue situation within the precinct.

4 In view of the dengue outlook for 2020, NEA will bring forward the launch of the annual National Dengue Prevention Campaign to March, ahead of the traditional mid-year peak dengue season. Together with grassroots leaders and Dengue Prevention Volunteers, NEA will embark on intensive nationwide outreach efforts. NEA does outreach to elderly at neighbourhood elderly corners using customised, vernacular-language videos. NEA also works with preschools and schools to provide dengue prevention materials depicting the life cycle of the *Aedes* mosquito, which also serves as a teaching aid.

5 But NEA alone cannot prevent dengue transmission in Singapore. 60 percent of mosquito breeding habitats detected continue to be found in residential premises. In addition to doing the Mozzie Wipeout, residents, especially those living in dengue clusters or areas with high mosquito population, are advised to regularly spray insecticide inside their homes, targeting dark areas where adult mosquitoes are likely to be resting. Young and old, there is an urgent need for everyone to step up their efforts to eradicate mosquito breeding habitats together with community partners and NGOs. Everyone must do their part to protect themselves and their loved ones.

Ms Anthea Ong: To ask the Minister for the Environment and Water Resources given that Singapore incinerates over 90% of its plastic waste (a) how is air quality coming out of the flue monitored; (b) whether there is a testing for a broad range of toxins and, if so, which toxins are tested for; (c) whether the results of the air quality tests done at the end of the incineration plant flues be published in order to give comfort and shed light on the safety and health impact of this process.

Written Reply by Minister Masagos:

The National Environment Agency (NEA) requires all operators of Waste-to-Energy (WTE) plants to engage an accredited laboratory to conduct emissions tests and submit results of those tests to NEA at least once a year. This is to ensure that the emissions from WTE plants comply with emission standards specified under the Environmental Protection and Management (Air Impurities) Regulations. These standards cover key pollutants associated with the incineration of plastics waste, such as carbon monoxide, oxides of nitrogen, as well as dioxins and furans. Under the Environmental Protection and Management Act (EPMA), operators who fail to meet the specified standards can be fined up to \$20,000 on the first conviction and up to \$50,000 on the second or subsequent conviction. To complement emissions testing, NEA inspects WTE plants twice a year to verify that pollution control equipment are properly maintained and operating effectively.

2 Singapore's emission standards are published as part of the Environmental Protection and Management (Air Impurities) Regulations under the EPMA. They are comparable with those in other jurisdictions. Our regulations do not require operators of individual facilities, including WTE plants, to publish their emissions test results. Nonetheless, operators of WTE plants may do so voluntarily. For the NEA-operated plants, data on the most common pollutants of concern, namely particulate matter, sulphur dioxide and oxides of nitrogen, are published annually on NEA's website.

Ms Anthea Ong: To ask the Minister for the Environment and Water Resources given that the official recycling rate for plastic in 2019 was 4% (a) what is the breakdown between plastic waste generated by households, as compared to plastic waste generated by commercial and industrial sectors; and (b) what percentage of plastic, by volume, remains after incineration and is left on Semakau Island.

Written Reply by Minister Masagos:

The recycling rate for plastic in 2018 was about 4%. The National Environment Agency is reviewing Singapore's waste management and recycling statistics for 2019, and will publish them when ready.

2 In 2018, Singapore generated 949,300 tonnes of plastic waste in Singapore. 41% was generated by domestic and trade sectors including households, and the remaining 59% by the industrial and commercial sectors.

3 Plastic waste in Singapore is either recycled or incinerated in waste-to-energy plants, and not directly landfilled. Incineration reduces the volume of general waste, which includes plastics, by about 90%. The incineration ash is then disposed of at Semakau Landfill.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources whether the Ministry will consider creating a Singapore Carbon Agreement to facilitate the exchange of best practices for emission reductions across the 23 major sectors of Singapore's economy following the model of tripartite collaborations like the Singapore Packaging Agreement.

Written Reply by Minister Masagos:

Singapore's Climate Action Plan outlines our climate mitigation strategies across key sectors – namely, the power, industry, transport, buildings, households, and waste and water sectors. Improving energy efficiency is a key strategy that not only contributes to emission reductions, but also enhances companies' long-term business competitiveness.

2 The Energy Efficiency National Partnership (EENP) launched by the National Environment Agency (NEA) in 2010, aims to support companies in their energy efficiency efforts. The EENP is a voluntary, industry-focused programme, in partnership with the NEA, the Economic Development Board and the Energy Market Authority. As of January 2020, 302 companies have joined the programme. As part of the EENP's learning network, NEA organises the biennial National Energy Efficiency Conference. Companies, organisations and individuals are also recognised for their achievements in energy management through the annual EENP Awards. These platforms allow companies to share best practices and promote the adoption of energy efficient technologies.

3 The Government also works closely with industry-led work groups such as the Singapore Chemical Industry Council Industry Sustainability Committee, the Biopharmaceutical Manufacturers Advisory Committee and the Food Manufacturing Energy Efficiency Committee to support companies in energy efficiency improvement.

4 The manufacturing sector in particular is heterogeneous, with varied manufacturing processes and bespoke equipment and systems. In addition to setting energy efficiency standards for common industrial systems and equipment, NEA analyses the energy performance of systems and equipment of more than 180 energy-intensive companies

regulated under the Energy Conservation Act and shares the findings with individual companies, as benchmarked against others in their respective manufacturing sub-sectors.

5 Climate action requires collective action from all stakeholders. We have been working with our 3P (People, Private and Public) partners to co-create and co-deliver solutions for our environmental challenges. My Ministry will continue to work closely with all stakeholders to build a more sustainable and climate-resilient future.

Assoc Prof Walter Theseira: To ask the Minister for the Environment and Water Resources (a) whether, and to what extent, efforts are still being made to investigate the open cases against four companies under the Transboundary Haze Pollution Act initiated in 2015; and (b) whether the Ministry will consider giving whistleblowers some financial incentives to provide information leading to successful investigation and prosecution.

Written Reply by Minister Masagos:

Singapore enacted the Transboundary Haze Pollution Act (THPA) in 2014 to send a strong signal that we will not tolerate the irresponsible actions of errant companies, whether Singapore-based or otherwise, that harm our environment. In 2015, NEA issued legal notices under the THPA to six companies to take immediate measures to stop the fires that caused haze that affected Singapore. Two of the companies responded and explained that they were no longer associated with the affected lands. Upon further investigation, NEA accepted their explanation and closed these two cases. The cases against the other four companies are still open. If the directors of the relevant companies enter Singapore, they will be required to assist in our investigations. Action will also be taken against one of the directors who has an outstanding court warrant against him.

2 The THPA is not a panacea or the only tool to fight transboundary haze. Although none of the investigated companies has been prosecuted yet, the THPA has nevertheless put added pressure on companies to behave responsibly. We have no plans to offer financial incentives to whistle blowers at this moment.

Ms Anthea Ong: To ask the Minister for the Environment and Water Resources (a) with respect to Singapore's 2020 air quality targets, how did we perform in 2019 for PM2.5, sulphur dioxide, ozone and nitrogen dioxide emissions; and (b) whether the Government will consider building and publishing emissions inventories for all pollutant types for better identification of the different sources of air pollutants and air quality management.

Written Reply by Minister Masagos:

1. The Ministry of the Environment and Water Resources (MEWR) and the National Environment Agency (NEA) benchmark Singapore's air quality against the World Health Organization (WHO) Air Quality Guidelines (AQG). Singapore has adopted as its 2020 air quality targets the WHO AQG for particulate matter (PM₁₀), nitrogen dioxide (NO₂), carbon monoxide (CO), and ozone, and the WHO AQG's Interim Targets for PM_{2.5} and sulphur dioxide (SO₂).

2. Comparing Singapore's 2019 performance with the 2020 air quality targets, we met the 2020 target for NO₂ and CO. For SO₂, while the annual target (annual mean) was met in 2019, the maximum 24-hour mean level exceeded the limit in one day of the year (recorded at 57 µg/m³). We did not meet the 2020 targets for particulate matter (PM₁₀ and PM_{2.5}) and ozone in 2019. A summary of Singapore's 2019 air quality performance in 2019 against the Singapore target by 2020 and the long term targets is shown in the table below.

Pollutant	Singapore target by 2020	Long Term Targets	2019 Performance
Sulphur Dioxide (SO ₂)	24-hour mean ¹ : 50 µg/m ³ (WHO Interim Target) Annual mean: 15 µg/m ³ (Sustainable Singapore Blueprint target)	24-hour mean ¹ : 20 µg/m ³ (WHO Final)	24-hour mean ¹ : 57 µg/m ³ Annual mean: 8 µg/m ³

Fine Particulate Matter (PM _{2.5})	Annual mean: 12 µg/m ³ (Sustainable Singapore Blueprint target) 24-hour mean ² : 37.5 µg/m ³ (WHO Interim)	Annual mean: 10 µg/m ³ 24-hour mean ² : 25 µg/m ³ (WHO Final)	Annual mean: 16 µg/m ³ 24-hour mean ² : 62 µg/m ³
Particulate Matter (PM ₁₀)	Annual mean: 20 µg/m ³ 24-hour mean ² : 50 µg/m ³ (WHO Final)		Annual mean: 30 µg/m ³ 24-hour mean ² : 90 µg/m ³
Ozone	8-hour mean ¹ : 100 µg/m ³ (WHO Final)		8-hour mean ¹ : 125 µg/m ³
Nitrogen Dioxide (NO ₂)	Annual mean: 40 µg/m ³ 1-hour mean ¹ : 200 µg/m ³ (WHO Final)		Annual mean: 23 µg/m ³ 1-hour mean ¹ : 156 µg/m ³
Carbon Monoxide (CO)	8-hour mean ¹ : 10 mg/m ³ 1-hour mean ¹ : 30 mg/m ³ (WHO Final)		8-hour mean ¹ : 1.7 mg/m ³ 1-hour mean ¹ : 2.3 mg/m ³

¹Highest; ² 99th Percentile

3. We have implemented a suite of measures to reduce the emission of pollutants. We are tightening industrial emission standards for new and existing plants from 2015 to 2023. We have also introduced measures to manage emissions from vehicles. These include stricter standards for fuel quality and tighter emissions standards for new vehicles, as well as incentive schemes to turn over older, more pollutive vehicles and encourage the purchase of new and cleaner vehicles. We will continue to review these measures.

4. NEA conducts emissions inventory and source apportionment modelling studies to identify key sources of air pollutants in Singapore and develop air quality management strategies. These internal studies help us fine-tune and improve our air quality management strategies.

1. Mr Speaker, I would like to thank the Members for their support and comments on the Public Utilities (Amendment) Bill. Let me run through the queries and concerns raised topically. I will begin by addressing coastal and flood-protection issues first.

AMENDMENT #1: CONFER NEW COASTAL PROTECTION FUNCTIONS AND ESTABLISH THE COASTAL AND FLOOD PROTECTION FUND

2. Er Dr Lee Bee Wah and Mr Gan Thiam Poh asked about the Government's plans to ensure that there are sufficient funds in the Coastal and Flood Protection Fund. Climate change and rising sea levels will not only affect our current generation but future generations and beyond. Coastal protection requires hefty upfront investments. But once built, they benefit many generations of Singaporeans. This is a complex, significant, and long-haul effort, and we need to distribute the share of funding more equitably across current and future generations.

3. The \$5 billion injection from this term of Government represents our generation's contribution towards safeguarding Singapore's continued survival. Setting up the Coastal and Flood Protection Fund now provides us with a longer runway to build up the Fund, and allows the Government to save up across successive terms. The Government will top up the Fund whenever our fiscal situation allows.

4. Given the significant outlay required, the Coastal and Flood Protection Fund will not be the only source of

funding. We have to use a combination of funding tools – the Coastal and Flood Protection Fund, borrowing, budget from the Government-of-the-day, as well as Past Reserves for measures such as land reclamation. PUB is working with agencies to refine our modelling and develop more detailed plans on the type of protection measures required and the costs. This will allow the Government to better assess the funding required and financing options.

5. Mr Gan Thiam Poh asked what measures will be in place to ensure strict oversight and prudent utilisation of the Fund. First, it will be ring-fenced through this legislative amendment to fund the expenditures relating to coastal and drainage flood protection measures. Second, PUB will have oversight over the management and withdrawal of the fund. PUB will publish the fund utilisation annually in a separate section in its financial statements. Third, like any other large scale and complex development projects the Government undertakes, coastal protection and drainage measures will continue to be subject to MOF's evaluation and prevailing approval processes. Finally, the Government will also employ competitive tendering processes to ensure that the costs of the coastal protection and drainage measures implemented are value-for-money.

6. Mr Gan Thiam Poh asked for examples of the uses of the fund. Ensuring our flood resilience will require careful planning and seamless integration of protection measures in our infrastructure. First, to prevent sea water from flowing inland, we will need to construct structures such as sea walls, revetments, dykes, tide gates or barrages to serve as

coastal defences and physical barriers. We will study the suitability of all these options for our coastline. Where feasible, we could even integrate nature-based solutions, such as the planting of mangroves to break wave energy.

While structures such as tide gates and barrages stop sea water from flowing inland, they will likewise prevent stormwater from flowing out into the sea, especially when intense rainstorms coincide with high tides. As such, we will need to install outlet pumps at some of our waterways to pump floodwaters into the sea. Finally, our vast network of inland drains must also be expanded and upgraded to cater to more intense and frequent rainfall.

7. Er Dr Lee Bee Wah rightly pointed out the extent of infrastructure works required to protect our coastline. She asked if we will tap on local resources and companies in this journey. Coastal protection is a new area in Singapore and capabilities will need to be built up. We will indeed have to tap on the best engineering capabilities available.

Where they are not available in Singapore, we will have to bring them in, even as we grow our own talent and capabilities. The Government and industry will have to work hand in hand. We are confident that over time, we will grow a strong and vibrant local industry, just like what we did with our water sector. We hope that our local firms will proactively build up their capabilities in coastal protection, hydraulic modelling, and flood risk forecasting just to name a few areas, and to tap on these opportunities when available.

AMENDMENT #2: LEGISLATIVE SAFEGUARDS OVER DBOO PLANTS

8. I will next address the questions on safeguards over PUB's DBOO plants.

9. Mr Gan Thiam Poh asked about the feasibility of the DBOO model and whether other operating models for water plants have been considered.

10. Besides the DBOO model, PUB also employs other models. For example, PUB employs the Design-and-Build model, where it partners the private sector to design and build the plant, while PUB owns and operates the plant.

11. As I explained in my opening speech, the DBOO model has been useful in allowing us to tap on private sector innovations and cost efficiencies to deliver water services more effectively. By combining design, build, own and operate functions in the same DBOO contract, it gives the private sector a strong incentive to ensure that the project design takes into consideration operational and other lifecycle costs.

12. The DBOO model also strengthens the capacity of the private sector. When companies undertake DBOO projects, they develop a track record that allows them to grow in our region and compete on the world stage.

13. Mr Gan Thiam Poh asked about PUB's ability to maintain oversight over concession companies which are struggling.

14. As I explained in this House in April 2019, even though PUB does not interfere with the business decisions made by the concession companies, PUB monitors the performance of the plants under the DBOO model to ensure that the concession companies can meet their contractual obligations to PUB. Concession companies are required to submit financial reports to PUB on a regular basis. Where there are issues, PUB will require the concession companies to rectify them; failing which, PUB may exercise its rights to terminate the DBOO contracts and take control of the plants. This contractual oversight will continue and with the new legislative mechanisms, we will have greater assurance and oversight over our DBOO plants.

15. Er Dr Lee Bee Wah rightly pointed out that PUB has been partnering with the private sector under the DBOO model for over 10 years. The majority of these partnerships have been successful. Given this, why the decision to introduce legislative levers over DBOO plants now?

16. Allow me to explain. As part of our regular review of the safeguards over DBOO plants, we observed that unlike other critical infrastructure, the Government did not have legislative safeguards for critical water infrastructure under the Public Utilities Act. We concluded that it would be prudent to put in place similar safeguards, especially as more DBOO plants are being completed.

17. Er Dr Lee Bee Wah also asked if the legislative levers over DBOO plants are triggered by the Hyflux situation.

18. The review to enhance our oversight over DBOO plants started before the Hyflux situation emerged. That said, the Hyflux situation was a reminder that we need to exercise proper oversight over our DBOO plants which are a key part of our water supply infrastructure, and have effective levers to intervene when necessary in order to ensure Singapore's water security. As mentioned in my opening speech, PUB has in place robust contractual safeguards which allowed us to successfully execute the contractual remedies for the Tuaspring Desalination Plant.

19. With the additional legislative safeguards introduced under this Bill, we will further strengthen our oversight over critical water infrastructure and enhance our levers, in case it is necessary to intervene.

20. Er Dr Lee Bee Wah and Mr Gan Thiam Poh also asked for elaboration on when and how Special Administration Orders will be invoked, versus the existing contractual safeguards.

21. PUB's interest is in safeguarding Singapore's water security. The grounds under which the Minister can impose Special Administration Orders are: first, the designated party is, or is likely to be, unable to pay its debts; second, the occurrence of a public emergency; third, the Minister considers it in the interest of the security and reliability of the supply of water in Singapore; and fourth, the Minister considers it in the public interest. These are similar to those found in the Special Administration Order regimes of other essential services.

22. I would like to assure the House that the power to issue a Special Administration Order would not be exercised lightly. Such Orders are meant to ensure Singapore's water security, and would be used only under exceptional circumstances. PUB will continue to rely on existing contractual remedies under the Water Purchase Agreements as far as possible.

CONCLUSION

23. Mr Speaker, Sir, as I have said in my opening speech, PUB's role continues to evolve. This Bill is an important step forward as PUB builds up its Coastal and Flood Protection role, strengthens its oversight over water concession companies, implements smart water meters, and enhances the security of water tanks.

