

INTEGRATED SUSTAINABILITY
REPORT 2019/2020

Safeguarding Singapore for a Sustainable Future



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VISION

A clean environment,
towards a liveable and
sustainable Singapore

MISSION

To ensure a clean and
sustainable environment
for Singapore, together
with our partners and
the community

ROLES

- Maintain high standards of public health
- Improve and sustain a clean environment
- Provide timely and reliable weather information services
- Promote resource efficiency and conservation in collaboration with our partners and the community

CORE VALUES ^[102-16]

Care

NEA values each individual and strives to exceed its customers' expectations

Integrity

NEA upholds the trust and confidence of others

Teamwork

NEA works as a team and with its partners to achieve common goals

Innovation

NEA constantly pursues new ideas and creative solutions

Professionalism

NEA takes pride in what it does and strives for excellence

Chairman's Foreword ^[102-14]

In the face of the growing COVID-19 situation, NEA rapidly developed surveillance capabilities to measure the amount of viral material in wastewater, to assess the COVID-19 transmission levels among large population segments.



Mr Lee Chuan Seng
Chairman

The year 2020 won't be quickly forgotten – we have been battling a global pandemic, which threatens public health and challenges our lives as we know it. COVID-19 has proven to be a test of our adaptability in the face of uncertainty, as a nation, as well as an agency in charge of maintaining high levels of environmental cleanliness and public hygiene. In addition, 2020 saw an unprecedented rise in dengue cases, which has challenged NEA's capabilities in responding to critical situations. But I am grateful to note that NEA can look back upon this year with pride, and one that we can draw on for valuable lessons in raising operational standards and resilience.

Challenges are not new to NEA, as each year, we face issues that are each more trying than the one before, such as haze, dengue, and new and emerging vector-borne and infectious diseases, which bring NEA into the public space and mind's eye. The list of challenges goes on, mandating that NEA is constantly operationally ready, and reflecting the many roles that NEA plays in ensuring a clean, green and sustainable Singapore. And while all those challenges are dealt with on the frontline, the rest of NEA's roles continue in the background, in our functions as policy maker, regulator and enforcer.

2019 was designated the Year of Zero Waste, and as a policy maker, NEA stepped up regulations for food waste, e-waste and packaging waste, which includes plastics. As a regulator, NEA implemented mandatory waste reporting and segregation for

commercial and industrial developments. And as an educator, NEA encouraged and promoted household recycling via collaborations with industry partners and stakeholders.

As environmental sustainability issues are central to NEA's business, much of our efforts in 2019 was dedicated to reinforcing and extending our commitment to sustainability, through initiatives that create immediate and long-term value for all our stakeholders. These initiatives include enhancing the Extended Producer Responsibility framework, with a Deposit Refund Scheme. As packaging waste, including plastics, is one of Singapore's priority waste streams due to its high generation and low recycling rate, the first phase of the Extended Producer Responsibility implementation will see a Deposit Refund Scheme for beverage containers launched by 2022.

The Extended Producer Responsibility is also an example of NEA's commitment to transition towards a circular economy, which essentially requires manufacturers to plan for the management of waste generated at the end of a product's lifespan. One such result of this 'starting with the end in mind' is a construction material we proudly call NEWSand, which closes the waste loop and recovers value from Incineration Bottom Ash, diverting it from Semakau Landfill. As a nation with limited resources, we are also exploring novel approaches and pursuing chemical recycling solutions to treat plastic waste that is unsuitable for mechanical recycling, converting it into NEWOil.

As part of NEA's continuous efforts to drive innovation, push widespread technology adoption, and improve productivity across the Environmental Services industry, NEA is working with companies to develop and conduct proof-of-concept trials, for example assistive technology for Public Waste Collectors, and compactor bins with sensors to detect when they are full. NEA also leverages technology to supplement existing dengue prevention efforts, such as with our Gravitrap surveillance system that has enabled the development of a new data-driven mosquito indicator on areas with higher *Aedes aegypti* mosquito population. More recently, in the face of the growing COVID-19 situation, NEA rapidly developed surveillance capabilities to measure the amount of viral material in wastewater, to assess the COVID-19 transmission levels among large population segments.

As we adjust to new standards of public hygiene, some innovations that NEA had implemented, such as the use of treated Municipal Solid Waste in construction, and the automated tray return system introduced in early 2018, will become more relevant and important than ever before. As we continue to navigate these unprecedented times, NEA will continue in our quest to ensure a safe, liveable and sustainable environment for all in Singapore.

CEO's Message ^[102-14]

NEA's readiness, capabilities and resilience as a public agency responsible for maintaining a high level of public health, was fully tested by COVID-19. Given the nature of the crisis, our response had to be swift and decisive.

Sustainability issues have come to the fore, not least because of recent conversations on the impact of climate change to Singapore. In everyday life, we deal with sustainability issues – big or small – all the time, and this is particularly salient for NEA as an environment agency. In 2017, NEA embarked on a journey to raise the level of our Annual and Sustainability reporting. With our diverse mandate and growing sustainability challenges, it is important for NEA to effectively communicate the connectivity and interdependencies of our various efforts, and how we create value over time. Four years on, I am pleased to present NEA's first full-fledged Integrated Sustainability Report. This report showcases how NEA creates value for our stakeholders, through our strategy, governance, performance and prospects, while keeping sustainability and the environment at the heart of all we do.

In FY2019, NEA's readiness, capabilities and resilience as a public agency responsible for maintaining a high level of public health, was fully tested by COVID-19. Given the nature of the crisis, our response had to be swift and decisive. In line with our diverse mandate and capabilities, our COVID-19 roles progressively expanded to cover several fronts, ranging from cleaning and disinfection, to the SG Clean campaign, safe distancing at our markets and hawker centres, and wastewater testing. NEA's detailed response to the pandemic can be found on page 20. In the midst of COVID-19, NEA also had to deal with an unprecedented dengue outbreak that saw historical high dengue cases this year. In response, we scaled up our vector control operations on the ground, and adapted our outreach,

stakeholders' engagement and public communication efforts given the backdrop of COVID-19. The Circuit Breaker period also posed challenges to the stallholders in our hawker centres, as well as companies in the ES sector. NEA responded by offering various reliefs and assistance schemes to help sustain their businesses. Our waste and resource management and public cleaning teams had to deal with the significant increase in the amount of biohazardous waste generated, while keeping our cleaning and waste disposal services going despite manpower shortages.

Besides ongoing operations and capabilities building in response to COVID-19, NEA continues to invest in R&D and technologies to help us do our job better and smarter. In November 2019, the World Federation of Engineering Organizations presented NEA with the prestigious 2019 Hassib J. Sabbagh Award for Engineering Construction Excellence, recognising our outstanding engineering feat in the development of Semakau Landfill. This same pioneering spirit of innovation can be seen in Project *Wolbachia* – Singapore, where NEA established a new, highly automated mosquito production facility in December 2019, with a target capacity of five million male *Wolbachia-Aedes aegypti* mosquitoes per week. NEA also piloted the use of the Business Intelligence System, leveraging on software, technology and services to transform data into actionable intelligence. In addition, we operationalised the Ambient Radiation Monitoring Network that will enable NEA to establish baseline ambient radiation levels and detect any increase in radiation levels in our local environment, to better safeguard public health and safety.



Mr Tan Meng Dui
Chief Executive Officer

To better position NEA for future challenges, NEA commenced an organisation-wide transformation and restructuring effort in FY2019. The restructuring seeks to expand NEA's *capacity* and build *capabilities* in our technical domains by developing key pillars of competencies required as a trusted environment authority. These range from areas as diverse as radiological protection and nuclear safety, to weather and climate science. At the same time, we recognise that public support is crucial to the success of our work, be it for traditional smoking and littering enforcement or our new safe distancing work. The restructuring thus seeks to also deepen *collaboration* – both inside and outside of NEA – to ensure that we continue to remain relevant and are able to leverage our stakeholders to do more and do better.

The last FY has been a challenging one; NEA officers have gone above and beyond – volunteering their time, supporting frontline efforts, and working tirelessly to ensure that essential services continue uninterrupted in the midst of COVID-19. We have done all these, while staying focused on NEA's core mission and at the same time building NEA for the future. COVID-19 is likely to stay with us for some time. We need to remain steadfast and press on with our work, balancing service delivery and operations management of the present, with transformation and organisational restructuring to shape a better future. Working as One NEA and together with all our stakeholders, NEA will continue to play a critical part towards making Singapore a truly clean, liveable and sustainable city, that all Singaporeans will be proud to call home.

Corporate Governance ^[102-18]

BOARD OF DIRECTORS

The Board of Directors provides strategic direction and oversight of organisational functions and goals, and steers NEA in fulfilling our vision and mission. In FY2019, the Board comprised 13 members with diverse and extensive experience from both the private and public sectors. Appointed by the Minister for Sustainability and the Environment, the Board is guided by a set of key principles to ensure fairness and impartiality in carrying out its responsibilities, as well as to uphold the integrity and reputation of the Public Service. Led by Board Chairman Mr Lee Chuan Seng, the Board has set up Board Committees to assist it in the execution of its responsibilities.

The Committees are:

Audit Committee

The Audit Committee assists the Board in maintaining a high standard of corporate governance, particularly in the areas of financial accounting and reporting, risk management, and internal control systems. Chaired by Ms Jackie Chew, the Audit Committee comprises Ms Sylvia Choo Sor Chew and Mr Phua Kok Keong. The Committee reviews the annual accounts, audit plans, internal control systems, risk report and audit reports with NEA's external and internal auditors.

Human Resource Committee

The Human Resource Committee assists the Board in ensuring an objective and fair performance management process for NEA. Chaired by Mr Lee Chuan Seng, the Human Resource Committee comprises Deputy Chairman Mr Ravinder Singh, Mr Wong Mun Summ (till 31 March 2020) and NEA's Chief Executive Officer (CEO).

Finance Committee

Formed in 2017, the Finance Committee oversees matters related to the investment of surplus funds, cash and working capital management and fundraising activities. Chaired by Mr Quek Suan Kiat, the Finance Committee comprises Ms Lynette Leong Chin Yee, Mr Suhaimi Zainul-Abidin and NEA's CEO.

Board Working Committees

There are three Board Working Committees (BWC) in the areas of 'Keep Singapore Clean', 'Sustainable Singapore', and 'Reimagining Hawker Centres'. These BWCs, chaired by Mr Lim Eng Hwee, Mr Ravinder Singh and Mr Wong Mun Summ (till 31 March 2020) respectively, provide industry and expert perspectives, guidance on the strategies, and advice on suitable strategic partnerships.

SENIOR MANAGEMENT

The senior management team, led by NEA's CEO, is responsible for implementing the strategic direction of NEA's programmes, as well as nurturing a high performance organisation committed to fulfilling NEA's mission and roles.

Members of the senior management team manage the financial, manpower and operational resources of their respective divisions and departments. They also come together during committee meetings to guide NEA's continued performance in risk management, innovation and sustainability practices.

Management Committee

In addition to the six Board Committees, NEA also has a Management Committee (MC) made up of NEA's CEO and senior management. The MC meets regularly to direct and review management and operational policies and activities. It also leads and directs NEA's strategies and transformational efforts. Through strategically-themed meetings and projects, the MC guides NEA in becoming more effective in our dual roles as regulator and champion for the environment. These efforts are aimed at improving how NEA is organised, leverages technology and utilises resources, thereby enabling better results by working smarter and striving for organisational excellence.

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Enterprise Risk & Safety Steering Committee

The Enterprise Risk & Safety Steering Committee (ERSSC) is chaired by NEA's Deputy CEO (Planning, Corporate & Technology) and comprises the Director-Generals, Group Directors, Directors and Chairpersons of selected Safety Committees, with Internal Audit Division as an observer.

The ERSSC meets every quarter to review key strategic and operational risks facing NEA and the progress of risk treatment plans for these identified risks. It reviews and ensures that relevant risks are highlighted and prioritised by the respective departments, and that these risks are adequately addressed.

The ERSSC also reviews the effectiveness of these risk treatment plans, and studies the trends and emerging issues that may impact the risks confronting NEA. The ERSSC, in turn, reports to the CEO, Audit Committee and the Board of Directors, which provide oversight and guidance over risk management matters in NEA.

Code of Conduct

NEA has an internal code of conduct that applies to all employees as NEA has a zero-tolerance policy on fraud and misconduct by employees. Called the NEA Person Code, the code of conduct articulates NEA's vision,

mission and values, appropriate conduct, and guidelines concerning conflicts of interest, confidentiality, preventing corruption and proper financial stewardship.

The Code also sets out principles to guide employees in discharging their duties and responsibilities to the highest standards of personal and corporate integrity. The NEA Person Code is readily available on the NEA intranet and in the Staff Handbook.

All new staff are informed about the NEA Person Code. Reminders on the code are also regularly sent to staff. In the event of a breach of discipline, the NEA Disciplinary Policy details the appropriate procedures to deal with the breach. Under NEA's whistleblowing policy, NEA encourages all employees and third parties to report any incidents of fraud and serious misconduct. NEA also offers employees ample channels to air their grievances on matters that affect the terms and conditions of their service.

Internal Audit

The Internal Audit Division advises NEA's management and the Audit Committee on the system of internal controls in NEA. Reviews performed by the Internal Audit Division assist the Board in promoting good corporate governance by assessing the design and operating effectiveness of controls.