24. Sir, with that, I beg to move.

1. Mr Speaker, Sir, I beg to move, "That the Bill be now read a second time."

INTENT

2. The Public Utilities Act was last amended in February 2018. Since then, the work of PUB has continued to evolve. First, as I had announced during my COS speech a few days ago, PUB will be given an expanded mandate to defend our coasts against rising sea levels. Second, as PUB continues to diversify Singapore's water sources, the number of desalination and NEWater plants has increased. There will be ten such plants by the end of this year, up from seven in February 2018. Third, PUB continues to leverage technology to improve service quality. As announced in January this year, PUB will roll out some 300,000 smart water meters in homes and commercial and industrial buildings by 2023. Lastly, to complement PUB's efforts in ensuring the security of our water supply, we will also need building owners and managers to do their part to keep our water supply system secure, by protecting their water tanks against unauthorised access.

3. Against the backdrop of these developments, it is necessary to update the Public Utilities Act in four key areas to ensure that it remains effective and relevant. Let me go through each group of amendments in turn.

AMENDMENT #1: CONFER NEW COASTAL PROTECTION FUNCTIONS AND ESTABLISH THE COASTAL AND FLOOD PROTECTION FUND

4. The first group of amendments will expressly confer new coastal protection functions on PUB, and legislate the new Coastal and Flood Protection Fund.

5. PUB is currently the national authority for drainage and inland flood protection. Given the synergy in tackling inland flooding and coastal inundation risks together in a holistic manner, the Government has tasked PUB to be the national Coastal Protection Agency. PUB will work with agencies and other stakeholders to enhance our coastline defences, and coordinate policies to facilitate decisions on land-use,

development and activities to safeguard Singapore against rising sea levels.

6. To provide for the substantial capital outlay and implement coastal and flood protection in a fiscally sustainable manner, DPM announced in his Budget Speech that a Coastal and Flood Protection Fund will be set up within PUB, with an initial injection of \$5 billion from the Government's FY2020 Budget.

7. We will use this fund prudently to implement coastal protection measures, which could include sea walls, tidal gates and pumping stations. These are all being studied, and may need to be deployed together to prevent flooding. The Fund will also be used to help PUB expand Singapore's drainage infrastructure to cope with more intense rainfall arising from climate change.

8. The Coastal and Flood Protection Fund signals the Government's resolve in tackling long-term existential challenges such as climate change. PM mentioned at the National Day Rally last year that climate change adaptation might cost \$100 billion or more over the next 100 years. Given the significant outlay, we will need a combination of funding methods to finance our adaptation measures. The Coastal and Flood Protection Fund will be just one source of funding. We will study this closely and assess what other appropriate funding sources should be used. These sources may include budgets of Ministries, borrowing, and tapping on Past Reserves where land reclamation is involved. Climate change defence is existential for Singapore. PM also said in his National Day Rally speech, that everything else must bend at the knees to safeguard the existence of our island nation. Planning and investing long-term for coastal defences and national flood protection will be critical to ensure that Singapore has adequate resources to meet this challenge.

AMENDMENT #2: LEGISLATIVE SAFEGUARDS OVER DBOO PLANTS

9. The second group of amendments will provide for legislative safeguards over our water infrastructure, especially water supply plants. As the House is aware, we have been diversifying our water

sources by building up our four national taps over the decades. The intent is to safeguard our water security.

10. As we build up our desalination and NEWater capacity, PUB has partnered the private sector to design, build, own, and operate some of our desalination and NEWater plants. This DBOO model allows PUB to tap on the expertise and resources of the private sector to deliver water solutions more cost-effectively.

11. By the end of this year, PUB will have six out of ten desalination and NEWater plants under the DBOO model. The remaining four plants are owned and operated by PUB.

ROBUST CONTRACTUAL SAFEGUARDS ARE IN PLACE

12. For the DBOO plants, PUB has put in place robust contractual safeguards to ensure water security. For example, concession companies that own and operate DBOO plants are obliged to seek PUB's approval when there is a change in control. Under the contractual terms, PUB can terminate the contracts and buy over the plants, or in some cases, step in to operate the plants, should the need arise. We have successfully executed some of these contractual remedies in the past to ensure our water security.

LEGISLATIVE SAFEGUARDS REQUIRED

13. Water security is critical to Singapore's national security. While we have already strong contractual safeguards, given that water security is an existential issue to Singapore, we need to always look for ways to strengthen safeguards over our water infrastructure. We have reviewed the regulatory regimes of other critical infrastructure, such as electricity and telecommunications, and concluded that it would be prudent to adopt similar legislative safeguards that are already in place in these sectors.

14. Taking reference from these other legislation, the Bill will strengthen PUB's oversight of the concession companies. These concession companies, as well as any underlying trusts or business trusts that may be set up to hold the plant assets, will be designated by PUB and be subject to additional oversight mechanisms under the Bill.

15. Broadly, under Clause 8, all designated parties will be subject to three types of oversight controls. First, a person who becomes a substantial controller or indirect controller of the designated parties that own and operate the DBOO plants will need to notify or seek approval from PUB. This is to ensure that control of DBOO plants rests with individuals or groups whose interests are aligned with the long-term interests of Singapore's water security and the public interest. For example, we may need to ensure that there is sufficient diversity in the ownership and operation of DBOO plants in Singapore. This will reduce the risk to Singapore's water security from having mega conglomerates monopolising our critical infrastructure but then unexpectedly collapsing. Given the strategic role that DBOO plants play in Singapore's water security, PUB must maintain oversight of controllers who directly or indirectly control substantial equity interest and/or voting power in these designated parties.

16. Second, these designated parties cannot be dissolved, terminated or wound up voluntarily without PUB's consent. The dissolution, termination or winding up of these designated parties will adversely affect our water security. If there are court proceedings for the dissolution, termination or winding up of these designated parties, PUB will be a party to such proceedings, and the court must consider representations made by PUB in such proceedings. This ensures that the court does not make any decision without having considered water security considerations. In addition, the creditors of these designated parties cannot enforce security over the property of such parties, or enforce any court order against such parties, without giving prior notice to PUB.

17. Third, the Minister will be empowered to issue Special Administration Orders, or SAOs. An SAO is an order of the Minister directing the takeover of control of the affairs, business and property of a designated party by another person, so as to ensure the continued operations of the DBOO plant for the public interest.

18. Mr Speaker, Sir, we are mindful that while such powers are similarly found in the other legislation I referenced earlier, concession companies may have some concerns over these powers. I would like to assure Members that these levers will not be exercised lightly and

the Bill has limited their use to exceptional circumstances, such as when Singapore's water security is under threat. As far as possible, PUB will continue to rely on existing contractual safeguards where appropriate, which have served PUB well thus far. But as I mentioned earlier, when it comes to water security, we take no chances.

AMENDMENT #3: SUPPORT IMPLEMENTATION OF ADVANCED METERING INFRASTRUCTURE

19. The third group of amendments relate to smart water meters. Clauses 2, 5, 6, 7 and 11 will update the Public Utilities Act to extend existing powers of PUB in relation to water meter installation, maintenance and enforcement to cover smart water meters.

20. These powers will support PUB's Smart Water Meter Programme, the first phase of which involves the deployment of some 300,000 meters, starting from next year, in new and existing residential, commercial and industrial premises. This will allow PUB to leverage digital technologies to encourage behavioural change towards water conservation, optimise water demand management, and achieve greater operational efficiencies.

21. The updated provisions would empower PUB to: first, install smart water meters, including ancillary equipment; second, enter premises at reasonable hours or at such other time as may be agreed with the owner or occupier of the premise to carry out inspection or works on smart water meters; third, direct the owner to remove any object that hinders or obstructs access to a smart water meter; and fourth, take action against any person who interferes, interrupts or obstructs with the operation of a smart water meter supplied by PUB. In addition, the amendments specify the circumstances under which a person would be presumed to have tampered with a smart water meter and thus committed an offence.

AMENDMENT #4: RAISE MAXIMUM PENALTY FOR OFFENCES RELATING TO WATER TANK SECURITY

22. The last group of amendments relate to water tank security. While PUB had made great efforts to protect its water infrastructure and ensure that potable water supplied to consumers is safe and fit for drinking, building owners and managing agents also have a part to

play in ensuring our water remains safe for drinking. For example, they need to take the necessary steps to prevent unauthorised access to the water tanks in their buildings, as these intrusions may disrupt or contaminate the water supply to customers.

23. Currently, a lapse in water tank security, such as failing to lock the water tank access door, is already an offence under the Public Utilities (Water Supply) Regulations. The offence carries a maximum penalty amount of \$10,000, or imprisonment of up to 12 months, or both. PUB can offer to compound the offence by collecting a sum not exceeding \$3,000.

24. Clause 10 introduces a new Section 45A to provide increased deterrence and enhance the security of water tanks by raising the maximum penalty amount for such offences to a fine of \$50,000, or imprisonment of up to 12 months, or both. This is in line with the maximum penalty amount for causing contamination to the water supply by PUB, or interfering with or disrupting PUB's water supply. In addition, the maximum composition sum for such offences will also be increased from \$3,000 to \$10,000.

25. The increased penalties will serve to remind building owners and management teams to take water tank security seriously. The vast majority of the building owners and management teams are diligent in ensuring water tank security and need not be concerned by the change.

CONCLUSION

26. Mr Speaker, in summary, PUB's work continues to evolve. As PUB takes on a new role to defend our coasts, it also continues to diversify our water sources, digitalise its operations, and enhance water security. The proposed amendments to the Public Utilities Act that I have elaborated on in my speech are necessary to ensure that the Public Utilities Act remains effective and relevant. Ultimately, these proposed amendments will allow PUB to continue to fulfil its mission of safeguarding our water security, and ensuring a safe and reliable supply of water for all.

27. Sir, I beg to move.

Ms Joan Pereira: To ask the Minister for the Environment and Water Resources as part of the SG Clean campaign, whether the Ministry will provide a set of guidelines and encourage our hawkers to refrain from practices that cause contamination risks.

Answer:

1. All hawkers are licensed by the Singapore Food Agency (SFA) and are required to comply with licensing conditions and regulatory requirements. These include maintaining and cleaning their stalls regularly, and having proper infrastructure in place to safely prepare, handle and sell food. Hawkers and their assistants who handle food must also pass the Basic Food Hygiene Course, which equips them with relevant food safety and hygiene knowledge, including proper food handling and good personal hygiene practices. SFA conducts regular inspections to ensure that the regulations are adhered to.
2. The National Environment Agency (NEA) also encourages best practices for the cleaning of hawker centres, such as the use of two separate cloths for table cleaning, as well as sanitising and soaking of cleaning cloths in household bleach at the correct concentration according to manufacturer's instructions. Following the SARS episode in 2003, NEA has also instituted quarterly "spring cleaning" for all hawker centres, where hawkers are required to clean up their stalls and the centre is closed for thorough cleaning, such as high pressure jet-wash of the whole centre and cleaning of hard-to-reach surfaces.
3. When COVID-19 cases were first detected in Singapore, NEA and SFA issued joint advisories and stepped up engagement efforts to food establishments, including hawker centres and hawker stalls, to ramp up cleaning efforts and safeguard public health. Last month, the national SG Clean campaign was launched to rally all Singaporeans to keep Singapore clean. As part of the campaign, NEA and SFA introduced sanitation and hygiene checklists for hawker centres and stalls which highlight key practices to safeguard hygiene and reduce contamination risks. Practices include regular cleaning of premises, especially frequent touch points or heavily soiled areas, and sanitisation of food preparation surfaces, utensils and cooking equipment. Hawker centres and stalls that adhere to the checklists will be awarded the "SG Clean" quality mark. To date, 19 hawker centres and 1 in 5 hawker stalls have been certified "SG Clean". We will audit all hawker centres and stalls for the "SG Clean" quality mark standards by this year.
4. Every Singaporean must also play our part to keep Singapore clean in our battle against COVID-19. As individuals, we should continue to practise good personal hygiene and responsibility like frequent handwashing and temperature monitoring. As a community, we need to exercise social responsibility and collectively keep our premises clean and pest-free to reduce the spread of diseases and viruses. I encourage all Singaporeans to practise the "7 Habits of Good Public Hygiene":
 1. Keep premises clean and pest-free;
 2. Return trays and keep table clean;
 3. Keep toilet clean and dry;
 4. Wash hands regularly with soap;
 5. Take temperature and see doctor if unwell;
 6. Use tissues when sneezing or coughing; and
 7. Bin litter and soiled tissue.

Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources (a) whether NEA has observed recurring dengue clusters in specific estates/areas in Bukit Batok East over the last five years; (b) if so, where are these specific estates/areas; and (c) what are the efforts in place to contain the spread of dengue in these estates/areas.

Answer:

1. Between 2015 and 2019, 41 dengue clusters were reported in Bukit Batok East division. The top areas with frequently occurring clusters in the past 5 years include the landed residential estate at Jalan Jurong Kechil / Upper Bukit Timah Road / Chun Tin Road / Yuk Tong Avenue, as well as the public housing estates at Bukit Batok East Avenue 4 / Bukit Batok East Avenue 5 and Toh Guan Road. The largest cluster of 35 dengue cases in that period was reported in the Chun Tin Road/Jalan Jurong Kechil/Yuk Tong Avenue area in November/December 2018. As of 1 Apr 2020, there were nine clusters in the Bukit Batok East division this year, of which five have closed.
2. The National Environment Agency (NEA) addresses the risk of dengue transmission through a multi-pronged evidence-based approach. This is consistent across all clusters in Singapore, including Bukit Batok East. NEA conducts comprehensive surveillance of the mosquito population through its network of more than 64,000 Gravitrap. This allows NEA to target its vector control operations early and prioritise areas with higher mosquito population. NEA also adopts a preventive approach by conducting regular inspections for potential mosquito breeding habitats, and taking enforcement action against premises owners found to be breeding mosquitoes. NEA works closely with members of the Inter-Agency Dengue Task Force (IADTF), including Town Councils, to step up vector control operations in dengue cluster areas. Dengue cluster alert banners and posters are also put up at the lift lobbies of HDB blocks to heighten residents' awareness on the dengue situation. Residents living in cluster areas are urged to co-operate with NEA officers to allow them to carry out checks for mosquito breeding habitats. Residents can also apply mosquito repellent to protect themselves from mosquito bites, and spray insecticide in dark corners within their homes to kill adult mosquitoes.
3. Since 2019, NEA has published, on the NEA website and myENV app, information on areas with relatively higher *Aedes aegypti* mosquito population. In February 2020, a total of 103 areas were detected with higher *Aedes aegypti* mosquito population by NEA's Gravitrap Surveillance System, including one in the Bukit Batok East division. Residents of Bukit Batok East and members of the public are encouraged to subscribe to the notification on dengue clusters and areas with higher *Aedes aegypti* mosquito population in the myENV app, and do their part to stem dengue transmission.
4. NEA has ongoing educational and publicity campaigns to promote community action to prevent dengue transmission. The annual National Dengue Prevention Campaign was launched on 22 March 2020, to rally the community to fight dengue ahead of the traditional mid-year peak dengue season. NEA also launched the SG Clean campaign to galvanise collective community action to keep our public spaces clean. The SG Clean campaign, which calls on members of public to adopt good public and personal hygiene habits, goes hand in hand with our fight against dengue. For instance, throwing litter into trash bins, to remove potential mosquito breeding habitats.
5. NEA alone cannot prevent dengue transmission in Singapore. NEA has observed a 50% increase in *Aedes aegypti* mosquito larval breeding habitats found in homes over the past three years, compared to the preceding three years. There is hence an urgent need for all stakeholders and home owners to step up their efforts to eradicate mosquito breeding habitats. Everyone must do their part to protect themselves and their loved ones from dengue.

Ms Anthea Ong: To ask the Minister for the Environment and Water Resources (a) whether the estimate of \$100 billion for coastal defences over the next 100 years is based on Singapore's Second National Climate Change Study released in 2015 by the Meteorological Service Singapore, which did not take into account the melting of Antarctica; (b) how much more will sea levels rise for Singapore given that Antarctica is melting with the latest scientific evidence; and (c) how much more will it cost Singapore to adapt to the increase in sea level rise due to this melting of Antarctica.

Answer:

1. Being an island state, Singapore is vulnerable to sea level rise. Our coastal protection efforts could cost us S\$100 billion over the next 50 to 100 years.
2. The S\$100 billion cost estimate was based on BCA's Coastal Adaptation Study (CAS) which was commissioned in 2013. The findings referenced the Fourth (AR4) and Fifth (AR5) Assessment Reports from the Inter-Governmental Panel on Climate Change (IPCC) as well as Singapore's Second National Climate Change Study published in 2015. These reports did not fully account for the ice-sheet melt in Greenland and the Antarctic as the science then was still nascent.
3. Over the past five years, scientific understanding of this issue has developed significantly and the IPCC released a Special Report on Ocean and Cryosphere in a Changing Climate (SROCC) in September 2019. The SROCC found that: global warming has increased the rates of ice loss from ice-sheets and glaciers worldwide, and contributed to accelerated rise in global mean sea levels; global mean sea level is projected to rise by up to 1.1m in 2100 (about 0.1m higher than the AR5 projections); and historically rare extreme sea level events could occur at least once per year, especially in tropical regions.
4. Scientists from the Centre for Climate Research Singapore (CCRS) have studied the SROCC findings closely and note that sea level rise in tropical areas could be up to 30% higher than the global average. As this is a complex topic, CCRS will be studying this in greater detail under the National Sea Level Research Programme (NSLP). The findings from the NSLP will provide important insights to help strengthen our defences against sea level rise. As part of the Third National Climate Change Study to be completed in 2022, CCRS will develop the new framework for future sea level projections for Singapore, making use of the upcoming Sixth Assessment Report's (AR6) climate projections. This will ensure that CCRS's sea level rise projections are robust and informed by the latest scientific knowledge.

5. PUB, who has been tasked as the national coastal protection agency, will focus on studying our coastal areas, beginning with City-East Coast and Jurong Island, to ascertain the type, feasibility, and extent of protection measures required, and derive detailed cost estimates. To provide for the substantial capital outlay, the Government will set up a Coastal and Flood Protection Fund within PUB, with an initial S\$5 billion injection.