The reviews also focus on compliance with NEA's policies and procedures.

External Audit

The external auditors provide the Board with an independent opinion on NEA's Financial Statements, offering reasonable assurance that the Financial Statements are free from material misstatements. The external auditors conduct their audit in accordance with their audit plan presented to the Audit Committee for internal controls they have considered to be relevant to the audit. They will report to management and the Audit Committee any recommendations on internal controls that they have identified during the course of audit.

The Audit Committee assesses the external auditors based on factors such as the quality of their audit and the independence of the auditors, and recommends their appointment to the Board. The external auditors are required to declare their state of independence to the Audit Committee prior to their appointment.

Board of Directors ^[102-18]



Mr Lee Chuan Seng
Chairman, National Environment Agency
Emeritus Chairman, Beca Asia Holdings Pte Ltd



Mr Ravinder Singh
Deputy Chairman, National Environment Agency
President, Electronics
President, Defence Business, Singapore Technologies Engineering Ltd



Mr Tan Meng Dui
Chief Executive Officer, National Environment Agency



Ms Lynette Leong Chin Yee
Chief Sustainability Officer, CapitaLand Group



Professor Ho Teck Hua
Senior Deputy President and Provost, National University of Singapore



Ms Jackie Chew
Chief Risk Officer, Prudential Assurance Company Singapore (Pte) Ltd



Mr Bernard Choo Chee Wee
Editor, Shin Min Daily News, Singapore Press Holdings Limited



Mr Quek Suan Kiat
Former Vice Chairman, Barclays Bank PLC Singapore



Ms Sylvia Choo Sor Chew
Director, Unions, National Trades Union Congress
Executive Secretary, Singapore Industrial & Services Employees' Union

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Mr Suhaimi Zainul-Abidin
Chief Executive Officer, Quantedge Capital Pte Ltd



Mr Lim Eng Hwee
Chief Executive Officer, Urban Redevelopment Authority



Mr Puah Kok Keong
Deputy Secretary (Policy), Ministry of Home Affairs



Mr Wong Mun Summ
Founding Director, WOHA Architects Pte. Ltd.
(till 31 March 2020)



Ms Susan Chong
Chief Executive Officer, Greenpac (S) Pte Ltd
(with effect from 1 April 2020)



Dr Andrew Khoo
Former Deputy Managing Director, Monetary Authority of Singapore
(with effect from 1 April 2020)

Senior Leadership Team ^[102-18]



Mr Tan Meng Dui
Chief Executive Officer



Mr Khoo Seow Poh
Deputy Chief Executive Officer,
Planning, Corporate & Technology



Mr Ng Chun Pin
Deputy Chief Executive Officer,
Planning, Corporate & Technology
(Designate)
Covering Group Director,
Public Engagement



Mr Ananda Ram Bhaskar
Deputy Chief Executive Officer,
Environmental Protection
Director-General,
Environmental Protection



Mr Chew Ming Fai
Deputy Chief Executive Officer,
Public Health
Director-General,
Public Health



Ms Wong Chin Ling
Director-General, Meteorological
Service



Mr Cheang Kok Chung
Deputy Director-General,
Environmental Protection
Group Director, Clean Environment



Ms Ivy Ong
Group Director, Strategic Planning
& Policy



Mr S Satish Appoo
Group Director, Joint Operations
& Technology



Mr Andrew Low
Group Director, Hawker Centres



Mr Tan Eng Kim Francis
Group Director, Corporate Services



Mr Desmond Tan
Group Director, Resource
& Sustainability



Mr Chua Yew Peng
Group Director, Infrastructure &
Engineering

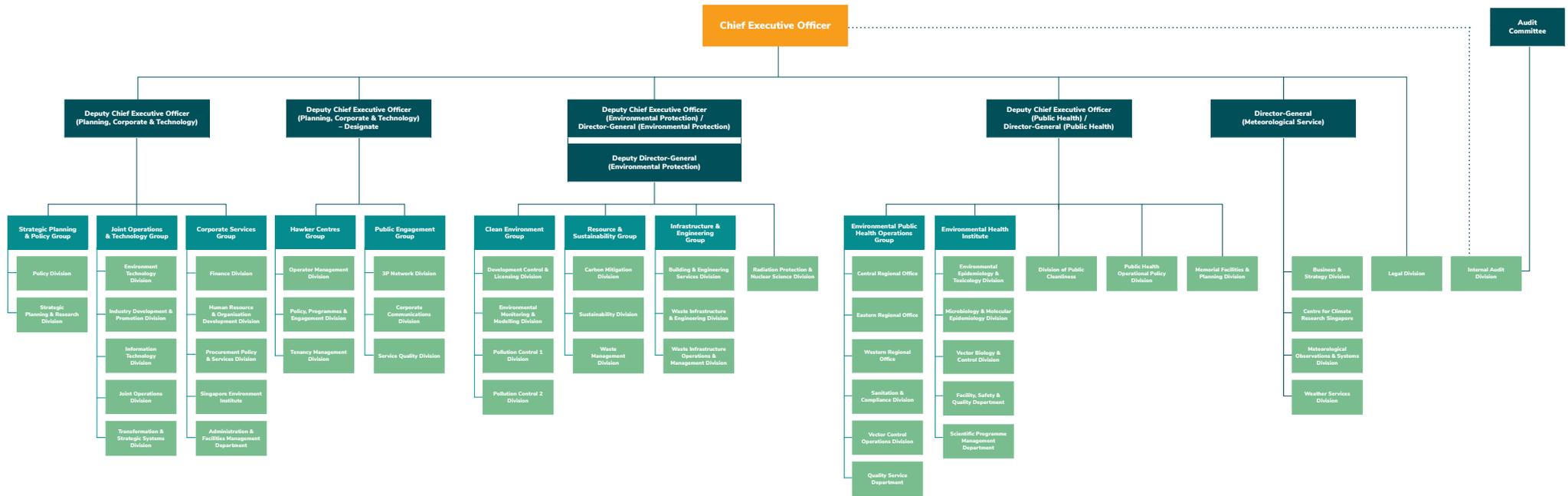


Mr Tony Teo
Group Director, Environmental Public
Health Operations



Dr Ng Lee Ching
Group Director, Environmental Health
Institute

Organisation Chart



Note: For a detailed version of NEA's organisation chart, please visit www.nea.gov.sg/corporate-functions/who-we-are/people/organisation-chart

About the National Environment Agency

[102-1,102-2,102-3,102-4,102-5,102-6,102-7,102-12,102-13]

NEA is the leading public organisation responsible for ensuring a clean and green environment, and the sustainable development of Singapore. It was established on 1 July 2002 by the NEA Act (Chapter 195) as a statutory board under the Ministry of Sustainability and the Environment (MSE). As of 31 March 2020, NEA has 3,654 employees.