6. Other countries are looking at investments of similar or even greater magnitude to protect their coastlines. For example, reports have suggested that the US may need to spend more than US\$400 billion between now and 2040 to defend its coastlines. The Netherlands currently commits around 1 billion Euros a year to address flood protection and water supply challenges.

7. Climate science is constantly evolving, and projections of sea level rise will continue to change. Our coastal protection plans will need to be flexible and dynamic to be able to accommodate both future needs and the latest science. The \$100 billion is an estimate that could change as science advances. This is a long-term and large-scale effort that the Government will undertake to protect Singapore and Singaporeans.

Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources with the implementation of the smoking ban in the Orchard Road area on 1 January 2019 (a) what is the trend in the number of offenders since the implementation; (b) whether there are plans to add more designated smoking areas; and (c) whether the Ministry will consider moving these designated smoking areas away from main pedestrian thoroughfare.

Answer:

The Orchard Road No-Smoking Zone (NSZ) came into force on 1 January 2019, as part of the Government's efforts to protect non-smokers from the harmful effects of second-hand tobacco smoke. An advisory approach was adopted in the first three months of the implementation, to give the public sufficient time to adjust to the smoking prohibition. A daily average of 735 advisories were issued to offenders between January and March 2019. With greater public awareness, this number fell sharply when enforcement started on 1 April 2019. The number of recorded offences decreased from 21 cases per day on 1 April 2019 to around 15 cases per day at present.

The NSZ covers a relatively large area with numerous commercial premises. As such, NEA works closely with the Orchard Road Business Association or (ORBA), and building owners to ensure sufficient provision of designated smoking areas or (DSAs). There are now more than 50 DSAs in the NSZ, spaced about 100 to 200 metres apart. The number of DSAs in the NSZ is currently sufficient.

Given the high footfall and densely built-up nature of Orchard Road, careful consideration is made on the location of DSAs. As far as possible, the DSAs are sited in less conspicuous locations and away from the main pedestrian thoroughfare, to ensure that smoking is contained and not done in clear view of passers-by. This will help protect public health and avoid normalising smoking. NEA will continue to monitor the ground situation and review the location of DSAs if necessary.

Everyone plays a part in keeping the environment clean and liveable. Families and friends of smokers, as well as the general public, can help reinforce the right social norms through timely and friendly reminders for smokers to use the DSAs.

1. Mr Speaker, Sir, I thank Dr Intan and Mr Zainal for conveying the concerns of home-based businesses, or HBBs.

2. I too salute Mdm N, Ms Sery and Ms Tan for their spirit of self-reliance. I too can empathise with Dr Intan's mother who supplemented her income with a home-based business. This was what many Malay families and many of us in the Chamber have gone through. My mother too operated a home based business when my father passed on. So when I say I can empathise deeply with their challenges, I say this as someone who has lived that life. Many housewives juggle taking care of their children and elderly parents, and running these businesses to supplement their incomes. The tightening of Circuit Breaker measures has put restrictions on many businesses including HBBs. For HBBs catering to the Malay/Muslim community, I understand their disappointment, especially those who had been gearing up for Ramadan and Hari Raya celebrations. But the COVID-19 crisis is not about preserving livelihoods alone. The crisis has forced many governments – many of us – to make stark choices between preserving livelihoods and preserving life itself.

3. Indeed their plight reflects the difficulties many Singaporeans currently face. Many have lost their jobs or have been placed on no-pay leave through no decisions of this government. And even for those of us who still have our jobs, we are confined to our homes, going out only for essentials and exercise. But I believe many support the Circuit Breaker and agree that it is necessary. We are starting to see the results. I thank everyone for choosing to stay united, to save lives and protect our community.

4. Let me share with the House our approach so far and the support available to those affected.

KEY CONSIDERATIONS FOR IMPLEMENTING CIRCUIT BREAKER AND TIGHTENING RESTRICTIONS ON HBB

5. On 7 April, we imposed the Circuit Breaker to decisively curb the spread of COVID-19. Before this, we routinely had more than 50 new cases daily. Like many countries, the risk of cases growing exponentially was real and this is the reason why it is so hard to plan and prepare our citizens for what comes next. We had to act fast and hard to minimise people movement and social interactions. We understand this has been painful for everyone.

6. The list of essential services was further tightened from 21 April as the infection rate had not reduced sufficiently. Barbers, laundromats, as well as desserts, confectionary and cakes stores suspended their operations.

7. We also clarified that only HBBs that operated solely online were allowed, as these do not involve collection and delivery of goods.

8. Non-online HBBs could normally run without oversight or registration as they were typically small and did not disturb their neighbours. However, their informal and dispersed nature presents a special challenge during COVID-19. We cannot enforce safe distancing in them the same way we do for commercial outlets. This poses a real risk when people move and interact in residential estates, as goods are collected and delivered.

9. It takes just one infected person to start a cluster. Lives, especially of our elderly, are at stake and they can be right in the homes of these HBB operations. The Circuit Breaker would need to be extended if community transmissions remained high. Hence, we made the difficult decision to restrict the operations of HBBs. I hope everyone understands why.

RESUMPTION OF SELECTED ACTIVITIES

10. But what has been the outcome? Because everyone including HBBs complied with the measures, we are seeing early results. The average daily number of new cases in the community has halved, from 25 in the week before to 12 last week.

11. We are therefore gradually relaxing restrictions from 12 May. Beyond allowing retail sale of cakes and confectionary for takeaway and delivery, we are resuming food HBBs, for delivery and collection only. So we are not backpedalling. We are just making decisions based on the situation, and the situation has improved. But we are not out of the woods yet, because clusters can still form as activities and interactions increase. Food HBBs, their customers and delivery personnel have to comply with a set of safe distancing measures — practising contactless delivery and collection, and installing TraceTogether to help contact tracing. Dr Intan suggested channelling HBBs to central kitchens but this is not necessary with the latest position, and may result in even greater movement of people. Other non-online HBBs are to remain closed for now.

12. Food HBBs can now accept and start preparing orders to be fulfilled after 12 May. It fulfils the hope I had expressed in my Facebook post — that you will be in time for Hari Raya Puasa, even if we must be prepared for a quieter Raya.

GOVERNMENT'S COMMITMENT TO SUPPORT WORKERS AND BUSINESSES IN THESE DIFFICULT TIMES

13. To preserve lives, moves have been rapid and hit many hard. We will take care of those affected by the COVID-19 situation and those affected by decisions to curb its exponential growth.

14. MOF has introduced schemes over three budgets to support our businesses, workers and those in need. All Singaporeans aged 21 and above also received a one-off Cash and Support payout in April.

15. Many HBBs operators would have benefited from the Temporary Relief Fund that was meant for relief in April. From May, as Mr Zainal enquired, self-employed HBB owners can apply for the Self-Employed Person Income Relief Scheme (SIRS), or the COVID-19 Support Grant if they do not qualify for SIRS but are salaried employees who lost their jobs, suffered a pay cut, or were placed on involuntary no-pay leave. Social Service Offices (SSOs) will also extend other forms of support, like ComCare for low-income families who need help.

16. Many members of the Malay/Muslim community have stepped up to calm worries and extended help to food HBBs. This is the correct spirit in the holy month of Ramadan. I would like to thank them all.

17. For instance, the Singapore Malay Chamber of Commerce and Industry (SMCCI) quickly got in touch with over 1,800 HBBs. SMCCI helped qualify HBBs so that they could access the Temporary Relief Fund automatically. They are advising them on how to tap on other government support schemes. SMCCI is also looking to provide capability and capacity building for HBBs. If there is a silver lining, the HBBs now have SMCCI to champion and help them run viable and resilient micro-businesses. I wish them a fruitful relationship.

18. I also thank lawyers in the M³ community who, together with SMCCI, extended free legal advice to HBBs concerned about the legal implications of failing to fulfil their obligations, like issues around deposits and inability to deliver in time.

[Mr Speaker, allow me to speak in Malay.]

19. Saya amat prihatin dan bersimpati dengan golongan masyarakat kita yang bergantung pada perniagaan kecil-kecilan dari rumah untuk sumber pendapatan mereka. Mereka yang telah mengambil pesanan untuk bulan Ramadan dan Syawal pasti terjejas teruk, terutamanya dengan pesanan Ramadan yang mungkin kurang sedikit tahun ini kerana COVID-19. Tetapi kita perlu mengurangkan semua pergerakan dan interaksi agar tidak menyebarkan virus kepada warga tua, keluarga dan rakan-rakan kita. Penyesuaian perlu dibuat, sama seperti bagaimana kita telah menyesuaikan diri untuk melalui Ramadan yang sangat berbeza tahun ini. Saya berterima kasih kepada masyarakat kita kerana memahami dan membuat penyesuaian. Oleh kerana kita sudah mula melihat hasil dari langkah-langkah pemutus rantai jangkitan yang telah diperketat, Pemerintah telah membenarkan perniagaan makanan kecil-kecilan dari rumah untuk beroperasi semula dari 12 Mei. Ini memberi para peniaga masa sebelum tibanya Hari Raya Aidilfitri, walaupun perayaan tahun ini perlukan penyesuaian juga. Dewan Perniagaan dan Perusahaan Melayu Singapura (DPPMS) sedang mendekati dan menasihati para peniaga untuk memanfaatkan skim-skim bantuan pemerintah, dan bekerjasama dengan para peguam M³ untuk menawarkan nasihat guaman secara percuma. Dalam usahanya untuk membantu HBB dalam masyarakat Melayu/Islam, DPPMS juga

sedang meninjau bagaimana untuk menyokong golongan ini dalam jangka masa panjang.

CONCLUSION

20. Let me conclude by assuring Dr Intan, Mr Zainal, and the House that the Government stands ready to support workers and businesses who have been hit by COVID-19.

21. The situation has improved, not by chance but because we stayed home and observed safe distancing. But we must not be complacent. We are dealing with a cunning virus and a difficult adversary. If we have reaped anything from this, it was to give focus to food HBBs to do your part to enforce safe distancing during food preparation. I also hope that through the crisis, they will be reborn resilient like Dr Intan's mother. For those HBBs that remain suspended, please be patient. Restrictions can only be lifted gradually and carefully when the situation continues to improve. We must prevent infections from spreading uncontrollably because when that happens, nature will take a tragic course. The more united we are in observing the Circuit Breaker, the sooner we can lift the measures.

Mr Melvin Yong Yik Chye: To ask the Minister for the Environment and Water Resources since the start of circuit breaker measures (a) how many stallholders operating in hawker centres managed by NEA and NEA-appointed operators have closed their hawker stalls due to a drop in business; (b) how many hawkers have embraced food delivery options and applied for Enterprise Singapore's Food Delivery Booster Package and NEA's one-off \$500 funding; and (c) what are the reasons cited by hawkers for not using the food delivery platforms despite the grants.

Answer:

1 Since the start of the Circuit Breaker measures, we have observed that about 20-30% of cooked food stallholders have chosen not to operate their stalls. Some stallholders, particularly those in the Central Business District, have chosen not to operate their stalls as the office crowd has thinned and business has fallen. Others like older stallholders have also temporarily closed their stalls. We have earlier announced our support for hawkers with 3 months of rental waivers, as well as one month of subsidies to defray table-cleaning and centralised dishwashing costs. We will continue to support hawkers to ensure that they need not pay for these services during the extended Circuit Breaker period.

2 Food delivery services can help to open up a new revenue stream for hawkers, especially during this Circuit Breaker period. While the demand for food delivery services has generally increased during this period, there are hawkers who remain hesitant in subscribing to such services. Some may not be aware of the various options available or find the commission costs charged by more popular platforms prohibitive. Others may be unfamiliar with and resistant to adopting new technology solutions.

3 NEA and Enterprise Singapore (ESG) have launched initiatives to support hawkers in adopting food delivery services. The Food Delivery Booster Package by ESG was introduced at the start of the Circuit Breaker period so that F&B establishments, as well as hawkers, can enjoy 5% off the prevailing commission rates charged by the major food delivery platforms and 20% lower delivery costs if they engage third-party logistics players. NEA also introduced a one-time funding assistance of S\$500 for hawkers who adopt food delivery services, and has been reaching out to hawkers to encourage adoption. As of today, some 600 applications have been received for this scheme. We encourage more hawkers to make full use of this funding to set up an additional revenue stream during this challenging period. To facilitate this, we have decided to extend the availability of this S\$500 assistance by one month, to end of June 2020.

4 Over the longer term, we recognise that the model for food delivery services, including the commission structures, would need to evolve if they are to be attractive to hawkers. These models must strike a balance among all parties in the food delivery services ecosystem, including hawker, delivery person and platform operator. We are heartened that ground-up initiatives such as Hawkers United and SG Dabao have emerged in recent weeks; these help hawkers to advertise their food for delivery or pick-up. There are also smaller operators with newer models that allow users to aggregate orders within a hawker centre and do not impose direct commissions on the hawker food. I encourage other established companies to review their business models to see how hawker food delivery can be a complementary and integral part of their broader suite of services.

Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources whether the Ministry will consider banning the display, slaughter and sale of wild-caught live soft-shelled turtles at the wet markets due to zoonotic disease transmission risks.

Answer:

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1 NEA has stopped tendering out wet market stalls for the sale of live turtles since 2012. Existing wet market stalls that are currently allowed to slaughter and sell live turtles can however carry on with their trade if they comply with food safety and hygiene requirements under the Environmental Public Health Act. This includes ensuring stall cleanliness and proper storage practices. Enforcement actions will be taken by SFA against vendors for food safety and hygiene infringements. SFA has not detected such infringements during its regular inspections.

2 SFA, in consultation with NParks and NEA, has evaluated the risk of zoonotic disease transmission by reptiles associated with the slaughter and sale of live turtles. Transmission risks are found to be low, as long as food safety and hygiene standards are maintained. There have been no cases of zoonotic disease transmission from these animals at the wet market stalls.

3 In general, foodborne bacteria such as *Salmonella* can be found in all live animals and raw meat, and these can be transmitted to people through direct contact or ingestion. To prevent foodborne illnesses, both stall vendors and patrons should observe good food safety and hygiene practices, such as the washing of hands with soap and water before and after handling raw meat, and by thoroughly cooking the meat, which helps to kill any harmful bacteria in food. -

4 Nonetheless, agencies are reviewing the sale and slaughter of live animals in wet markets taking into consideration international benchmarking and scientific evidence, and will continue with efforts to improve public health and environmental hygiene standards in Singapore, including our wet markets. Members of the public can also report non-compliant wet market stall vendors to SFA or NEA via the agencies' online feedback forms.

Question:

Mr Murali Pillai: To ask the Minister for the Environment and Water Resources what are the additional plans to tackle and bring down the expected high number of dengue cases so as not to overwhelm the healthcare service providers who are currently heavily engaged in the fight against the COVID-19 outbreak.

Answer:

1 The total number of dengue cases in 2020 has exceeded 6,000 so far – more than double that over the same period in 2019. The number of weekly dengue cases remains high, hovering at around 300 to 400 cases per week, and the total number of dengue cases is projected to exceed the 16,000 cases in 2019. To manage the expected increase in cases as we approach the traditional peak dengue season, NEA's dengue operations are continuing during this circuit breaker period. NEA has also called for all stakeholders to take concerted action to suppress the *Aedes* mosquito population.

2 Regular housekeeping and maintenance of premises and common areas are crucial to curb dengue transmission. Raising the standards of personal and public hygiene are not only critical for our defence against COVID-19, they also mitigate the spread of dengue.

3 Good housekeeping at residential premises is critical, especially as more people are working from home. NEA has observed a 50 per cent increase in *Aedes* mosquito breeding in homes over the past three years, compared to the preceding three years. NEA therefore brought forward the launch of the National Dengue Prevention campaign to 22 March to rally the community to be vigilant in carrying out the Mozzie Wipeout to remove potential mosquito breeding habitats. Homeowners of landed houses are also urged to check their roof gutters and perimeter drains in their compounds for potential mosquito breeding habitats.

4 NEA is working closely with stakeholders in the Inter-Agency Dengue Task Force, including Town Councils, to remove potential mosquito breeding habitats in public areas and housing estates. Despite increased demands on the cleaning sector arising from the ongoing COVID-19 situation, NEA has worked with our cleaning service providers and Town Councils to ensure that cleaning of higher footfall areas and flushing of drains are not compromised, and even stepped up as necessary.

5 Even though businesses are closed during the circuit breaker period, NEA requires owners of premises and work sites to continue with proactive vector control measures. Pest control operators are allowed to continue operating during the circuit breaker period. Owners of premises, especially construction and renovation sites which have a propensity for water pooling that allows for larger mosquito breeding habitats, should apply for "Time-Limited Exemptions" for their workers to return to their premises to perform essential mosquito prevention measures during this period.

6 NEA has also embarked on a stepped-up inspection regime of construction sites, prioritising hotspots which are located in dengue clusters or have a previous record of mosquito breeding. NEA has reached out to members of the Singapore Contractors Association Ltd. and operators of dormitories to sustain their vector control works. This posture will be maintained for the entire duration of the Circuit Breaker period.

7 All stakeholders, residents, contractors and business owners, have a part to play in preventing dengue. Everyone must step up efforts to eradicate mosquito breeding habitats together, uphold good personal and public hygiene, to protect themselves and their loved ones from dengue and COVID-19.

Questions:

Ms Rahayu Mahzam: To ask the Minister for the Environment and Water Resources (a) what training has been given to the safe distancing ambassadors to prepare them for their role during the circuit breaker period; and (b) what measures have been put in place to ensure their safety and well-being as they perform their roles.

Miss Cheng Li Hui: To ask the Minister for the Environment and Water Resources when the circuit breaker period ends (a) whether the safe distancing measures and penalties will continue to be in force and, if so, how; (b) whether additional measures are necessary to ensure a continuous reduction in new COVID-19 cases; and (c) whether safe distancing ambassadors will continue to be deployed and, if so, how will it be ensured that they adequately protect themselves from abuse and violence.

Answer:

1 The introduction and enforcement of Safe Distancing measures (SDMs) is an important strategy in Singapore's national effort to curb the transmission of COVID-19. The Government takes these SDMs seriously, as they are crucial to slow the transmission of the virus and to keep all of us safe. We thank the majority of Singaporeans who have followed not just the letter of the law, but also the spirit of the measures. For the small minority who refuse to cooperate, they remain at higher risk of contracting the virus and then spreading it to others. We therefore have enforced strictly so that the pain endured and sacrifices made by the majority are not wasted.

2 The Ministry of Environment and Water Resources leads a Taskforce to implement SDMs in key public spaces in HDB estates, such as town centres, wet markets, hawker centres, coffee shops, parks, and public transport nodes. The Taskforce comprises NEA, SFA, HDB, NParks, LTA, SportSG, PA, SPF, MCCY, and PSD. Every day, the agencies deploy around 3,000 Safe Distancing Enforcement Officers, SG Clean Ambassadors, and Safe Distancing Ambassadors.

3 The role of an Enforcement Officer or Ambassador is not an easy one. The officers start their shifts from as early as 6am, and are constantly on their feet ensuring that members of public and businesses adhere to the SDMs. Enforcement Officers are authorised to take enforcement actions against violations of SDMs. I would like to thank our officers for their tireless efforts and sacrifices to keep us safe.

4 Our Enforcement Officers and Ambassadors have different backgrounds and skillsets. Many are public service officers from around 50 different agencies, who have stepped forward to join the Taskforce's operations, on top of their existing functions and duties which they still have to balance. Others are displaced Singaporeans on temporary employment, such as those recruited from the aviation sector. We also have volunteers who support PA and other Task Force agencies to ensure safe distancing.

5 Training is conducted for all officers to prepare them before deployment. They are briefed on the SDMs, and rules of engagement when dealing with members of public. We pay special attention to remind them not to put themselves in harm's way, and to train them to handle situations, like assisting vulnerable groups such as seniors and individuals with mental illness with sensitivity, or managing uncooperative and abusive

individuals. During their initial deployment, these officers are paired with more experienced team mates for additional on-the-job guidance to familiarise them with the work and build their confidence.

6 For their safety and protection, Enforcement Officers and Ambassadors are given identification such as passes and armbands, and protective equipment which may include face masks, face shields, and hand sanitisers. They are also reminded to practise good hygiene such as to take their temperature twice a day, wash their hands frequently with soap and water, and shower and change their clothes at the end of the day before they come into close contact with others. We have also developed a set of best practices for deploying agencies, such as keeping officers to the same team for daily deployment where possible.

7 While the majority of the population has been cooperative, a small number of individuals have been defiant and abusive to our Enforcement Officers and Ambassadors. They have photographed and filmed them as they do their jobs, and have even verbally and physically abused them. Let me state categorically that this is unacceptable, and we have zero tolerance for abuse of our officers. We have and will continue to work closely with the Police to identify, apprehend, and charge those responsible with the full force of the law.

8 SDMs and the associated penalties will be in force for the duration of the Circuit Breaker period, which is until 1 June. We will adjust the measures and deployment of officers depending on the prevailing situation. To minimise the risk of future outbreaks, we must continue to take steps to protect ourselves and others. I urge everyone to continue to follow the prevailing safe distancing advisories and measures, and observe high standards of personal hygiene and social responsibility. In this way, we can better protect ourselves and our loved ones.

9 I also seek your support for our Enforcement Officers and Ambassadors who are working for our collective safety and health. Please cooperate with them. If you see them in your community, give them a wave of encouragement from a distance away, to recognise and support them for their hard work to keep us safe.

Mr Sitoh Yih Pin: To ask the Minister for the Environment and Water Resources (a) what is the reason for the recent flash floods in several areas in Singapore, including Sennett Estate in Potong Pasir, despite the drainage system being recently expanded; and (b) what are PUB's plans to further tackle this issue moving forward.

Answer:

On the afternoon of 30 April 2020, strong solar heating of land areas coupled with convergence of winds in the region led to intense thundery showers over Paya Lebar, Punggol and Hougang. The total rainfall of 128.4mm that day was one of the highest daily rainfall ever recorded in Singapore over the past 30 years.

2 As the capacity of roadside drains were overwhelmed by the intense rainfall, flash floods resulted at locations such as Upper Paya Lebar Service Road, Lorong Gambir, Tampines Road, Serangoon Avenue 2 and Lichi Avenue (which is close to Sennett Estate). These flash floods lasted between 10 to 30 minutes. PUB officers were on site to actively engage affected residents, provide sandbags and loan the portable Dam-Easy flood panels to prevent floodwaters from entering homes. These flood panels, which PUB started loaning to residents and businesses in flood-prone areas since the start of the monsoon season in 2019, can be set up quickly during a flash flood. These flood panels were used by one of the residents during the 30 April 2020 rainstorm, who found them effective in preventing water from entering his home.

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Drainage Improvement Works

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3 As part of PUB's broader efforts to address the impacts of climate change, PUB had raised the drainage design standards to cater to higher rainfall intensity in 2011. Since then, the Government has invested almost \$2 billion in drainage works, and will invest another \$190 million this year to enhance our flood resilience.

4 In most of the areas affected by the intense rainfall on 30 April 2020, a number of flood alleviation projects have been recently completed or are ongoing. For example, PUB completed the upgrading of the Tampines Canal (from Hougang Avenue 1 to Hougang Avenue 7) in March 2019 at a project cost of \$27 million to alleviate flooding along Tampines Road. The hydraulic analysis showed that the completed works had successfully reduced the flood area by 86%, including a large section of Tampines Road. As a result, the flash flood on 30 April 2020 was confined to a localised road depression at the junction of Tampines Road and Hougang Avenue 1. PUB will study the feasibility of raising the depressed road junction.

5 For the low-lying Upper Paya Lebar Service Road, works are on-going to divert stormflow from existing drains to larger new drains. The works are expected to complete in 2021 and will further improve flood protection in these areas. In addition, PUB will be upgrading the drains serving Serangoon Avenue 2 and Lorong Gambir to alleviate flooding. These works are expected to commence over the next 2 years.

6 In the case of Sennett Estate, which is a low-lying area and prone to flooding, PUB has been progressively upgrading the drains serving the estate between 2006 and 2015. There are on-going works to upgrade the

remaining stretches of drains in the estate. When completed in 2021, flood protection for Sennett Estate will be further enhanced.

7 While PUB will continue with efforts to improve drainage systems, it is not practical to expand our drains to meet every extreme rainfall event in land-scarce Singapore. Besides drainage improvements, PUB will put in place cost-effective measures to minimise flood risks and better manage flood events. For instance, PUB is in the midst of upgrading its rainfall forecasting radar technology, which will help improve prediction of locations where heavy rainfall might occur and enhance its response time to potential flash floods. Members of the public can also stay updated on weather and flash flood warnings by subscribing to NEA's or PUB's mobile apps and SMS alerts. In the event of a flash flood, members of the public are advised to take appropriate safety measures, such as to avoid driving and walking in flooded areas.

Mr Seah Kian Peng: To ask the Minister for Environment and Water Resources whether there are plans to review the "30 by 30 vision" to locally produce 30% of Singapore's nutritional needs by 2030.

Answer:

1. When we started working on our "30 by 30" goal in 2018, our primary intention was to adapt to the challenges posed by climate change and resource scarcity. Last year, my Ministry announced our "30 by 30" goal, to produce 30 per cent of our nutritional needs locally by 2030. It complements our other strategies of diversifying import sources, growing overseas and stockpiling, to ensure the resilience of Singapore's food supply. This goal is ambitious, considering that we currently produce less than 10 per cent of our requirements, and we must achieve this goal with less than one per cent of our land.

2. In February this year, my Ministry launched the 2020: Singapore Food Story, a year-long campaign to raise awareness on Singapore's food security. As events would have it, the COVID-19 outbreak escalated quickly, impacting countries, big and small, all over the world. This pandemic has disrupted global supply chains and affected global trade and commerce. COVID-19 has strongly reinforced the need for Singapore to secure our food supply and the importance, timeliness and relevance of our "30 by 30" goal.

3. For now, we are not planning to review the "30 by 30" goal, which is already an ambitious undertaking. Local food production forms one part of our basket of strategies to buffer against food supply shocks. We are mindful that local production will not allow us to be self-sufficient in all varieties of food types that we are importing from more than 170 countries and regions today.

4. However, we are responding to the COVID-19 pandemic by accelerating our ramp up in local food production. In April, the Singapore Food Agency (SFA) launched a "30 by 30 Express" grant call to ramp up local production in eggs, leafy vegetables and fish over the next six to 24 months. Through this call, SFA will crowdsource and support innovative proposals to grow food productively and sustainably. I am also chairing a multi-agency ministerial taskforce to guide agencies in this effort, including addressing any hurdles related to the setting up or expansion of farms.

5. Even as we ramp up local food production, we need the support of all consumers, corporations and supermarkets to support local produce. Local produce is grown close to our homes, and is therefore fresher, lasts longer and is more sustainable as it incurs lower carbon miles. We encourage Singaporeans to eat local, so as to spur our farmers to increase their production, and in turn reap the benefits of economies of scale and generate exciting jobs for our people.

6. To make it easier for everyone to identify and support local produce, SFA is working with our farmers and retailers to include a new local produce logo, to be incorporated into their packaging which will be rolled out soon. The new label is a result of SFA's consultation with industry stakeholders and members of the public. SFA will also 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. As part of Singapore Together, we will be convening a Citizens' Workgroup this year to co-create ideas to increase demand for local produce.

Mr Seah Kian Peng: To ask the Minister for the Environment and Water Resources (a) whether he can assure Singaporeans that our water supply is adequate and that the water plants are continuing to run at full capacity; and (b) what is the percentage of staff at these water plants who are on telecommuting and whether this compromises the quality of our water supply.

Answer:

1. Singapore enjoys a diversified and robust supply of water, due to years of continued planning and investments in our water infrastructure. Water from local catchment and imported water, together with weather-resilient sources namely NEWater and desalinated water, make up Singapore's "Four National Taps".

2. Under the COVID-19 (Temporary Measures) (Control Order) Regulations 2020, the supply of water was amongst the essential services allowed to operate during the Circuit Breaker period. Since early February 2020, PUB has activated business continuity plans to ensure that all our water plants continue to operate as per normal.

3. PUB has implemented Safe Management Measures in accordance to the Ministry of Manpower's guidelines at the plants and work sites. These include regular temperature screenings, physical spacing of at least 1m between persons at all times and wearing of masks. PUB has also stepped up the cleaning of work sites to ensure that equipment shared between different employees across different shifts or teams are cleaned and disinfected at the end of each shift. In addition, PUB has staggered working and lunch hours, and implemented split team arrangements to reduce congregation of our employees.

4. As part of its comprehensive water sampling and monitoring programme, PUB has also continued to collect and test water samples from our reservoirs, waterworks distribution systems to customers' taps daily. The quality of our drinking water continues to comply with the Environmental Public Health (Water Suitable for Drinking) Regulations 2019 and are well within the World Health Organisation (WHO) Guidelines for Drinking-water Quality.

5. Singaporeans can be assured that they will continue to enjoy good quality drinking water from the tap during this period. I thank PUB officers for their continued dedication especially during the Circuit Breaker period.

Mr Kwek Hian Chuan Henry: To ask the Minister for the Environment and Water Resources whether Singapore will stay the course on fighting climate change and meet our climate change commitments despite the current upheavals in the energy market and the potential long-term economic impact arising from the COVID-19 situation.

Answer:

1. The Government's current priority is to manage the COVID-19 outbreak and ensure the lives and livelihoods of Singaporeans, as well as those of our migrant worker community, are well taken care of. We are all in this together and we will spare no effort to make sure that Singapore comes through this COVID-19 crisis much better than before.

2. Even as we continue with our efforts to suppress the outbreak and prepare our economy to recover from the COVID-19 pandemic, we must not lose sight of the other global challenge of climate change, which remains the biggest threat facing humanity over the long term. As a small island city-state, Singapore remains highly vulnerable to the impacts of climate change. This is why we cannot let up our efforts to address climate change.

3. Recently in March, we released our long-term low-emissions development strategy and enhanced our 2030 climate pledge in support of the goals of the Paris Agreement. They contained bold aspirations and plans to guide our long-term development and ongoing work to effect a well-managed transition to a low-carbon economy. Despite the uncertainties presented by the COVID-19 situation, we decided to press ahead with these plans and submitted them early to the United Nations Framework Convention on Climate Change (UNFCCC) in March, as we wanted to send a strong signal to Singaporeans and the international community that Singapore remains fully committed to tackling climate change. They demonstrate our seriousness and commitment to support global climate action and move towards a low-carbon and climate resilient future. We hope that our early submission to the UNFCCC would encourage other Parties to do likewise and jump-start the process of early submissions, thereby strengthening the momentum of global climate action at this critical time.

4. We also remain committed to climate action and are making good progress on our climate plans. Just last month, EMA announced that we had achieved our 2020 solar deployment target of 350 megawatt-peak. We are now pressing ahead with our plans to reach our more ambitious solar target of at least 2 gigawatt-peak by 2030. MEWR will play our part. As earlier announced at the Committee of Supply (COS) 2020, PUB will be deploying floating solar photovoltaic systems at Bedok, Lower Seletar, and Tengah Reservoirs by 2021. With this, Singapore will be one of the few countries in the world to have 100% green waterworks.

5. In the face of climate change challenges, Singapore cannot take food security for granted and we have made early moves to prepare ourselves. As early as 2019, my Ministry announced an ambitious "30 by 30" goal to produce 30 per cent of Singapore's nutritional needs locally by 2030. The COVID-19 situation has underscored the need to further enhance our food security and resilience. To this end, the Singapore Food Agency (SFA) has just launched a \$30 million "30x30 Express" grant call to accelerate the ramping up of local food production over the next six to 24 months.

6. We are also pressing on with plans to protect Singapore from sea-level rise. PUB has taken on the role of the national Coastal Protection Agency from April 2020. With this new responsibility, one agency, PUB, will study both coastal and inland flooding holistically and develop models to guide our flood protection response.

7. To facilitate the transition to a low-carbon economy, we are continuing our investment in low-emissions solutions and are partnering the industry and our research community to explore pilot projects to evaluate and improve the feasibility of technologies to drive the decarbonisation of our electricity grid and industrial processes. EDB and EMA have launched energy efficiency incentives and schemes to help our companies to be best-in-class globally in energy and carbon efficiency, and are bringing companies within a sector together to achieve systems-level efficiency gains across the sector. We urge companies to use this period of lowered activities to consider implementing energy efficiency improvement projects where

possible, so that companies can be more cost-competitive and emerge stronger when the economy picks up again.

8. As we work to prepare Singapore to recover from the COVID-19 pandemic, members of this house can be assured that the Government will keep climate change high as a priority. We will work assiduously to build a more resilient Singapore to withstand the test of future challenges, notably climate change. We encourage all Singaporeans to join us and play their part to 'game change' climate change.

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Mr Louis Ng Kok Kwang: To ask the Minister for the Environment and Water Resources with regard to the import of wild-caught soft-shelled turtle for consumption (a) what diseases are the animals tested for; (b) for each disease, how many tests have been carried out in each year for the past five years; (c) for each disease, what are the number and percentage of test results that have been positive in each year for the past five years; and (d) whether the Minister will start collecting this data if it is not already doing so.

Answer:

1. The Singapore Food Agency (SFA) takes a science-based risk assessment approach to manage food safety from farm to fork. For imports of food, SFA imposes control measures that are calibrated based on the assessed food safety risks. Importers must be licensed, and apply for import permits for each consignment of food imported into Singapore, which facilitates food traceability and recalls if any food safety infringements are found. SFA also conducts regular food safety inspections and testing of the end product to ensure that food sold in Singapore complies with our food safety standards and requirements.

2. Such control measures are applied to the import and slaughter of turtle for food in Singapore. Approximately 95% of all the turtles, including wild-caught soft shell turtles, which are imported for food are slaughtered and processed into meat products at a SFA-licensed local slaughterhouse, with the remaining live turtles being distributed to the four wet market stallholders within one market for sale. Given that the food safety and disease transmission risk associated with the import, slaughter and sale of turtles is low, SFA does not test for diseases in imported turtles which are sold live. Nevertheless, as part of SFA's inspection regime, SFA conducts random sampling and testing of turtle meat products, including those from the SFA-licensed slaughterhouse, for foodborne pathogens such as *Shigella* species and *Vibrio cholerae* (pronounced as vee-brio collar-rae).

3. Over the past five years, SFA has collected a total of 63 samples of turtle meat products and conducted 129 laboratory tests on these samples. All test results showed that the samples met SFA's food safety and hygiene requirements with no foodborne pathogens detected. Thus far, there have not been any foodborne outbreaks associated with the consumption of turtles.

4. In line with ongoing efforts to improve public health and environmental hygiene standards in Singapore, SFA will continue to be vigilant in its inspection regime and tighten requirements for food safety when necessary. However, the assurance of food safety is a joint responsibility across the industry, consumers and the Government. To prevent foodborne illnesses, food handlers and consumers should also observe good food safety and hygiene practices, such as the washing of hands with soap and water before and after handling any raw meat, and by thoroughly cooking the meat, which helps to kill any harmful bacteria.

Mr Murali Pillai: To ask the Minister for Sustainability and the Environment whether the schedule for the building of the hawker centre in Bukit Batok HDB Town by 2027 may be brought forward to deal with the increased number of dwelling units and to stabilise the food and beverage prices in the area.