NEA's work is highly diverse. In order to sustain a quality living environment for present and future generations, NEA is committed to motivating every individual to care for the environment as a way of life.

NEA is a member of these international associations:

- United Nations Global Compact (UNGC), since September 2016
- Global Compact Network Singapore, a local chapter of UNGC, since February 2010

Advancing Sustainability in NEA's Public Initiatives

As regulator and advocate for the environment, NEA strives to formulate clear policies and public initiatives that benefit Singapore's environment, economy and society in the long run. NEA's Strategy Map outlines our key strategies to promote a liveable and sustainable Singapore.

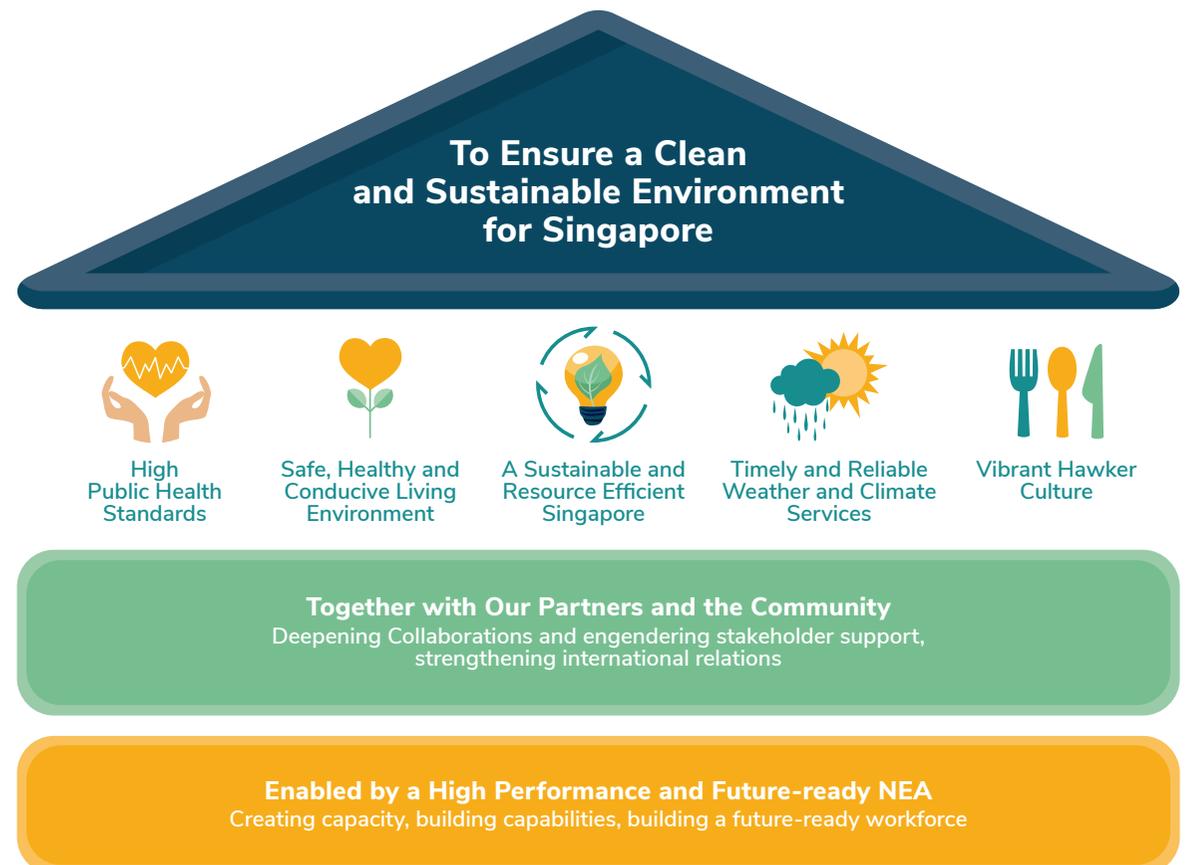
Striving Towards a Clean and Sustainable Environment

The Value Creation Model on page 11 presents how NEA strives to achieve our mission through key roles in maintaining high standards of public health, sustaining a clean environment, providing timely and reliable weather and climate services, promoting sustainability and resource efficiency, and ensuring a vibrant hawker culture, while working closely together with our partners and community.

Driving Innovation Excellence in NEA

To cultivate and sustain an innovation-driven culture, NEA has in place an innovation framework to encourage idea incubation, and drive innovation excellence so as to streamline NEA's systems and processes.

Strategy Map



Value Creation Model

Our Mission

NEA's mission is to ensure a clean and sustainable environment for Singapore, together with our partners and the community. Our mandate is aligned with the Singapore Agenda on achieving a Sustainable, Resource Efficient and Climate Resilient Singapore.

The Value Creation Model presents how NEA transforms our inputs, through our business activities, into outputs and outcomes for NEA's five key roles in public health, hawker centres, environmental protection, resource sustainability, weather and climate services. NEA is able to achieve these outcomes by working closely with partners and the community, as well as developing our capabilities and human capital to be a high performance and future-ready organisation.

What We Do

We strive to achieve our mission of ensuring a clean and sustainable environment for Singapore through five key roles.



High Public Health Standards

We maintain an effective surveillance programme for vector-borne diseases and the control of vector populations. We shape social norms against littering and maintain an effective cleaning regime in public places. To guard against environmental-related diseases, we maintain high environmental hygiene standards. We also provide cremation, burial and columbarium services, and operate Singapore's public after-death facilities.



Safe, Healthy and Conducive Living Environment

We monitor and prevent air and water pollution, and regulate hazardous substances and toxic industrial waste. We also ensure a quality living environment through upstream land use planning and siting of industries and implementation of noise management measures. NEA also safeguards the public, radiation workers, and the environment against the harmful effects of radiation.



Sustainable and Resource Efficient Singapore

We promote energy efficiency and conservation to improve air quality, reduce greenhouse gas emissions and mitigate climate change. We plan, develop and manage the solid waste management system in Singapore, and strive towards Zero Waste Nation by promoting circular economy and 3Rs (reduce, reuse and recycle) to conserve resources.



Timely and Reliable Weather and Climate Services

We provide reliable and responsive weather and climate services, disseminating weather forecasts and hazard warnings in a timely manner and contributing to climate adaptation efforts. We provide fit-for-purpose weather information and climate services to support public safety and socio-economic activities. We also issue haze alerts and provide vital meteorological services to the aviation and maritime communities.



Vibrant Hawker Culture

We develop and manage hawker centres as vibrant communal spaces, offering a wide variety of affordable food, in a clean and hygienic environment. We also ensure the sustainability of the hawker trade by facilitating training programmes and ensuring decent livelihoods of hawkers.