Written Reply by Minister Grace Fu:

My Ministry announced during the Committee of Supply debates in 2019 that the Bukit Batok hawker centre will be co-located with the assisted living residential flats pilot in Bukit Batok Town. NEA is coordinating with HDB on the timeline of the co-located development. We will announce further details such as the expected date of completion when ready. We will also continue to engage the local adviser on the progress of the centre. Meanwhile, besides the existing coffee shops and other eating establishments already in the area, new coffee shops have also been added by HDB with the completion of new HDB flats in the area, to serve the dining needs of residents.

Mr Dennis Tan Lip Fong: To ask the Minister for Sustainability and the Environment with regard to the marine trash washing ashore Singapore during the monsoon season (a) which beaches are usually impacted by the monsoon season (b) how has the schedule of the cleaning of recreational beaches been impacted during the COVID-19 period; (c) what is the schedule of cleaning of non-recreational beaches; and (d) how is the Ministry working with other countries to mitigate the issues of marine trash.

Written Reply by Minister Grace Fu:

1 Singapore faces the Northeast monsoon from November to March and the Southwest monsoon from June to September. The monsoon brings along flotsam to our shores. During the Northeast monsoon, the recreational beaches of Changi Beach, Pasir Ris, Punggol, Coney Island and Sembawang are affected by flotsam, while East Coast Park is affected during the Southwest monsoon. In 2019, NEA collected over 1,000 tonnes of flotsam from East Coast Beach, of which about half were collected during the Southwest monsoon months. During those months, there was an increase of almost 90% in the amount of flotsam collected from the beach.

2 To keep our recreational beaches clean, NEA increases the frequency of cleaning at these beaches from four times a week to twice a day during the monsoon periods. Non-recreational beaches not accessible to the public are cleaned once a week or fortnightly, depending on the amount of flotsam washed to our shores. This frequency of cleaning has been maintained even during the COVID-19 period. Nevertheless, despite this high frequency cleaning regime, after each cleaning session, new waves of flotsam from the open sea are washed onto our shores during each high tide. We are gratified to see that Singaporeans have taken the initiative to help clean our beaches. Many ground-up groups are actively involved in cleaning regularly. One of them, “East Coast Beach Plan” with more than 2,500 members, has been facilitating clean-up since July and has collected about 9,600kg of litter in August alone.

3 Singapore is an active contributor to international and regional platforms that address the issue of marine litter, which is transboundary in nature. We have worked with the international

community to craft and adopt resolutions on Marine Plastic Litter and Addressing Single-Use Plastic Products Pollution at the 4th UN Environment Assembly, and worked with G20 countries to establish the 2019 G20 Implementation Framework for Actions on Marine Plastic Litter. We are also a member of the Ad-Hoc Open-Ended Expert Group (AHEG) on Marine Litter and Microplastics under the United Nations Environment Programme.

4 At the regional level, Singapore, along with other ASEAN member states, adopted the Bangkok Declaration on Combating Marine Debris and the ASEAN Framework of Action on Marine Debris in June 2019. We are also active in marine litter initiatives organised by the Coordinating Body on the Seas of East Asia (COBSEA) and Partnerships in Environmental Management of the Seas of East Asia (PEMSEA).

5 Last but not least, Singapore conducts capacity building programmes under the Singapore Cooperation Programme to support other developing countries in combating marine litter, and undertakes bilateral cooperation with countries to address the problem.

6 Even as we continue to tackle marine litter, all of us should do our part to keep our beaches clean. Littering not only spoils the beauty of our beaches, but also harms wildlife. I urge visitors to do their part and bin their rubbish when at the beaches, and advise others to practise similar good habits.

Mr Don Wee: To ask the Minister for Sustainability and the Environment what are the criteria, such as the number of dwelling units, to set up a hawker centre and wet market within a constituency.

Written Reply by Minister Grace Fu:

1 In 2011, the Government announced its intention to restart building hawker centres after a 26-year hiatus, focusing on new estates or existing ones that are relatively under-served in terms of a diversity of affordable dining options. This ensures Singaporeans will continue to have access to affordable food across Singapore. We announced in 2011 and 2015 that we would build twenty new hawker centres in total. Seven are already in operation while another ten are currently in the design development or construction stages and are expected to be completed by 2027. For the remaining three hawker centres, one has earlier been announced to be in Choa Chu Kang Town Centre while the locations of the remaining two will be announced in due course.

2 As we plan for the long term, the National Environment Agency (NEA) assesses the need for new hawker centres to serve towns with larger geographical areas and populations instead of individual constituencies. NEA works closely with planning agencies such as URA and HDB to identify appropriate locations for new hawker centres based on criteria such as residential catchment and availability of affordable and comparable F&B options in the vicinity. For residents' convenience and to ensure a viable level of business for hawkers, sites with good accessibility and connectivity are also preferred, such as those co-located with other amenities or transport nodes.

3 New hawker centres will generally not come with a market section selling fresh produce given the availability of alternative options such as HDB market produce shops and supermarkets. From our experience, market sections in hawker centres require sufficient scale to succeed, and must attract customers from a broader regional level.

Those which are unable to get this catchment generally do not fare well.

Mr Gan Thiam Poh: To ask the Minister for Sustainability and the Environment whether the Ministry will consider incentivizing the use of environment-friendly food and drink containers such as washable or reusable containers.

Written Reply by Minister Grace Fu:

My Ministry and the National Environment Agency (NEA) have been actively promoting the use of reusable containers in place of disposables. For example, NEA has disallowed the use of disposables for dine-in meals at all its new hawker centres and for cooked food stallholders who started their tenancies in any hawker centre from September 2018.

2 Through the nation-wide “Say YES to Waste Less” campaign” launched in 2019, operators of over 1,600 premises have partnered NEA to encourage consumers to bring along reusables and decline disposables when ordering food for takeaway or delivery. Under this campaign, many Food & Beverage establishments have taken the lead to incentivise consumers who bring reusable containers. For example, Starbucks offers a \$0.50 discount to customers who bring their own cups or tumblers, and SaladStop! offers a free topping for customers who bring their own bowls for takeaway orders. We are heartened by the initiatives and commitment of the private sector and encourage more companies to join in this effort.

3 Addressing the excessive consumption of disposables remains a priority of my Ministry and NEA. A Citizens’ Workgroup to look into measures to check the excessive consumption of disposables will be convened this month. We look forward to hearing their ideas on how we can encourage everyone to play his or her part to reduce the use of disposables, including incentivising the use of environment-friendly food and drink containers.

Mr Gan Thiam Poh: To ask the Minister for Sustainability and the Environment (a) what is the ratio of Singaporeans to foreigners working in the local food production sector; and (b) how will the Ministry attract more Singaporeans to the farming sector to work as employees or as owners and entrepreneurs.

Written Reply by Minister Grace Fu:

1 The local agri-food sector comprises over two hundred farms producing mainly eggs, fish and vegetables. As of June 2020, slightly more than half of the workers hired in the sector were locals, and most of the foreign workers were semi-skilled workers holding Work Permits. This is because the majority of these farms adopt conventional methods of food production, which are often low in productivity and labour-intensive, involving manual feeding or planting, harvesting and packing.

2 With new farming technologies, the agri-food sector presents fresh job opportunities. My Ministry has set the “30 by 30” goal to produce 30 percent of our nutritional needs locally by 2030, up from less than 10% today. To achieve it, we will need to uplift and transform our farms to embrace such new technologies to be highly productive, innovative and sustainable. The agri-food sector will generate more higher value-add jobs and demand for skilled workers. For instance, vegetable farming can shift from single-layer outdoor cultivation which is manpower-intensive, to multi-tiered, automated indoor farming where a few workers can manage the growing environment through sensors and a computer-controlled system.

3 We have introduced policies to support the industry in its transformation journey. Since 2014, the Singapore Food Agency (SFA) has been co-funding farmers’ investments in productivity-enhancing farming equipment through the \$63 million Agriculture Productivity Fund. In April this year, SFA launched the “30 by 30 Express” Grant Call to crowdsource innovative proposals to accelerate local production in the near term amidst disruptions in global food supply chains due to COVID-19.

4 As the agri-food sector modernises, we can expect to see a shift in agri-food sector workforce towards one that is highly-skilled and

manpower-efficient. There will be a growing demand for agriculture/aquaculture specialists, and we will build up a pipeline of local talents with multi-disciplinary skillsets.

5 To attract and emplace skilled workers in the agri-food sector, SFA has worked with various Institutes of Higher Learning (IHLs) and local farms to develop relevant Pre-Employment Training (PET) and Continuing Education and Training (CET) courses. These programmes equip students and adult job seekers with skillsets that will lead to careers in the agri-food sector. For example, over the years, SFA has partnered polytechnics to curate diploma programmes in aquaculture and agriculture technology, including part-time diplomas targeted at career-switchers keen to join the high-tech farming sector and individuals in the sector looking to upgrade their skills. SFA also helps to match students in these programmes to local farms for structured internship opportunities, giving them a first-hand experience of working in farms while putting their knowledge and practical skills to use. More than 60 students have benefited from such structured internships over the past 3 years. Just a few months ago, SFA partnered Temasek Polytechnic to launch a SGUnited Skills programme, “Up-Skill in Aquaculture Technology”, to provide essential knowledge for Singaporeans who are keen on a career in the aquaculture industry.

6 SFA will continue to introduce and expand initiatives that will transform the agri-food sector and upskill the agri-food workforce. These will be rolled out at the right time to meet industry needs without creating oversupply. We want to see more Singaporeans in the local agri-food sector, contributing towards a more food-secure Singapore.

Mr Louis Ng Kok Kwang: To ask the Minister for Sustainability and the Environment (a) what measures is the Ministry studying to assist individuals who are negatively affected by second-hand cigarette smoke from their neighbours smoking within their HDB flats; and (b) whether the Ministry has studied the effectiveness and receptiveness of bans on residents smoking at their balconies and windows implemented at some condominiums.

Written Reply by Minister Grace Fu:

1. The issue of smoking is one that requires everyone to play their part. Smokers are encouraged to exercise social responsibility and be mindful of the health of others, and not light up where the smoke will affect others. Families and friends of smokers, as well as the general public, can help reinforce the right social norms.

2. To assist individuals who are affected by second-hand cigarette smoke arising from neighbours smoking in their HDB flats, the National Environment Agency (NEA) works with Town Councils and HDB to advise smokers to be considerate when smoking. Oftentimes, the smoker is unaware that his actions have affected his neighbour and such advisories are sufficient in encouraging the smoker to adjust his behaviour. Community leaders also help to mediate between neighbours, help them empathise with one another's situation and discuss what adjustments can be made. Affected residents can also seek help from the Community Mediation Centre (CMC), which provides mediation service for disputes between neighbours. Trained mediators will facilitate discussions between parties in an effort to reach a mutually acceptable solution. For intractable cases where parties are unable to resolve their disputes, residents can raise the matter to the Community Disputes Resolution Tribunal as a last resort.

3. We do not have information on any condominiums that have implemented a ban on residents smoking at their balconies or windows. We are only aware of the case of a condominium that had issued a circular telling residents to refrain from smoking on their balconies and in window areas, which was reported in the press in August 2017. While some residents were supportive, there were also those who argued that the management should not dictate what one

can or cannot do in their private spaces. We understand that subsequently, the management did not proceed to ban residents from smoking on their balconies and in window areas.

Mr Liang Eng Hwa: To ask the Minister for Sustainability and the Environment (a) what are the reasons for the recent surge in dengue cases; and (b) what are the short- and medium- term measures to reduce overall dengue cases.

Mr Yip Hon Weng: To ask the Minister for Sustainability and the Environment whether the reduction in grass-cutting and tree-pruning activities due to the COVID-19 pandemic has caused the rise in dengue cases in housing estates.

Mr Leon Perera: To ask the Minister for Sustainability and the Environment (a) what is the number of dengue cases in the past six months; (b) what has been the progress of anti-dengue efforts; and (c) what has been the progress of Project Wolbachia.

Written Reply by Minister Grace Fu:

1 As of 29 August 2020, there were 27,281 dengue cases reported this year. Of these, about 24,000 cases were reported in the past six months, from March to August 2020.

Reasons for Surge in Dengue Cases

2 A confluence of factors contributed to the surge in dengue cases. First, the less common DENV-3 was dominant in the first four months of this year and remains high. As this serotype had not been prevalent in the last three decades, our population has low herd immunity and this facilitates rapid disease transmission.

3 Second, NEA's Gravitrap surveillance system detected a 30 per cent increase in the *Aedes aegypti* mosquito population from May to June 2020, compared to the period February to March 2020. Coupled with the warmer and wetter weather as we entered the traditional peak dengue season from May onwards, the momentum of the high dengue case load sustained the high number of cases seen in June and till today.

4 Third, the spike in dengue cases coincided with the two-month Circuit Breaker (CB) period. The weekly number of dengue cases

started to rise sharply from May 2020. With more people staying at home, there were more human targets for the female *Aedes aegypti* mosquitoes.

5 Finally, the scaling back of services for cleaning and facilities maintenance during the CB period, including stoppage of work at construction sites, could have also compounded the dengue situation. In some cases, overgrown grass may have concealed discarded receptacles which could become potential breeding sites. However, this issue is being addressed as cleaning and associated services have resumed.

NEA's Dengue Control Efforts: Recent Efforts and Progress

6 NEA has scaled up efforts on all fronts since the end of the CB, working with stakeholders.

7 First, NEA has an intensive inspection regime. Majority of breeding was found in homes. In May and June alone, it carried out 107,000 inspections of homes, and detected and destroyed about 2,600 mosquito breeding habitats. Another 2,700 mosquito breeding habitats were destroyed during inspections of condominium grounds, construction sites, common areas and other premises.

8 Second, to deter mosquito breeding, NEA has tightened the enforcement regime for Town Council managed areas, construction sites, and residential premises since 15 July 2020. For example, NEA has increased composition fine amounts in instances of repeated breeding offences, or multiple breeding habitats detected during a single inspection.

9 Third, on 24 July, NEA launched an intensive vector control exercise with Town Councils, Grassroots Advisers and leaders, and community volunteers. Town councils were called upon to step up housekeeping efforts to keep common areas litter-free, remove stagnant water, maintain drains, as well as work with NEA to conduct coordinated chemical treatment such as fogging, misting and applying larvicide in common areas. Most Town Councils have completed desilting and flushing of drains in the larger dengue clusters, and have moved on to also tackle other areas with high

mosquito population. NEA has been auditing Town Councils to ensure that housekeeping efforts are satisfactory.

10 Fourth, NEA has stepped up collaboration with stakeholders on dengue prevention. For example, NEA is working with community partners, such as Grassroots Advisers and Leaders, as well as community volunteers, to reach out to residents with messages on how to prevent mosquito breeding and protect themselves against mosquito bites. Together with the People's Association and Ministry of Health, 700,000 bottles of repellent were distributed to residents in active dengue clusters and another 300,000 bottles were distributed by Polyclinics and General Practitioners to suspected dengue patients. Recently, NEA partnered the Ministry of Education to provide 46,000 bottles of repellent to students in 37 schools located in large dengue clusters, to protect the students and educate them and their families on how to protect themselves against dengue.

11 Fifth, NEA has launched successive public communications campaigns on both mainstream and online media. NEA has expanded the number of dengue alert banners displayed at neighbourhood precincts of dengue cluster areas, and brought the message closer to residents with dengue alert posters at the individual HDB blocks. Residents living in cluster areas are also receiving SMS reminders to check their homes for stagnant water and do the Mozzie Wipeout.

12 These efforts have borne some initial results. We have seen about a 20% decline in dengue cases in recent weeks. About 84 per cent of the 2,253 clusters reported in 2020 have closed as of 31 August 2020. This includes the large dengue clusters at Bartley Road, Tampines Avenue 7, Cassia Crescent, Dakota Crescent, Leicester Road, Potong Pasir Avenue 1 and Braddell Road. However, the overall number still remains high and we cannot let our guard down.

Project *Wolbachia* – Singapore

13 While NEA puts in concerted efforts on dengue control, we are continuing with the Project *Wolbachia* trials and expanding to new areas. The phased field studies at Yishun and Tampines have been promising, with the *Aedes aegypti* population being suppressed by 90

per cent. Preliminary analysis has shown that 65 to 80 per cent fewer dengue cases are observed at the study sites, compared to areas without releases. NEA has progressed to Phase 5 of Project *Wolbachia* in July 2020, which will involve releases for the whole towns of Tampines and Yishun, covering 1,455 blocks or about 15 per cent of all HDB blocks in Singapore. In addition, since May 2020, NEA has been testing a more targeted release strategy in areas with higher risk of dengue in Choa Chu Kang and Bukit Batok towns, to pre-emptively suppress the high *Aedes aegypti* population in these areas. These releases cover an additional 207 blocks.

14 Despite the success of the trials, *Wolbachia* is not a silver bullet; nor is it ready for immediate deployment. Constant efforts are still required to find innovations and engineering solutions to automate and sustain the mosquito production and release processes, before *Wolbachia* can be implemented on a larger scale. More importantly, *Wolbachia* technology cannot replace the community's efforts to ensure good housekeeping, which will always be needed to keep our homes and estates free from mosquitoes and dengue.

Conclusion

15 The current conditions are challenging. We are still in the peak dengue season and an all-out national effort is necessary to win the battle against dengue. NEA and partner agencies are committed to do our best to sustain the efforts. I urge all residents, especially those residing in dengue cluster areas, to do their part and take the three protective actions against dengue – spray insecticide in dark corners around the house, apply insect repellent regularly, and wear long sleeves and long pants. Residents should also continue to do the Mozzie Wipeout and ensure that their homes and surroundings are free of stagnant water.

Mr Gan Thiam Poh: To ask the Minister for Sustainability and the Environment (a) how many culprits of high-rise littering cases have been charged in the past five years; (b) whether there has been a rising trend over the past five years; and (c) whether new measures will be implemented to curb the problem.

Written Reply by Minister Grace Fu:

1 The National Environment Agency (NEA) took 6,000 enforcement actions in total against 2,200 offenders for high-rise littering in the past five years. The number of enforcements per year hovered between 1,100 to 1,500 from 2016 to 2019.