What We Rely On

We draw upon six capitals as part of our organisational strategy and business model.



Working Together with Partners and Community

Collaborating and co-creating with our partners and the community to bring a greater positive impact on the environment



Delivering Citizen-centric Services

Delivering citizen-centric services and being well-placed to take on public health threats together



Creation of Capacity

Strengthening key operational domains in NEA and reinventing service delivery and enforcement



Building Strong Capabilities

Building strong capabilities to deliver on work areas and ensure preparedness to mitigate future challenges



Developing and Engaging Staff

Developing a highly efficient and effective workforce by promoting a culture of life-long learning and instilling a spirit of innovation in staff



Strengthening Corporate Practices and Governance

Strengthening corporate practices and governance for a future-ready organisation

The Value We Create

Sustainability is high on NEA's agenda. We consider the wider value we deliver against each capital.

- 84%** of respondents to the Public Cleanliness Satisfaction Survey were satisfied/very satisfied with the overall public cleanliness¹
- 275** local dengue (Dengue Fever and Dengue Haemorrhagic Fever) cases per 100,000 population²
- 97%** of days in a year where Pollution Standards Index is in the 'Good' and 'Moderate' range
- 14** percentage points increase in overall recycling rate compared to 2002
- 35%** improvement in energy consumption per dollar GDP from 2005 levels¹
- 8%** reduction in domestic waste disposed of per capita from 2012
- 91%** accuracy of Nowcast
- 114** hawker centres and markets managed by NEA and NEA-appointed operators

¹ Based on 2018 data

² The outbreak years of 2013 and 2014 had an incidence rate of 405 and 326 cases per 100,000 population

NEA's Material Issues ^[102-15,102-40,102-42,102-46,102-47,102-49]

Our material issues have been refined based on the latest NEA Strategy Map, both reviewed every three years, to cover pertinent areas that are critical to mission success. In the creation of our Strategy Map, we took into account concerns of our key stakeholder groups that were gathered during NEA's Board Strategy Advance meeting³.

Our key stakeholders include:

- Employees
- Business Community, Non-governmental Organisations (NGOs), Partners and Public Sector Agencies
- Schools, Public and the Community

Material Issues	Impact on NEA and Stakeholders	NEA's Involvement	Boundary ⁴	GRI ⁵ Topic-specific Standards
High Public Health Standards	<p>Why topic is material Good control of vector-borne diseases, management of public cleanliness, environmental sanitation and hygiene, extension of smoking-prohibited areas, and provision of after-death facilities and services are necessary for maintaining high public health standards vital to Singapore residents' quality of life</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> • Public, Community 	<ul style="list-style-type: none"> • Enhance vector control and sustain low endemicity of vector-borne diseases through surveillance, prevention and control, outbreak management, enforcement and outreach • Enhance cleaning services, enforcement against litterbugs, encourage ground-up movement, and establish values and norms for public cleanliness • Achieve low incidence of public health issues involving waterborne pathogens and airborne contaminants and improve cleanliness of high-risk premises and toilets • Protect public from harmful health effects of second-hand tobacco smoke in public places • Ensure sufficient capacity of after-death facilities, and explore provision of additional after-death options 	External	Non-GRI
Safe, Healthy and Conducive Living Environment	<p>Why topic is material Monitoring, reducing and preventing environmental pollution, as well as incorporating environmental factors into land use planning, development and building control of new developments, are vital in ensuring a safe, healthy and conducive living environment</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> • Public, Community 	<ul style="list-style-type: none"> • Maintain clean air through effective monitoring capabilities and implementation of policies • Maintain the quality of coastal and inland waters ideal for the enjoyment of the public • Maintain clean land through sound management of hazardous substances • Safeguard the public, radiation workers and the environment against the harmful effects of radiation • Develop standards and mitigation measures to address construction noise 	External	Emissions Effluents Environmental Compliance
		<ul style="list-style-type: none"> • Maintain clean air with low levels of pollutants at our incineration plants, comparable with the best cities in the world 	Internal	

³ The Board Strategy Advance meeting is held annually for the Board of Directors and Senior management of NEA to engage external stakeholders on topics concerning NEA. This year, NEA will also engage youth leaders on environmental issues

⁴ Internal material issues refer to issues that are directly managed and controlled within NEA. External material issues refer to issues beyond NEA's direct control, but is managed by NEA to improve the external environment

⁵ The Global Reporting Initiative (GRI) Standards are the first global standards for sustainability reporting. More information on GRI can be found on www.globalreporting.org

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Material Issues	Impact on NEA and Stakeholders	NEA's Involvement	Boundary	GRI Topic-specific Standards
A Sustainable and Resource Efficient Singapore	<p>Why topic is material Minimising waste generation and disposal, increasing energy efficiency, and water management are vital in conserving resources and landfill space</p>	<ul style="list-style-type: none"> Move towards a zero-waste nation and circular economy Strengthen corporate environmental responsibility and promote 3Rs to conserve resources Promote energy efficiency and conservation to reduce greenhouse gas emissions and mitigate climate change 	External	Energy Emissions Waste
	<p>Where the impact occurs</p> <ul style="list-style-type: none"> Public, Community 	<ul style="list-style-type: none"> Develop and manage solid waste management facilities Promote energy and water conservation as well as waste reduction within NEA 	Internal	
Timely and Reliable Weather and Climate Services	<p>Why topic is material Meteorological services are vital in providing valuable weather and climate services to support informed decision-making and planning</p>	<ul style="list-style-type: none"> Deliver timely and reliable weather forecast and warning services customised to user needs and requirements Conduct research to advance understanding and prediction of the weather and climate of Singapore and the region Strengthen climate science capabilities to support climate adaptation planning 	External	Non-GRI
Vibrant Hawker Culture	<p>Why topic is material Hawker centres are community dining rooms where people from all walks of life can enjoy affordable food in a clean and hygienic environment</p>	<ul style="list-style-type: none"> Ensure availability of cooked food at affordable prices in a clean and hygienic environment Sustain and promote the hawker trade by encouraging new entrants Drive initiatives for environmentally sustainable and productive hawker centres Enhance vibrancy of hawker centers through place-making efforts and promote gracious and considerate behaviour among patrons 	External	Non-GRI
Private Sector as Force Multipliers for Mission Success	<p>Why topic is material Environmental Services (ES) provide essential cleaning, waste management and pest management services to keep Singapore clean and hygienic</p>	<ul style="list-style-type: none"> Build strong capabilities and spearhead technology and innovation in Singapore's ES industry Improve land use efficiency and manpower productivity Support local companies to become global players, and promote local companies internationally Build a skilled and resilient workforce for a vibrant, sustainable and professional ES industry 	External	Non-GRI