2 The use of surveillance cameras with video analytics has contributed significantly to improving NEA's enforcement efforts. It has enabled NEA to increase the yearly enforcement actions from 11 in 2012, prior to the use of surveillance cameras, to over 1,000 in recent years.

3 To further improve effectiveness, NEA has implemented additional measures. Besides significantly increasing the number of surveillance camera deployments, NEA has also streamlined processes to reduce the time taken for investigation and partnered closely with Town Councils to enable more timely information-sharing and prompt reporting of the interventions conducted.

4 Going forward, NEA will explore better camera technology and strengthen partnerships with communities to develop localised solutions for the high-rise littering problem. For example, we worked with Grassroots Leaders, the Town Council and agencies such as the Municipal Services Office (MSO) last year to pilot a project for two blocks of flats in Yio Chu Kang that had persistent issues with high-rise littering and pigeon-feeding. The grassroots had formed a community watch group to conduct house visits and raise awareness about the issue among residents, while NEA deployed surveillance cameras and MSO developed new publicity materials and informed residents about the number of persons caught. The joint efforts saw a dip in the number of feedback on high-rise littering and pigeon feeding in the area. NEA will be looking into more of such community co-solutioning with active surveillance and enforcement in future.

5 High-rise littering is an anti-social and irresponsible act which affects public safety and environmental hygiene. Even as we step up our efforts to address the situation, we must also step up our efforts as a community to cultivate social graciousness, consideration for others and a sense of collective responsibility for the cleanliness of our common spaces.

Mr Lim Biow Chuan: To ask the Minister for Sustainability and the Environment in the past three years, how many cat feeders have been summoned for littering.

Answer:

1. In the past three years, the National Environment Agency (NEA) has enforced against eight cat feeders for littering. Food left behind from the feeding of stray animals may attract pests such as cockroaches and rats, and endanger public health. Containers left behind can also collect stagnant water and lead to mosquito breeding. It is therefore important that cat feeders are considerate and clear leftover food and food containers after feeding.

2. Many community cats are taken care of by regular, responsible feeders. NEA and the Animal and Veterinary Service work with the Cat Welfare Society to allow such feeding, while making sure that food remnants are not left behind.

Mr Yip Hon Weng: To ask the Minister for Sustainability and the Environment (a) what are the protocols for enforcement of safe distancing measures at coffee shops and hawker centres in HDB heartlands after office hours; and (b) how are safe distancing ambassadors trained to handle drunk and rowdy patrons.

Answer:

1. Compliance with Safe Management Measures (SMMs) and Safe Distancing Measures (SDMs) is an important part of Singapore's national effort to curb the transmission of COVID-19.
2. Every day, around 3,000 Safe Distancing Ambassadors and Enforcement Officers from government agencies are deployed to enforce these measures, with more being deployed during peak dining hours and weekends, and in more crowded hawker centres and coffeeshops. They take on different shifts, starting as early as 6am for certain areas.
3. In recent weeks, agencies have stepped up enforcement at Food and Beverage establishments, including hawker centres and coffeeshops. As at 1 October 2020, three drinks stalls at coffeeshops have been temporarily suspended for serving and allowing the consumption of alcohol by their patrons after 10.30pm. Two coffeeshops were fined for not adhering to one metre safe distancing between tables, and another was fined for allowing gatherings in groups of more than five.
4. Before they are deployed, our ambassadors and officers are trained on the safe distancing and management measures, as well as the rules of engagement with premise operators and members of the public. They are deployed in teams of at least two officers and the more experienced staff will be partnered with new officers to guide and support them. They are reminded not to put themselves in harm's way, and to engage the assistance of the Police when needed. While most residents in the community have been cooperative, a small number of individuals have been defiant and abusive, especially when they are drunk and rowdy. For such cases, agencies were given the full support of the Police in identifying, apprehending and eventually charging the culprits.
5. Enforcement is only but a part of how we manage the COVID-19 pandemic with the aim of keeping our community safe. What is equally, if not more important, is the cooperation from premise operators and the community to do their part in observing the safe distancing and management measures, even when there are no ambassadors and officers around, so that we continue to keep community transmission under control.

Mr Christopher de Souza: To ask the Minister for Sustainability and the Environment whether the Ministry will look into ways in which the advantages of biodegradable plastics may be harnessed and advertised so as to reduce reliance on Singapore's landfill.

Answer:

1. Plastic waste generated in Singapore is either recycled or incinerated. Unlike in many other countries, plastic waste is not landfilled directly. As such, the environmental benefits of using biodegradable plastics do not apply in Singapore's context. Biodegradable as well as oxo-degradable plastics could even interfere with the recycling process when mixed with conventional plastics.

2. A more sustainable approach for Singapore is to reduce the use of all disposables and increase the recycling of plastics. We are doing this through public education, and upstream regulation through the Resource Sustainability Act that will mandate key responsibilities to enable recycling at the systems-level.

3. To raise awareness of the impact of excessive consumption of disposables and the need to reduce usage, the National Environment Agency (NEA) launched the second run of the nationwide "Say YES to Waste Less" campaign last month. Operators of more than 2,100 premises have partnered NEA to encourage consumers to bring reusables and decline disposables for takeaways and online food orders. NEA also started a Citizens' Workgroup last month to address the excessive consumption of disposables.

4. Moving upstream, NEA will be rolling out mandatory reporting of packaging waste for large generators as well as their plans for reducing, reusing or recycling packaging from 2021. This will increase companies' awareness of the potential for waste reduction in their business operations. We will also implement a Deposit Refund Scheme (DRS) for beverage containers from 2022 and the Extended Producer Responsibility (EPR) framework for managing packaging waste, including plastics, no later than 2025. Collectively, these measures will help to reduce plastic waste and improve its recycling rate, and contribute to the effort to extend the lifespan of Semakau Landfill.

Mr Gerald Giam Yeap Song: To ask the Minister for Sustainability and the Environment (a) in each of the last five years, how many tonnes and what percentage of Singapore's recyclable waste has been exported; and (b) how does the Ministry ensure that the exported recyclable waste ultimately gets recycled instead of being incinerated or deposited in landfills overseas.

Answer:

1. We exported about 1,889,000 tonnes of recyclable waste in 2015, 1,757,000 tonnes in 2016, 1,637,000 tonnes in 2017, 1,579,000 tonnes in 2018 and 1,439,000 tonnes in 2019. This corresponds to 41% of Singapore's total waste recycled in 2015, 37% in 2016, 35% in 2017, 33% in 2018 and 34% in 2019.

Reference Table: Total amount of recyclables exported, waste recycled, and proportion of recyclables exported

Year	Total Recyclables exported (tonnes)	Total Waste Recycled (tonnes)	Proportion of Recyclables Exported
2015	1,889,000	4,650,000	41%
2016	1,757,000	4,769,000	37%
2017	1,637,000	4,724,000	35%
2018	1,579,000	4,726,000	33%

Note: Figures are rounded to the nearest thousand tonnes.

2. Ferrous and non-ferrous metals, paper and cardboard waste made up about 90% of the total amount of recyclables exported in 2019. These recyclables have commercial value and fetch competitive prices when exported.

3. Recyclables that are contaminated with hazardous or other wastes, are governed by the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal ("Basel Convention"), which is a Multilateral Environmental Agreement that regulates the import, export and transit of hazardous wastes and other wastes.

4. Our companies are regularly reminded about Singapore's obligations under the Basel Convention, and NEA will investigate and enforce against any violations. While we are aware of the countries where our recyclables are exported to, we do not have information on how the recyclables are processed and treated in the countries of import, or if they are further exported. We are unable to gather data from companies that are outside our jurisdiction.

5. Recyclables have an intrinsic value. The value is a function of the value of the recycled material, the market price of its substitute, and the cost of recycling, including transportation to an export destination. If there is no export market for it, or if the cost of recycling outweighs the value of the recycled product, the waste collector may choose not to collect the recyclables but to treat them as general waste and send them to the incineration plant. Therefore, my Ministry recognises the need to build up our local recycling capabilities. For example, we are working with the private sector to develop mechanical recycling solutions to turn waste plastics into plastic pellets for manufacturing new products. And chemical recycling to process contaminated plastics that cannot be mechanically recycled. For e-waste, we are developing capabilities to recycle Large Household Appliances, ICT products, batteries and lamps to support the upcoming e-waste Extended Producer Responsibility framework. This will allow us to better extract resources from waste and close our waste loops locally through a circular economy approach.

Mr Gerald Giam Yean Song: To ask the Minister for Sustainability and the Environment (a) whether he can provide an update on (i) the expansion of our domestic waste recycling industry and (ii) NEA's study on e-waste and plastics recycling solutions and technologies and its assessment of their suitability for local adoption; and (b) whether there has been a cost-benefit analysis of exporting recyclables versus owning the capabilities to process them, considering the carbon footprint of transport and the environmental impact on developing countries that import recyclable waste.

Answer:

1. My Ministry recognises the need for Singapore to build local recycling capabilities. The National Environment Agency (NEA) commissioned a recycling landscape study in 2018, which found that it was feasible to develop domestic recycling capabilities for both e-waste and plastic waste. These recommendations provided the inputs to our circular economy approach outlined in the Zero Waste Masterplan that we launched in 2019. The Masterplan will enable us to better extract resources from waste, and create economic opportunities and good jobs for Singaporeans.

2. We are making good progress in developing local recycling capabilities, working with the private sector. Over the next three years, we expect three new e-waste recycling facilities to be set up that will allow us to recycle more than 64,000 tonnes of e-waste per year. At the same time, we are working with research institutes and companies to develop solutions in treating and recycling e-waste in a more energy-efficient and eco-friendly manner. For example, the NTU Singapore-CEA Alliance for Research in Circular Economy (SCARCE) is developing innovative solutions to treat and recover resources from e-waste like lithium ion batteries and silicon solar panels, and finding ways to detoxify and recycle plastic parts in e-waste.

3. We are also exploring mechanical recycling and chemical recycling solutions for plastics with industry players. Chemical recycling is an added option to process contaminated plastics that cannot be mechanically recycled. More recycling capabilities are expected to evolve with our upcoming Extended Producer Responsibility (EPR) framework for packaging waste, including plastics. To recover more plastics from our waste for recycling, NEA is also conducting a feasibility study for a pilot Plastic Recovery Facility (PRF). If feasible, the pilot PRF will be the first such facility built by the government.

4. We have not done a cost-benefit analysis to compare exporting recyclables with processing them locally. While we are aware of the countries where our recyclables are exported to, we do not have information on how the recyclables are processed and treated in the countries of import, or if they are further exported. We are unable to gather data from companies that are outside our jurisdiction. Nevertheless, we are committed to building up our local capabilities to treat and close our waste loops locally, where feasible, both physically and economically, to enhance our resource resilience. As the COVID-19 pandemic has shown, we are vulnerable to global supply chain disruption, including disruption to cross-border flow of our recyclables for recycling. As such, my Ministry and the NEA will continue to work closely with all stakeholders to strengthen our local recycling capabilities.

Mr Sharael Taha: To ask the Minister for Sustainability and the Environment (a) whether there are any criteria to determine the number and size of wet markets in a town; and (b) if so, whether there are plans to review and upgrade the wet markets in towns that are growing in size.

Answer:

1. Most of our markets were built as part of hawker centres between 1967 and 1985, to resettle street hawkers into purpose-built buildings such as those built in new public housing estates to serve the residents' needs.

2. Over time, consumer trends and preferences have shifted due to changing demographics, as well as the widespread availability of alternative options such as supermarkets and online retailers. Wet markets in their current form have gradually become less popular. Thus, when these older markets underwent the Hawker Centres Upgrading Programme from 2001 to 2013, market stalls vacated by stallholders retiring from the trade were removed to free up space for wider passageways and bigger areas for the remaining stalls. Similarly, when the Government announced in 2011 that it would restart the building of hawker centres, efforts were focused on increasing the number of cooked food stalls in new estates or existing estates with insufficient affordable eating options.

3. Currently, the provision of new markets or expansion of existing ones will be considered only if there is strong demand and support, or where there is a shortage of other sources of market produce in the area. This is to ensure the viability of the market stalls. From our experience, new markets, such as the one at Jurong West Hawker Centre, have generally not fared well. The concept of future markets would need to evolve to meet the emerging needs and preferences of consumers who have the options to buy online and from full-day, even 24-hour, supermarkets. To this end, the National Environment Agency will continue to work with relevant government agencies and the community to monitor the situation and ensure that residents' needs are met.

Mr Christopher de Souza: To ask the Minister for Sustainability and the Environment how will the Ministry engage with supermarkets and consumers to reduce plastic pre-packaging of fruits and vegetables.

Answer:

1. Plastic pre-packaging for fruits and vegetables has practical uses, such as extending shelf life and minimising cross contamination. Nevertheless, my Ministry recognises the need to avoid excessive use of all packaging, including plastic pre-packaging.

2. Next year, we will implement the mandatory packaging reporting framework, where producers of packaged products as well as retailers such as supermarkets with an annual turnover of more than \$10 million will have to submit packaging data and plans to reduce, reuse or recycle packaging. This will make companies more aware of their packaging use (including plastic pre-packaging of fruits and vegetables) and encourage them to minimise waste and reduce business costs. The reporting framework will lay the foundation for an Extended Producer Responsibility (EPR) framework to manage packaging waste including plastics, which will be put in place no later than 2025. The EPR ensures that producers are responsible for the collection and end-of-life management of the packaging materials for their products, and encourages producers to reduce the amount of packaging used.

3. To complement the regulatory measures, the National Environment Agency (NEA) is also encouraging supermarkets and consumers to reduce the use of packaging for grocery shopping through the "Say YES to Waste Less" national campaign. For example, a partner of this campaign, Dairy Farm Singapore, has provided visual cues at the fresh produce plastic roll stands to encourage customers to reduce usage of plastic bags when bagging fruits and vegetables. NEA is also raising awareness of packaging-free grocery stores such as Unpackt and Scoop, where consumers are encouraged to bring their own containers and buy what they need.

4. My Ministry and the NEA will continue to work closely with all stakeholders to reduce the consumption of all types of packaging and move towards becoming a Zero Waste Nation.

Ms Tin Pei Ling: To ask the Minister for Sustainability and the Environment whether there has been an increase in rat sightings since the circuit breaker period and what measures are in place to address them.

Answer:

1. During the circuit breaker period in April and May 2020, an average of about 350 instances of feedback on rat sightings were reported each month. Of these, an average of 23 instances of feedback were received by the Singapore Food Agency (SFA) in relation to sightings at food establishments monthly, while the rest were received by the National Environment Agency (NEA) in relation to sightings at other public spaces. The instances of feedback on rat sightings in July and August have reverted to about 500 per month, which is in line with pre-circuit breaker levels. The dip in feedback on rat sightings during the circuit breaker period could have been due to no dining-in at food and beverage outlets and that fewer people were out and about.

2. To keep the incidence of rat infestation low, NEA carries out islandwide surveillance to identify places which can attract rats, such as bin chutes where food waste is not well-managed. The surveillance information is shared with relevant government agencies and Town Councils (TCs) so that they can take preventive measures, such as improving housekeeping and conducting rat proofing works. NEA incentivises TCs with funding under the Rat Attack Programme to implement customised rat control measures in public housing estates. NEA also conducts regular inspections to ensure that agencies, TCs and premises owners implement adequate rat control measures and proper waste management practices, and will take enforcement action against them for any rat infestation.

3. Similarly, SFA requires operators of food establishments to keep their premises clean and free of pest infestations, including rats. Operators must have a pest control contract to ensure that their premises are free of pest infestation. It is also their responsibility to keep their premises clean and well-maintained; and failure to do so constitutes an offence. Repeated offences or serious offences can result in suspension or even cancellation of the food establishment's licence. SFA conducts regular inspections at food establishments to ensure that they comply with food hygiene and safety, including keeping their premises free from rat infestation. These inspections continued during the circuit breaker period. From January to August 2020, more than 40,000 inspections were conducted on food establishments.

4. While we keep up the rat surveillance and control measures in Singapore, all stakeholders have the responsibility to institute a robust system of housekeeping, refuse management and regular pest control checks and treatment. Members of the public, operators of food establishments, and businesses are advised to store food properly in covered containers, not to leave food or food waste behind, and to bag, tie and properly dispose of food waste into covered bins.

Mr Liang Eng Hwa: To ask the Minister for Sustainability and the Environment (a) whether complaints against smoking, second-hand smoke and cigarette butt littering at HDB estates have increased in the past six months; and (b) whether the measures implemented so far have been effective.

Answer:

1. Over the past six months, the National Environment Agency (NEA) received about 21,000 instances of feedback related to smoking, second-hand smoke and cigarette butt littering at HDB estates, up from about 14,000 during the same period in 2019, or a 50% increase. This increase is likely due to more residents working from home during the Circuit Breaker in April and May, a situation which has continued even post-Circuit Breaker. This has resulted in a higher concentration of people in residential estates and more activity taking place in homes, rather than workplaces.

2. NEA takes a multi-pronged approach, including education, surveillance and enforcement, to tackle unlawful smoking at common areas of residential estates such as common corridors, lift lobbies, void decks and staircase landings. Generally, smokers appreciate the rationale behind the smoking prohibition and most comply willingly after being advised by NEA, Town Councils and HDB. Sometimes, smokers forget and light up where they should not, and friendly reminders from family and friends are helpful to signal the positive social norms that smokers should abide by. Visual reminders put up by Advisers and community leaders, such as posters in lifts and HDB areas where there have been feedback on unlawful smoking, are also useful in reminding smokers to be considerate and entrenching positive social norms.

3. Where unlawful smoking feedback persists, NEA conducts surveillance of the affected block. Since January 2019, NEA has enhanced its surveillance capability with thermal cameras which can detect objects emitting high heat and capture images of the smoking offence. NEA uses the images along with other forms of evidence, such as public feedback, for investigations. Thus far, 270 thermal camera deployments have been made, resulting in enforcement actions being taken against about 100 offenders.