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Material Issues	Impact on NEA and Stakeholders	NEA's Involvement	Boundary	GRI Topic-specific Standards
Active Community as Stewards of the Environment	<p>Why topic is material Collaboration with stakeholders and public support are critical to NEA's mission success</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> • NGOs, Business Community, Public, Community 	<ul style="list-style-type: none"> • Build public support for NEA as the trusted environment authority in Singapore • Co-create solutions with citizens, businesses and NGOs • Grow, nurture and engage volunteers • Inculcate values, shape positive social norms and practices in the community that promote the adoption of environmentally friendly habits as a way of life 	External	Non-GRI
Public Sector Taking the Lead in Environmental Sustainability	<p>Why topic is material A Whole-of-Government (WOG) approach is needed to ensure a Clean and Sustainable Singapore</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> • Public Sector Agencies 	<ul style="list-style-type: none"> • Lead and drive sustainability efforts across the public sector 	External	Non-GRI
International Partnerships as Strategic Levers	<p>Why topic is material International engagement is vital in safeguarding and advancing Singapore's environmental interests</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> • Organisations, Partners, Public Sector Agencies, Public, Community 	<ul style="list-style-type: none"> • Advance NEA's environmental cooperation with our strategic partners through regular bilateral and regional platforms • Ensure compliance with Singapore's obligations under the relevant multilateral environmental agreements • Develop collaborations, initiatives and engagements with strategic partners (such as foreign governments, NGOs and international organisations) in technical, scientific and policy areas of benefit to NEA 	External	Non-GRI
Creation of Capacity	<p>Why topic is material Operational capacity is vital for service delivery and enforcement efforts, especially since NEA is an agency with multiple public touchpoints and heavy operational workload</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> • Employees, Public Sector Agencies, Business Community, Organisations, Partners, Public 	<ul style="list-style-type: none"> • Leverage technology to enhance operations and enforcement and explore shared enforcement mode to improve efficiency • Harness the use of data analytics and behavioural insight strategies to improve service delivery efforts • Right-size regulations to improve efficiency of business processes 	Internal	Non-GRI

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Material Issues	Impact on NEA and Stakeholders	NEA's Involvement	Boundary	GRI Topic-specific Standards
Strong Capabilities for Mission Success	<p>Why topic is material Digitalisation and capability development are key pillars in meeting public sector transformation objectives</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> Employees 	<ul style="list-style-type: none"> Build scientific, technological, engineering and infrastructure capabilities to support domain areas and achieve strategic outcomes Improve process and productivity through planning and designing a unified, standardised and flexible Information Technology (IT) infrastructure and capability Share information and knowledge that enable value creation by NEA, partners and stakeholders 	Internal	Non-GRI
Strong Corporate Practices for a Sustainable Organisation	<p>Why topic is material Financial and manpower management are vital in enabling effective and efficient operations, governance and development. Good procurement practices are vital for enabling fair, transparent, effective and efficient operations and governance</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> Employees, Business Community, Organisations 	<ul style="list-style-type: none"> Responsible utilisation of financial resources that aims for efficiency and budget marksmanship while delivering effective results within operating resource constraints Proactive planning to anticipate and identify the shape and structure of NEA's future workforce to ensure that there is sufficient and sustainable capacity and capability to fulfil NEA's objectives now and into the future Comprehensive system of internal controls based on sound principles to provide guidance, direction and oversight in the running of NEA, coupled with a proactive and integrated approach to manage uncertainties that may negatively affect NEA's objectives 	Internal	Economic Performance Procurement Practice Employment Occupational Health and Safety
Conducive Culture for Collaboration, Learning and Innovation	<p>Why topic is material A strong organisational culture is vital for a high performance and future-ready organisation</p> <p>Where the impact occurs</p> <ul style="list-style-type: none"> Employees 	<ul style="list-style-type: none"> Strong emphasis on training and development to ensure that employees are equipped with the right competencies to contribute effectively their career with NEA Steer NEA towards becoming a learning organisation, by encouraging self-directed mobile learning via the LEARN app, recognising learning contributions through LEARNing and Trainer Awards, and promoting the sharing of NEA knowledge assets via the EMPOWER portal on the intranet Reach out to all employees to address their concerns, health and well-being so as to build an engaged workforce Build shared values, beliefs and behaviours that enable our staff to anticipate and adapt to change and disruptions 	Internal	Training and Education

Risks and Opportunities ^[102-11,102-15]

NEA'S ENTERPRISE RISK MANAGEMENT PROGRAMME ^[102-15]

NEA recognises the importance of effective risk management in enhancing corporate governance and strategic planning. An Enterprise Risk Management (ERM) programme was therefore established to manage risks and opportunities in a structured, integrated and effective manner.

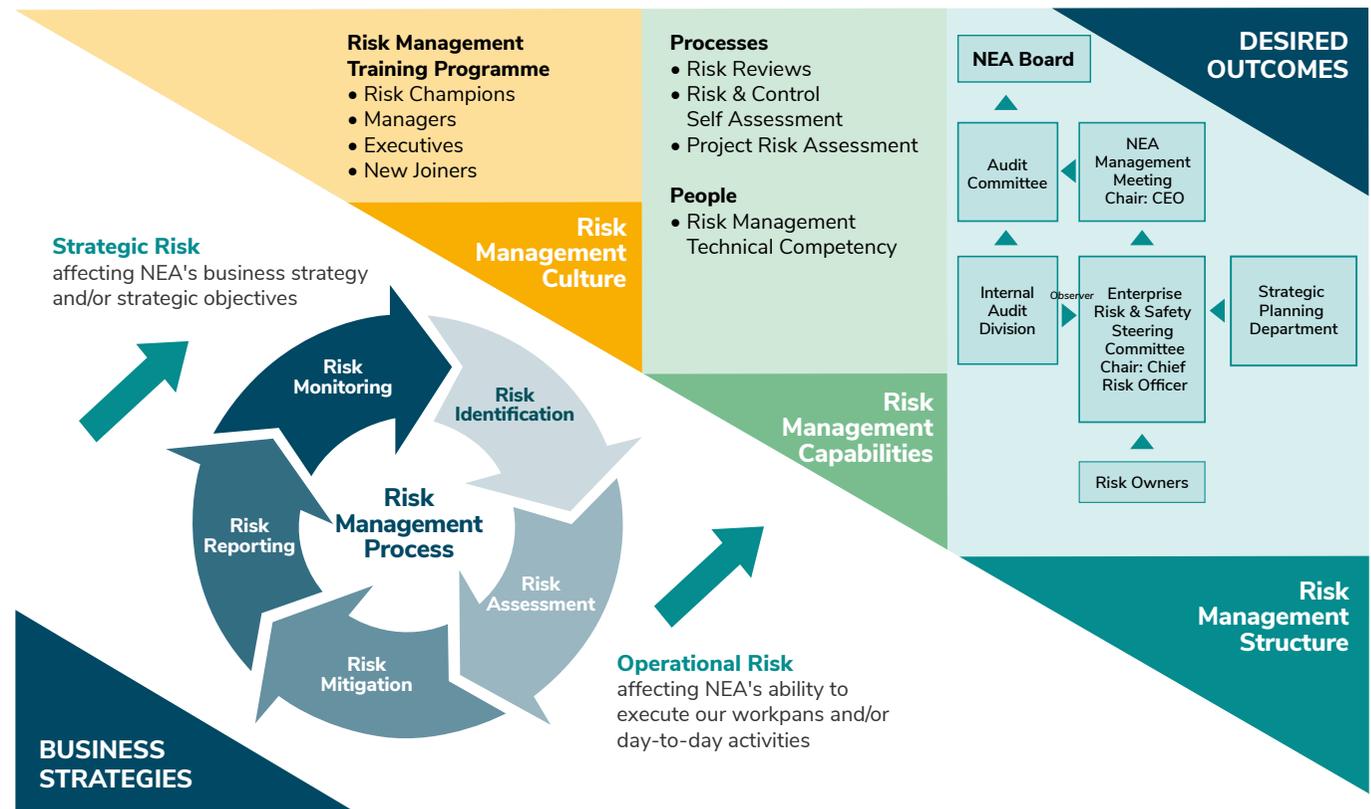
The ERM programme enables NEA to proactively identify, assess, prioritise, treat and monitor our key strategic and operational risks on an ongoing basis. The programme enhances:

- **Risk Awareness**, by providing an integrated view of the combined impact of different risks on the organisation, thereby eliminating silo thinking in risk management
- **Risk Ownership**, by providing a formalised structure to assign accountability for key risks, mitigating measures and treatment plans
- **Proactive Risk Management**, by providing a structured and robust management process to minimise upstream risks, based on both top-down and bottom-up risk reviews

NEA applies a precautionary approach to managing our risks and closely monitors them, as well as identifies new risks and opportunities. This is to ensure that NEA's corporate sustainability efforts address all developing trends and risks.

In planning ERM activities, NEA is guided by an ERM framework that features three thrusts detailed in the following page.

Enterprise Risk Management Framework



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Robust Risk Management Governance Structure

The Enterprise Risk and Safety Steering Committee (ERSSC) is responsible for overseeing risk management in NEA. The ERSSC is chaired by NEA's Deputy CEO (Planning, Corporate and Technology) in his capacity as NEA's Chief Risk Officer.

The ERSSC meets every quarter to review key strategic and operational risks facing NEA and the progress of risk treatment plans for these identified risks. It reviews and ensures that relevant risks are highlighted and prioritised by the respective departments, and that these risks are adequately addressed. The ERSSC also reviews the effectiveness of these risk treatment plans, as well as studies trends and emerging issues that may have an impact on the risks confronting NEA. In turn, the ERSSC reports to the CEO, Audit Committee and the Board of Directors, who provide oversight and guidance over risk management matters.

At the NEA Management Meeting, ERSSC reports to the CEO key risk management issues and recommendations.

ERSSC also reports to the Audit Committee and NEA Board on the ERM programme, ERM initiatives and top priority strategic risks. ERSSC then obtains the Board's guidance on any further development of the ERM programme.

Risk Owners are assigned the task of identifying, assessing, and monitoring key strategic and operational risks, and treatment plans. As part of the risk identification process, environmental scans are conducted on material issues that may impact the achievement of strategic objectives in the Strategy Map. Meanwhile, Process Owners provide risk content (root causes, consequences and controls), and implement and monitor the risk treatment plans.

There is a Risk Champion in each NEA department, responsible for administering risk control policies and procedures, as well as documenting the department's risks and related control plans in the risk register.

Strong Risk Management Capabilities and Tools

The risk map provides ERSSC an overview of the top priority risks faced by NEA. This will allow the committee to monitor the effectiveness of risk treatment plans.

Departments with operational functions also conduct Quality Assurance Self-assessments. Introduced since August 2016, these regular control self-assessments help the departments determine the effectiveness of their internal controls and risk mitigation.

Proactive Risk Management Culture

To strengthen our risk culture, NEA conducts numerous training sessions and customised briefings each year. They include:

- **Risk Training Workshops**

Conducted as part of the Leaders in Environmental Action Planning course for middle management staff, and the NEA Executive Training course for all executive-grade staff, these workshops create greater awareness and understanding of risk management, its importance to NEA's roles and functions, and how staff can play their part in instilling risk management practices in their areas of work.

NEA has also incorporated a risk awareness module in the induction programme for new hires to ensure that they are aware of NEA's risk management practices and how they too can contribute to the effort.

- **Recognition of Risk Champions' Contributions**

Risk Champions from their respective departments are given due recognition for their contributions, which are documented in their staff appraisal and human resource records.

The materiality assessment is part of our Enterprise Risk Management framework in the identification and assessment of Environment, Social and Governance (ESG) risks and opportunities. The ESG risks, challenges and opportunities for each of the material issues are summarised in the table below.

Material Issues	Risks & Challenges	Opportunities
High Standards of Public Health	<ul style="list-style-type: none"> Vector-borne disease outbreaks 	<ul style="list-style-type: none"> Use of data to understand epidemiology of diseases for temporal and spatial risk stratification Leverage technology to enhance our operations and build capability in related areas of research
Safe, Healthy and Conducive Living Environment	<ul style="list-style-type: none"> Deterioration of ambient air quality Deterioration of coastal and inland water quality 	<ul style="list-style-type: none"> Enhance capabilities in water quality monitoring and pollution source identification with technology
Sustainable and Resource Efficient Singapore	<ul style="list-style-type: none"> Resource scarcity Insufficient incineration capacity Climate change 	<ul style="list-style-type: none"> Drive infrastructure enhancement, innovation and behavioural changes to achieve environmental sustainability Gain public trust for our national policy by walking the talk
Timely and Reliable Weather and Climate Services	<ul style="list-style-type: none"> Severe weather conditions 	<ul style="list-style-type: none"> Leverage technology to boost our capabilities in weather monitoring and forecasting
Vibrant Hawker Culture	<ul style="list-style-type: none"> Inability to meet the needs for affordable food in a clean and hygienic environment 	<ul style="list-style-type: none"> Build new hawker centres and rejuvenate existing ones Offer a variety of pathways for aspiring hawkers
International Partnerships as Strategic Levers	<ul style="list-style-type: none"> Inability to fulfil NEA's obligations set out in environmental agreements 	<ul style="list-style-type: none"> Increase in demand for clean energy, low-emissions transport and sustainable urban solutions
Private Sector as Force Multipliers for Mission Success	<ul style="list-style-type: none"> Inability to meet increasing demand for environmental services (ES) 	<ul style="list-style-type: none"> Transform the ES industry through the Environmental Services Industry Transformation Map, by helping the ES industry adopt technology to improve their standards and service delivery, build a skilled productive workforce, and grow and export their businesses
Active Community as Stewards of the Environment	<ul style="list-style-type: none"> Lack of environmental ownership 	<ul style="list-style-type: none"> Work more closely with NEA's partners to achieve environmental goals