4. Overall, the number of enforcement actions taken by NEA against smoking and cigarette butt littering in HDB estates has increased to more than 8,400 in the past six months of 2020 compared to more than 7,700 in the same period last year. The increase in enforcement actions has been boosted by the use of thermal cameras for surveillance, as well as ramped up enforcement operations by NEA.

5. The issue of smoking is one that requires everyone to play their part. While NEA has improved its enforcement capability, it is not realistic for NEA to constantly monitor all smoking-prohibited places or respond immediately to every instance of feedback, given the fleeting nature of such acts. I urge smokers to be mindful of the health of others, and not light up in smoking-prohibited places. Families and friends of smokers, as well as the general public, can help reinforce the right social norms.

Ms Joan Pereira: To ask the Minister for Sustainability and the Environment in view of COVID-19, whether screw taps for wash basins and manual flushing systems in hawker centre toilets can be replaced with automatic ones.

Answer:

1. The Code of Practice on Environmental Health currently states that public toilets should install sensor-operated taps and flushing systems. All new building developments, including hawker centres, are required to comply with the Code.
2. Of the 33 MSE-owned hawker centres, 25 already have sensor-operated taps and flushing systems installed. We will install these provisions in the remaining centres during upcoming periodic renovations. I encourage Town Councils to install sensor-operated taps and flushing systems in HDB-owned hawker centres. This is particularly important in view of public health concerns amidst the COVID-19 pandemic.
3. To support the Town Councils, NEA is providing co-funding under the Toilet Improvement Programme for improved toilet designs that facilitate cleaning and maintenance, including the installation of sensor-operated taps and flushing systems.

Dr Lim Wee Kiak: To ask the Minister for Sustainability and the Environment how can Singapore leverage on the work-from-home trend to promote adoption of greater personal acceptance and responsibility for recycling and reducing waste.

Answer:

1. In view of the work-from-home trend, NEA has stepped up engagement to encourage the community to adopt good 3R (Reduce, Reuse, Recycle) habits. Additional emphasis has been placed on actions which can be taken by those working from home. These include bringing reusable food containers for takeaway; not opting for disposable cutlery; avoiding food waste by ordering and cooking the right amounts; storing any unfinished cooked food properly for safe consumption later; and emptying and cleaning recyclables before placing them in the blue recycling bins.

2. Last month, NEA launched the second run of the “Say YES to Waste Less” campaign together with partners to encourage consumers to reduce food wastage and consumption of disposables. We are heartened that 95 partners have come on board, an increase from 59 partners last year. These include food delivery service platforms, which have seen increased demand in recent months as more people work from home, as well as operators of major food and beverage (F&B) outlets, malls and retail chains, hotels, schools, and non-government organisations. In all, they cover more than 2,100 premises, an increase from the 1,600 premises last year.

3. Our partners have rolled out several initiatives. For example, by making opting out of receiving disposable cutlery the default option, prompting customers to ask for smaller food portions or consider if they need a bag, and offering incentives for customers who bring their own reusables.

4. We also recently started a Citizens’ Workgroup to co-create solutions with members of the public to reduce the excessive consumption of disposables. We look forward to hearing participants’ ideas on how we can reduce the use of disposables, whether working from home or at our workplaces.

Mr Chua Kheng Wee Louis: To ask the Minister for Sustainability and the Environment when will Project *Wolbachia* be extended to Sengkang town and the rest of Singapore to complement existing vector control strategies.

Answer:

1. The National Environment Agency (NEA) commenced Project *Wolbachia* in 2016 through a phased approach to rigorously evaluate the technology in the field.

2. A key challenge is that *Wolbachia* technology is nascent and does not have an off-the-shelf commercial solution for big scale application. NEA and its collaborators are innovating engineering solutions to scale up production and release sustainably and cost-effectively. For example, the male-female pupae sorter, developed by NEA and its collaborator Orinno Technology Pte Ltd, can sort pupae 10 to 20 times faster than the previous model. It uses a specially designed sieve, lighting and water-flow control, to achieve high accuracy and high efficiency separation of male pupae, female pupae and larvae. The deployment of *Wolbachia* technology to additional towns is contingent on the success of these efforts.

3. As such, while the initial results of Project *Wolbachia* in the Yishun and Tampines study sites are promising, we will need to conduct further trials to determine the optimal method in releasing mosquitos to achieve effective suppression. This is so that the *Wolbachia* technology can be sustainably deployed on a larger scale in the future. Since May 2020, NEA has also tested a more targeted release strategy in dengue high-risk areas of selected neighbourhoods in Choa Chu Kang and Bukit Batok towns, to pre-emptively suppress high *Aedes aegypti* mosquito populations in these areas. These trials are part of NEA's efforts to explore alternative deployment strategies that are most suitable for the different urban landscapes in Singapore.

4. If the trials are successful, we will ramp up Project *Wolbachia* to cover the entire Tampines and Yishun towns by 2022, which is about 17% of all HDB estates and double the current area. We will start trials in landed housing estates. The selection of new areas for implementation will take into consideration the results of the trials in Tampines and Yishun towns, the mode of operations, NEA's assessment of long-term dengue risk profile and other environmental factors.

5. Mosquito suppression technology like the use of *Wolbachia* is not a silver bullet and it cannot replace the community's efforts to ensure good housekeeping, to keep our homes and estates free from mosquitoes breeding grounds. Comprehensive mosquito surveillance, source eradication of mosquito breeding, and comprehensive vector control efforts will continue to be Singapore's key strategies for dengue prevention and control.

Mr Christopher de Souza: To ask the Minister for Sustainability and the Environment whether research is being conducted to consider possible sustainable uses for incinerated ash and non-incinerable waste.

Answer:

1. The National Environment Agency (NEA) has been studying different ways to convert incineration bottom ash (IBA) into construction material, which we call NEWSand. This involves treatment methods such as washing and chemical stabilisation, after the removal of metals from the IBA. NEA is planning field trials using NEWSand from treated IBA for road construction at Tanah Merah Coast Road.

2. NEA is also piloting the use of slagging gasification technology at the Nanyang Technological University (NTU) Waste-to-Energy Research Facility to directly convert municipal solid waste into glass-like slag, which can be used directly as NEWSand. For example, NEA has successfully used NEWSand from the slag to construct the concrete plaza in front of the Environment Building.

3. These efforts to create NEWSand, if successfully scaled up, will create a sustainable source of construction materials while helping to prolong the lifespan of Semakau Landfill.

4. NEA partners Institutes of Higher Learning, research institutes and the private sector to improve treatment methods for IBA, as well as develop new uses for incineration ash. For example, Republic Polytechnic is working on developing cost-effective techniques to treat and convert incineration ash into aggregates. NTU is also researching the use of incineration ash in automotive catalytic converters.

5. Non-incinerable waste (NIW), which includes industrial sludges and asbestos, makes up about 30% of waste sent to Semakau Landfill by weight. We are exploring new technologies to reduce NIW. For example, PUB is piloting a thermal hydrolysis process that reduces the amount of sludge from used water treatment. To spur further research, NEA launched a Request for Proposal (RFP) in March 2020 to call for research projects to recycle or reduce NIW. The RFP closed in July 2020, with 22 proposals received. These proposals are currently under evaluation.

6. My Ministry will continue to work closely with stakeholders to leverage science and technology to address incineration ash and NIW, supported by NEA's \$45 million Closing the Waste Loop R&D Initiative. This is part of our strategy to reduce the amount of waste sent to landfill by 30% by 2030 under the Zero Waste Masterplan.

Mr Yip Hon Weng: To ask the Minister for Sustainability and the Environment (a) what is being done to alleviate the disamenities and inconveniences caused by the placement of safety distancing barricades and markers at public places; and (b) whether the responses pertaining to feedback from the public concerning safe distancing features are dealt with in a timely manner.

Answer:

1. COVID-19 is a global pandemic of unprecedented scale and will remain with us for some time. We must therefore adapt and adjust the way we live, work and play to reduce the spread of the virus and keep ourselves and others around us safe.
2. During the Circuit Breaker period, the Government implemented stringent safe management and safe distancing measures, to curb disease transmission. The barricades and markers to restrict access to amenities such as public benches, fitness corners, sports stadiums were necessary to protect the well-being of our population.
3. We removed some of these barriers and markers as we gradually reopened our economy in Phase 2, to allow more businesses to operate. However, we must remain vigilant to keep the COVID-19 cases down. Every day, around 3,000 Safe Distancing Ambassadors and Enforcement Officers are deployed to educate the public and take enforcement action against egregious cases.
4. In crowded areas, control measures are still necessary to ensure safe distancing and prevent intermingling between groups to curb transmission. For instance, we have maintained, or even enhanced, access controls at some crowded hotspots like popular markets, shopping malls and beaches, in tandem with enhanced public education efforts. We work closely with the business operators in implementing these measures, and are grateful for their understanding as we strike a balance between protecting livelihoods and preventing community spread.
5. At the same time, we are mindful to minimise inconvenience to patrons and businesses from these safe distancing measures, such as longer waiting times and disruptions to businesses. Agencies are in constant discussion with stakeholders and re-calibrate our measures where the situation allows. For example, NEA had recently lifted the odd or even date entry restrictions at the four popular markets following feedback from stakeholders, and after assessing the crowd levels and the risks of transmission.
6. With the co-operation from business operators and the community, we have been able to manage the COVID-19 situation and keep community spread low. However, we cannot afford to be complacent. I urge everyone to continue to cooperate and play your part in adhering to safe management and safe distancing measures, so that we continue to keep community transmission under control.

Mr Darryl David: To ask the Minister for Sustainability and the Environment what support is available for small and independent food and beverage outlets attempting to strictly enforce safe management measures but are also fearful about offending errant diners and worried about losing future business given that action will be taken against such businesses, even for first-time offenders.

Answer:

1. With the commencement of Phase 2 of Singapore's reopening on 19 June 2020, many economic activities have resumed, including dine-in services at Food and Beverages (F&B) establishments. However, dining in F&B establishments involves considerable public health risks because it typically entails gathering in enclosed spaces, without masks on, and for a prolonged duration. Hence, we need to ensure that F&B establishments operate in a way that is safe for their customers and staff. Patrons should also cooperate by keeping to groups of no more than five, keep masks on unless when eating or drinking, and to maintain at least one metre safe distancing from other groups.

2. To help F&B establishments provide a safe environment, public agencies have also issued joint advisories on the measures specific to F&B establishments and to guide them on the steps they need to take to keep patrons and their staff safe. These include guidelines on crowd management, table and seating arrangement, contact tracing, health checks, cleanliness and hygiene practices. Our Safe Distancing Ambassadors and Enforcement Officers have also been advising the F&B establishments and the patrons on the application of safe management measures. It is encouraging to see that some F&B operators have proactively implemented additional measures on their own, such as having last orders for alcoholic drinks at 9.30pm, reminding patrons to finish their drinks before 10.30pm, and rolling down the shutter and switching off the lights at 10.30pm. We are heartened that the majority of F&B operators, including many small and independent operators, have properly implemented the SMMs.

3. However, a minority of the F&B operators have continued to breach SMMs, such as allowing the sale and consumption of alcohol after 10.30pm and allowing bookings and gatherings in groups of more than five. Several operators have even attempted to conceal their infringement by impeding our enforcement officers in their inspections or concealing their sale of alcohol. Over the past few weeks, agencies have stepped up enforcement checks on F&B establishments – out of 846 establishments inspected as at 5 October, 16 have been required to close for 10 days while another 46 have been issued fines for failing to observe SMMs.

4. Patrons also bear their share of the responsibility to achieve a safe environment in F&B establishments and most are cooperative. But some patrons refuse to comply with SMMs or cooperate with F&B operators. Such behavior not only endanger themselves but other patrons and staff of the F&B establishment. Agencies will not hesitate to take enforcement action against such irresponsible patrons who flout SMMs, endangering themselves and others. As part of the stepped up enforcement checks, fines were issued to 53 F&B patrons as at 5 October for failing to observe SMMs. In taking enforcement actions, agencies will also take into account whether the operator has taken effort to advise or deter the patron on non-compliance of SMMs.

5. We are at a critical stage in our fight against COVID-19. To ensure that our caseload remains low and effectively contain the spread of the virus, everyone must play their part and exercise social responsibility.

Dr Tan Wu Meng: To ask the Minister for Sustainability and the Environment (a) how are the current specified maximum permissible noise levels for construction work determined; (b) how are the noise levels measured; and (c) when were the noise limits and penalties last reviewed.

Answer:

1. The National Environment Agency (NEA) stipulates maximum permissible noise limits for construction sites to protect public health. The noise limits take reference from the World Health Organisation's guidelines and are tailored to the local context. To minimise noise nuisance to residents, the noise limits are further differentiated based on time bands, with more stringent limits imposed at night from 7pm to 7am and on Sundays and Public Holidays, which is when people are more likely to be resting.
2. To measure the noise levels generated from their worksites, construction companies must install noise meters at the nearest affected buildings and monitor the noise levels regularly. For projects of contract value more than \$3 million or those which involve demolition or piling, contractors are required to install noise monitoring systems, which allow real-time monitoring of the noise levels by both NEA and the contractors.
3. My Ministry regularly reviews the construction noise limits and penalty regime. For instance, NEA tightened the noise controls and implemented the no-work rule in 2011 to prohibit work activities at construction sites located within 150 metres of residential premises and noise-sensitive premises, such as hospitals and nursing homes, on Sundays and Public Holidays. The penalty regime was also reviewed in 2014. NEA is working with other agencies and industry stakeholders on an ongoing review of the construction noise limits and penalty regime.

Mr Murali Pillai: To ask the Minister for Sustainability and the Environment (a) how many cases of littering have been reported to NEA for each of the past three years; (b) how many persons have NEA taken action against for littering in each of the past three years; (c) what are the main difficulties that NEA faces in addressing the littering problem; and (d) whether NEA is considering any step to instil a stronger ethos of keeping Singapore's environment clean.

Answer:

1. In 2017, 2018 and 2019, the National Environment Agency (NEA) received about 8,800, 8,100 and 11,200 instances of littering feedback from the public. Over the same periods, it took enforcement action against some 31,000, 37,000 and 26,900 offenders respectively. Since 2019, NEA has adopted various approaches with a focus on deterring potential offenders by increasing enforcement presence in hotspots and deploying more uniformed enforcement officers to increase visibility.
2. NEA takes a firm stance against litterbugs and will continue to step up enforcement action against littering, with the help of technology. The use of predictive data analytics, and the adoption of camera surveillance and video analytics, have augmented NEA's enforcement efforts. In addition to more visible presence of enforcement officers, NEA is also working to enhance deterrence through the display of posters and banners which highlight the penalties for littering.
3. Notwithstanding these enforcement efforts, the bigger challenge is to foster a culture of collective action and social responsibility in keeping Singapore clean. NEA engages various stakeholders in the community, including residents, community leaders, Town Councils, schools and other organisations to promote community ownership in keeping public spaces clean. Our community partners conduct activities such as litter-picking brisk walks, beach and park clean-up exercises, and cleaner appreciation days.
4. For example, the Public Hygiene Council (PHC) introduced the Sustainable Bright Spot programme in 2019 at 11 Residents' Committee zones and one constituency. Through this, residents take ownership of the cleanliness of community spaces and are involved in regular awareness programmes, litter-picking and other outreach activities. PHC plans to bring on board another 10 constituencies into the Sustainable Bright Spot programme in 2020.
5. All of us must play our part to keep Singapore a clean, green, and sustainable home. This includes demonstrating greater social responsibility by not littering. We will then achieve our aim of building Singapore into a gracious society.

Mr Patrick Tay Teck Guan: To ask the Minister for Sustainability and the Environment what is being done to mitigate against the various chemical odours/fumes (besides cocoa) emanating from the factories in Pioneer constituency that adversely impact the households located within their close proximity.

Oral Reply by SMS Amy Khor:

1. The National Environment Agency (NEA) continuously monitors the ambient air levels of key pollutants as well as Volatile Organic Compounds (VOCs), which are organic vapours of common industrial emissions and precursors of ozone. The ambient VOC levels in the western region are in the parts per billion and parts per trillion range, well within safe levels which are mostly in the parts per million range. The ambient air quality in the western region was also in the normal range from January to September 2020, with the Pollutant Standards Index ranging from 14 to 66 in the Good to Moderate bands.

2. NEA has in place a suite of measures to manage emissions from industrial premises, including factories in Pioneer Constituency. Emissions of key industrial pollutants such as sulphur dioxide, oxides of nitrogen, carbon monoxide, dioxins and furans are regulated under the Environmental Protection and Management Act. Factories are required to install pollution control equipment to ensure that their emissions are properly treated before discharge. Industries with processes that emit higher levels of air pollutants are required to engage accredited surveyors to conduct source emission testing and submit the test reports to NEA regularly. NEA also conducts regular factory inspections to verify that their pollution control equipment is well maintained and operating effectively. About 150 inspections are conducted every year at factories in the Jurong area.

3. Some factories in the Jurong Industrial Estate, such as those specialising in the manufacturing of food flavourings and fragrances, generate certain smells during their operations. Such smells are generally not harmful to human health. NEA has advised these factories on additional mitigation measures, such as the installation of odour control systems and dispersion fans to reduce odours from their premises.

4. NEA will continue to ensure that industries meet air emission standards and will enforce against companies found to be non-compliant. My Ministry also regularly reviews the industrial emission standards to ensure they are on par with those in other jurisdictions.

Mr Murali Pillai: To ask the Minister for Sustainability and the Environment (a) what is the percentage of hawker centres and coffeeshops which currently do not adhere to the ratio of female and male toilet facilities of 5:3 as required by the NEA; (b) what steps can be taken to encourage the relevant owners and operators to make the requisite changes to comply with the ratio requirement; and (c) whether incentives can be provided under NEA's Toilet Improvement Programme launched on 2 October 2020 to effect the desired changes.

Answer:

1. The Code of Practice on Environmental Health (COPEH) specifies the minimum number of female and male toilet facilities for different categories of premises, according to their Gross Floor Area (GFA) or capacity. For small food establishments, such as coffeeshops that are no more than 250 square metres in area, the minimum requirement is to provide one toilet and one wash hand basin. For larger hawker centres and coffeeshops, the required ratio of female to male toilet facilities will vary according to size. The 5:3 ratio of female to male toilet facilities applies to premises such as shopping malls, conference halls and cinemas.
2. NEA regularly updates the requirements in the COPEH, including those pertaining to the number of female and male toilet facilities. These will apply to premises, including hawker centres and coffeeshops, when they undergo rebuilding or major renovation.
3. NEA will encourage owners and operators of hawker centres and coffeeshops to provide toilet facilities that meet the latest COPEH through the Toilet Improvement Programme (TIP). The TIP provides co-funding support of up to 90% to incorporate better designs and technologies for more productive and effective cleaning of toilets.
4. I urge Town Councils and coffeeshop owners to apply for the TIP to upgrade their toilets.

Mr Don Wee: To ask the Minister for Sustainability and the Environment whether the Ministry will consider introducing a tax on plastic packaging products in view of their negative environmental impact.

Answer:

1. Addressing packaging waste, including plastic packaging, is a priority for my Ministry. We take a multi-pronged approach, from encouraging upstream reduction in excessive consumption, to ensuring proper end-of-life management.
2. We have announced the introduction of an Extended Producer Responsibility (EPR) framework in Singapore to manage packaging waste including plastics, which will be implemented no later than 2025.
3. We are actively studying and considering various EPR approaches, taking reference from the experience of other jurisdictions. Some jurisdictions price in the environmental costs via a tax. Under this approach, there is no obligation for producers to ensure the subsequent collection and recycling of the packaging waste. Other jurisdictions require producers to pay an appointed organisation for take-back of packaging waste and to ensure that the waste is recycled properly. Finally, some other jurisdictions impose collection or recycling targets on producers and downstream recyclers. Compared to the tax approach, the two latter approaches provide more certainty on waste recovery outcomes, create an incentive for producers to reduce their packaging usage, and improve recycling facilities and processes. This will promote a circular economy approach to packaging waste management.
4. We are still developing the EPR framework for packaging waste and will share further details when ready.

Mr Dennis Tan Lip Fong: To ask the Minister for Sustainability and the Environment (a) what is the rationale for SFA's latest revised position on the maximum residue limits for ractopamine in pork and cattle imported into Singapore; (b) what are the known and possible health risks arising from consuming meat with such residue limits of ractopamine including risks for young people or any vulnerable group; and (c) whether SFA is concerned that ractopamine is banned in various other countries.

Answer:

1. Importers of meat and meat products are required to ensure that the food they import comply with the regulatory standards set by SFA, so as to ensure that the food is safe for consumption. These standards include the maximum residue limits for substances found in the food. When considering new regulatory standards or when reviewing existing regulatory standards, SFA takes reference from international standards-setting bodies such as the Codex Alimentarius Commission (Codex), which was established by the Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO).

2. Ractopamine is an additive that is used in animal feed to promote growth in approved food animal species, namely pig and cattle which are raised for their meat for human consumption. The Codex had considered the safety of ractopamine before adopting the existing maximum residue limits for ractopamine in meat and other organs. Codex's scientific expert panel, the Joint FAO/WHO Expert Committee on Food Additives (JECFA), had conducted comprehensive risk assessments in 1993, 2004, 2006 and 2010 which studied the toxicity of ractopamine, the levels of residue found in food animals that were fed with ractopamine and the amount of ractopamine consumed by humans as a result of consuming meat and other organs from these animals. JECFA concluded from these assessments that ractopamine is safe for use in food production. SFA's decision to align to the Codex standards for ractopamine in meat and other organs was made only after careful consideration, taking into account the safety assessments done by JECFA as well as SFA.

3. Based on these safety assessments, the intake of ractopamine through residues in meat and other organs within the regulated limits set by SFA would not pose a health risk, even if the meat and other organs are consumed over a long period of time.

4. Countries set their own standards based on their own risk assessments and considerations and it would be inappropriate for us to comment on them. Although it is not mandatory for countries to align their standards with Codex standards, it is important to note that the Codex standards have been recognised as reference standards for international trade under the World Trade Organisation's Agreement on Sanitary and Phytosanitary measures. While some countries have banned ractopamine, many other countries including developed ones such as Australia, New Zealand, Japan, South Korea and Canada have adopted similar limits for ractopamine as Singapore.

5. SFA will continue to monitor the scientific developments on the safety of ractopamine and will review our regulations where necessary to safeguard food safety and public health.

Mr Chua Kheng Wee Louis: To ask the Minister for Sustainability and the Environment (a) how is the 2035 lifespan of Semakau landfill determined; (b) in the past 10 years, how much of the waste generated is domestic waste versus industrial waste and what are their respective growth rates; and (c) what has been the reduction in waste generation since the launch of the Zero Waste Masterplan in 2019.

Answer:

1. The National Environment Agency (NEA) projects the amount of waste disposed of at Semakau Landfill, which comprises incineration ash and non-incinerable waste. This figure is then compared with the remaining space at Semakau Landfill to estimate its lifespan.

2. Domestic waste comes from households and trade premises, while non-domestic waste comes from commercial and industrial premises. On average for the past 10 years, close to 30% of the waste generated was domestic waste, and the remaining 70% non-domestic waste. In 2019, about 7.2 million tonnes of waste were generated compared to 6.5 million tonnes in 2010, reflecting an average annual growth rate of about 1%. Between 2010 and 2019, domestic waste generation decreased by about 9% while non-domestic waste generation increased by about 20%.

3. 2019 was designated as Singapore's Year Towards Zero Waste. The Zero Waste Masterplan, which was launched in August 2019, maps out our key strategies to adopt a circular economy approach, and targets to reduce the amount of waste we send to Semakau Landfill by 30% by 2030. These include regulatory measures such as Extended Producer Responsibility frameworks, as well as educational and engagement efforts with people, private, and public sector partners, such as the "Say Yes to Waste Less" campaign to discourage the use of disposables.

4. While the Zero Waste Masterplan was produced with a 2030 time horizon, we have seen some initial promising signs in overall waste generation. For example, the rate of growth in waste generation has slowed over the past decade, with absolute reduction in overall waste generated in the last three years from 7.8 million tonnes in 2016 to 7.2 million tonnes in 2019. We will regularly assess the progress and outcomes of our initiatives in the next few years as more data become available.

Miss Cheryl Chan Wei Ling: To ask the Minister for Sustainability and the Environment as we move towards further easing measures in the community, how will the social distancing ambassadors be aided to enforce rules on the ground as there will be more grey areas on when and how to mask on.

Answer:

1. Since the start of Circuit Breaker period, agencies have continued to deploy Safe Distancing Ambassadors and Enforcement Officers to advise the public and enforce on safe distancing measures. These measures are critical to safeguard public health and protect ourselves and each other, even as we gradually open up our economy and social settings. Even though caseloads are currently low, we must not let our guard down. We will need to stay nimble and calibrate our measures appropriately. For example, we recently lifted the odd or even entry restrictions at the four popular markets but stepped up our enforcement at F&B hotspots.

2. In line with this, our Safe Distancing Ambassadors and Enforcement Officers are regularly updated on the safe distancing measures, including the rules of engagement with premises operators and members of the public. They are briefed by their team leaders and supervisors on adjustments to the measures and provided reference material through their mobile devices. They are also deployed in teams of at least two, where a more experienced officer will be partnered with a newer one to provide support and guidance.

3. Mask wearing will remain an important measure for public health, to protect ourselves and those we come into contact with. Mask wearing will remain mandatory for anyone leaving their homes. A recent study by A*STAR found that small particles from a person's cough could travel more than one metre within eight seconds if no mask was worn. On the other hand, wearing a mask would help reduce the spread of the virus, by significantly reducing the droplets and aerosols ejected from a person's nose and mouth. Everyone should put on your mask at all times, including putting your mask back on immediately after activities such as eating, drinking, or engaging in strenuous exercise. You should also keep your mask on when seated before you start consuming your food or drink or before you begin your workout.

4. We have been able to contain the COVID-19 situation with the co-operation of the community and business operators. I urge everyone to continue to play your part in adhering to these safe distancing measures and to co-operate with the Safe Distancing Ambassadors and Enforcement Officers, so that we continue to keep community transmission of COVID-19 under control.

Dr Tan Wu Meng: To ask the Minister for Sustainability and the Environment (a) over the past 10 years, how many funeral wakes have taken place in HDB void decks annually; (b) whether any forecast has been done for future trends; and (c) what is being done in light of Singapore's ageing population to ensure adequate facilities and community spaces for bereaved families to hold funeral wakes in future years.

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Answer:

1. Funeral wakes are mostly held at Housing Development Board (HDB) community spaces. Between 2010 and 2019, an average of about 8,000 wakes were held annually at void decks and multi-purpose pavilions. A smaller number of funeral wakes are held in purpose-built funeral parlours, places of worship and private home compounds.

2. As the population ages, the number of resident deaths is projected to increase to around 40,000 in 2040. The demand for after-death facilities and services, such as wake spaces, will increase in tandem.

3. The Government has long-term plans to ensure sufficient funeral wake spaces as the population ages. We will be increasing the number of funeral parlours in Singapore. The National Environment Agency (NEA) and HDB is redeveloping the existing funeral parlours at the former Mount Vernon Columbarium Complex into a new funeral parlour complex in Bidadari estate, which is expected to complete in 2025. In addition, four more funeral parlour sites will be launched for development over the next decade. The sites are located in various parts of Singapore to provide a better distribution of funeral parlours for the convenience of the bereaved families and visitors. The first of these four sites, at Woodlands Industrial Estate, was launched in July 2020 for development.

My Ministry and NEA will continue to work closely with other Government agencies such as the Ministry for National Development, the Urban Redevelopment Authority and the HDB to monitor the long-term demand for funeral spaces and ensure that the necessary facilities are ready ahead of demand.

Mr Melvin Yong Yik Chye: To ask the Minister for Sustainability and the Environment (a) whether domestic non-recyclable waste disposal rates have increased significantly in the past six months due to work-from-home arrangements; and (b) whether domestic recycling rates have increased in tandem.

Answer:

1. The domestic non-recyclable waste collected by the Public Waste Collectors (PWCs) from domestic and trade premises did not change significantly in the last six months. The PWCs collected an average of 3,340 t/day of waste from April to June 2020. This fell slightly to 3,265 t/day between July and September 2020. This is similar to the waste collected (3,241 t/d) in March 2020, before work-from-home arrangements were widely adopted.

2. The daily average amount of recyclables collected by the PWCs in April to June 2020 was 20% lower than in March 2020. The decrease is largely attributed to the suspension of the Cash-for-Trash recycling programme and door-to-door collection by PWCs during the Circuit Breaker period. However, the daily average amount of recyclables collected in July to September increased significantly, exceeding March 2020 levels by 11%.

3. While we have seen a shift in consumption patterns brought about by COVID-19 and work-from-home arrangements (e.g. more online shopping, food delivery and takeaway), we have continued to encourage the community to adopt good 3R (Reduce, Reuse, Recycle) habits. For example, NEA published a Food Wastage Reduction Handy Guide, with tips to help consumers reduce food waste. As part of the Say Yes to Waste Less campaign, NEA is also emphasizing waste reduction measures, such as bringing reusable food containers for takeaway and not opting for disposable cutlery. We have also started a Citizens' Workgroup to co-create solutions with members of the public to reduce the excessive consumption of disposables. We look forward to hearing participants' ideas on how we can reduce the use of disposables, whether working from home or at our workplaces.

Mr Louis Ng Kok Kwang: To ask the Minister for Sustainability and the Environment whether the Ministry can include a specific category of "secondhand smoke from neighbour" on NEA's online feedback form to accurately capture the amount of concerns on this issue.

Answer:

1. The National Environment Agency's (NEA) online feedback form is designed for the public to provide information on issues regulated by NEA. Currently, the feedback form lists 13 categories which cover the most common types of feedback received by NEA, such as smoking at prohibited places, littering and mosquito breeding. In addition, there is a general category for the submission of feedback on other issues, including secondhand tobacco smoke from neighbours. Feedback providers can select one of these 13 categories when submitting their feedback.

2. The form is designed to be user-friendly and hence, care has been taken to list the more common feedback issues. Having too finely cut categories covering the broad range of issues under NEA may make the feedback process cumbersome and even increase the chances of erroneous tagging by feedback providers.

3. Feedback on secondhand tobacco smoke from neighbours submitted through the form remain small. Secondhand tobacco smoke from neighbours in homes constitutes just 1.2% of total feedback submitted through the form this year. This is much lower than some of the most common feedback areas such as mosquito breeding, which accounted for 16% of the total feedback. Nonetheless, we will continue to monitor the feedback on secondhand tobacco smoke from neighbours to see if this category warrants inclusion in the form.

4. In addition, every feedback item recorded in NEA's system is promptly looked into and tagged appropriately. In the backend, NEA will sieve out the feedback on specific issues and monitor the trends accordingly.

5. Besides NEA, there are other accessible channels for the public to provide their feedback on smoking-related matters. The Municipal Services Office, Housing Development Board, Health Promotion Board and Town Councils also receive such feedback and will respond accordingly. All these agencies work closely together on joint-solutioning to address feedback on smoking.

Mr Louis Ng Kok Kwang: To ask the Minister for Sustainability and the Environment (a) whether cleaning companies under the Enhanced Clean Mark Accreditation scheme will be required to provide cleaners (whether foreign or local) mandated rest days every month without reducing their take-home salary; (b) if so what is the timeline for implementing this; and (c) if not why not.

Answer:

1. The voluntary Enhanced Clean Mark Accreditation Scheme (EAS), administered by the National Environment Agency (NEA) since 1 Nov 2012, aims to raise the overall standards and professionalism of the cleaning industry through better employment practices and productivity initiatives.

2. The Employment Act (EA) under the Ministry of Manpower is Singapore's main labour law. It covers employees in Singapore who are under a contract of service with an employer, including local and foreign cleaners. The EA already requires cleaning companies, including those which adopted EAS, to provide their cleaners with statutory benefits, such as granting cleaners one rest day per week, as well as payment for overtime work and work performed on rest days and public holidays.

Mr Leon Perera: To ask the Minister for Sustainability and the Environment (a) whether Indonesia's Omnibus Law will have environmental implications for Singapore, specifically on the issue of transboundary haze; and (b) whether the law affects Singapore's strategy in dealing with potential haze problems.

Answer:

1. Singapore was free of transboundary haze this year. Apart from the wetter weather conditions this year, Indonesian President Joko Widodo and his government have shown leadership and determination in preventing and fighting land, forest and peatland fires in Indonesia.

2. We do not interfere with the domestic politics of any foreign country and it is in the sovereign right of a country to introduce laws to meet its domestic needs. We understand that the Omnibus Law on Job Creation was introduced by the Indonesian government to create new jobs and support economic growth.

3. The Omnibus Law will not affect Singapore's commitment to work closely with Indonesia, other ASEAN Member States and the international community to address transboundary haze. We stand ready to offer fire-fighting assistance to combat the fires, and deploy them when requested, as we did in 2005 and 2015.

4. At the regional level, the ASEAN Specialised Meteorological Centre (ASMC) based in Singapore will continue sharing regional weather and haze outlook, and satellite imagery information with ASEAN Member States. The ASMC plays a critical regional role as its technical assessments and updates on the haze situation, along with its meteorological forecasts and data on hotspot activities, support efforts to prevent, detect and fight fires.

5. Singapore remains committed to working with the region to realise our vision of a haze-free ASEAN. We will continue to participate and contribute actively in all regional haze meetings such as the ASEAN Agreement on Transboundary Haze Pollution (AATHP) and the Sub-Regional Ministerial Steering Committee (MSC) on Transboundary Haze Pollution.

Mr Murali Pillai: To ask the Minister for Sustainability and the Environment with regard to the "30 by 30" goal to secure Singapore's food needs (a) how many HDB rooftop farming sites does SFA intend to set up in the next ten years; (b) what is the expected yield from these sites; and (c) whether SFA will consider incorporating in the tenders for these sites a requirement to engage the community as well.

Answer:

1. Singapore aims to achieve our "30 by 30" goal to locally produce 30% of our nutritional needs by 2030, using about 1% of our land. Besides making productive use of our agri-land, such as at Lim Chu Kang, agencies are identifying alternative spaces to repurpose for commercial scale urban farming, including the rooftops of HDB Multi-Storey Carparks (MSCPs). Commercial farming in alternative spaces contributes to food security as it activates pockets of under-utilised space for productive farming.

2. Following the launch of the pilot MSCP urban farm Citiponics in 2019, interest from the industry and public towards urban farming in community spaces has grown. SFA and HDB awarded the first tender of nine MSCP sites in September 2020 to successful tenderers with innovative and high productivity proposals, such as vertical and climate-controlled farming systems. This is in line with HDB's Green Towns Programme to intensify greening in HDB estates. As urban farms operating from MSCPs are expected to contribute to Singapore's "30 by 30" goal, farms must commit to and meet a high volume of production. Collectively, the successful tenderers from the first tender can produce up to 1,600 tonnes of vegetables annually.

3. SFA and HDB are identifying more suitable MSCP rooftops that can be converted for food production and will launch a second tender of sites in the coming months. Agencies will continue to identify more potential MSCP sites and make them available, depending on the level of industry interest.

4. Besides contributing to food security, urban farming in spaces such as MSCP rooftops benefits the community. For example, these commercial farms may offer employment opportunities for residents. They bring the community closer to local production, thereby raising awareness and support for local produce.

5. With the ramp up in local production towards the "30 by 30" goal, we will need the support of all Singaporeans to buy local produce. Local produce is grown close to our homes, and is therefore fresher, lasts longer and is more sustainable as it incurs lower carbon miles. By choosing locally-produced food, we can all play a part in contributing to Singapore's food security and save the planet too.