... continued from previous page ^[102-11,102-15]

Material Issues	Risks & Challenges	Opportunities
Public Sector Taking the Lead in Environmental Sustainability	<ul style="list-style-type: none"> • Resource scarcity • Insufficient incineration capacity • Climate change 	<ul style="list-style-type: none"> • Drive innovation and behavioural changes to achieve environmental sustainability • Gain public trust for our national policy by walking the talk
Creation of Capacity	<ul style="list-style-type: none"> • Compromised data due to malicious activities against NEA's IT systems and infrastructure • To be relevant in the face of evolving needs and challenges 	<ul style="list-style-type: none"> • Deepen technical capabilities in key areas to improve our services • Simplify application and compliance processes of NEA's regulations where feasible
Strong Capabilities for Mission Success	<ul style="list-style-type: none"> • Inability to meet NEA's manpower requirements 	<ul style="list-style-type: none"> • Open up new possibilities for collaboration and deployment of systems and services • Improve productivity and forge a future-ready NEA
Strong Corporate Practices for a Sustainable Organisation	<ul style="list-style-type: none"> • Rising public expectations of government • Inability to check for any possible corruption and fraud within the organisation • Manpower challenges • Poor staff retention • Non-compliance with the Workplace Safety and Health Act • Work-related incidents resulting in injuries to employees 	<ul style="list-style-type: none"> • Spur accountability and resource optimisation • Gain public's confidence in how NEA manages our finances as a government-funded organisation • Spur strong corporate governance and risk management practices • Gain public confidence on how NEA uses our resources responsibly • Enable a high performance NEA (drive organisational productivity and growth) and strengthen our brand as an employer of choice • Develop a stronger sense of identity and purpose among staff • Develop a more engaged and socially responsible workforce that gives back to the community
Conducive Culture for Collaboration, Learning and Innovation	<ul style="list-style-type: none"> • Poor staff retention 	<ul style="list-style-type: none"> • Enable a high performance NEA (drive organisational productivity and growth) and strengthen our brand as an employer of choice

NEA's Response to the COVID-19 Pandemic

When the nation calls, NEA answers. We play a vital part in Singapore's fight against COVID-19, spanning several fronts.

High Readiness Core Teams were formed to attend to confirmed cases, and supervise the cleaning and disinfection works on land and onboard ships. In response to COVID-19, NEA released interim guidelines for environmental cleaning and disinfection for different sectors. With our evolving knowledge of COVID-19, we provided early guidance on disinfection regime, effective disinfectants, and later disinfection methods and technologies.

NEA organised a series of briefings on the cleaning and disinfection of COVID-19 infected premises. Targeted at public agencies responsible for large communal facilities – including the Ministry of Education that oversees schools, and the Ministry of Manpower (MOM) that manages dormitory operations, the briefings highlighted key guiding principles in identifying high touchpoints that require disinfection control across different facilities. NEA also sent circulars and advisories to funeral directors and funeral parlour operators to inform them of guidelines for the handling of bodies with COVID-19, safe distancing measures and ensuring good environmental hygiene practices in their premises.

To uplift public hygiene as the first line of defence against disease transmission, NEA launched a national-level

SG Clean campaign in February 2020, which continues to be relevant as we enter the post-COVID-19 new normal. NEA conducted over 700 deployments of volunteer SG Clean Ambassadors to promote SG Clean messages such as

NEA was also assigned the role to implement **safe distancing/management measures** at our hawkker centres and markets, and after-death facilities. At its peak during the start of the Circuit Breaker, we had about 600 to 700 Safe Distancing Ambassadors and Enforcement Officers on the ground every day, keeping everyone safe, with the core of this Safe Distancing force formed by our NEA officers.

NEA also played a key role in other major efforts in the national fight against COVID-19. An example is the **rapid development of a wastewater-based COVID-19 surveillance capability**, where NEA led a multi-agency effort to conduct wastewater sampling from places such as Water Reclamation Plants and workers' dormitories, to assess COVID-19 transmission in the community. NEA kept essential services running – these include the disposal of the significant amount of biohazardous waste generated, and ensure that our cleaning and waste disposal services continue despite manpower shortages.

Yet another area is how we have **conceptualised and implemented various incentive schemes quickly** to support our hawkkers, as well as cleaning and waste

management sectors. To protect and support the livelihoods of our hawkkers, we introduced a one-time funding of \$500 to help hawkkers defray the cost of adopting food delivery services, offered a five-month rental waiver for hawkkers and market stallholders, and subsidised tablecleaning and dishwashing fees for hawkkers. Targeted schemes were also rolled out to help hawkkers embrace digitalisation, such as by adopting e-payment solutions and subscribing to online delivery services to reach new customers.

NEA provided an automatic one-time six-month extension of cleaning business licences and Enhanced Clean Mark Accreditation Scheme statuses to alleviate the administrative burden on cleaning companies.

NEA also worked with workforce agencies, unions and trade associations to issue Tripartite Advisories to the cleaning and waste management sectors, to provide recommendations on measures that service buyers and providers could adopt to ensure sustainability of the sectors in view of COVID-19.

CHAPTER 1

Ensuring a Clean and Sustainable Environment for Singapore

High Standards of Public Health

As the national authority on environmental public health standards in Singapore, NEA undertakes a critical role to maintain these standards through research, ground surveillance, enforcement, licensing and outreach.

Encouraging Ownership of Public Cleanliness

On 28 April 2019, the Public Hygiene Council (PHC) launched Keep Clean, Singapore! 2019 to raise awareness of the challenges faced by a diminishing pool of cleaners, and correct the misconception that it is someone else's job to clean up after us. The month-long campaign led to more than 730 clean-ups conducted by over 450 partner organisations all over Singapore.

Inaugurated in March 2019, the R.I.S.E. (Reach, Inspire, Synergise, Empower) Champions Network shares the vision of a Singapore where every individual takes responsibility in keeping our public spaces clean and hygienic, by disposing their trash correctly and cleaning up after themselves. The network began with 23 social and interest groups that were regularly involved in community and beach clean-ups, and has since expanded to 42 partners from environment NGOs, and education, social, and corporate sectors

within a year. The R.I.S.E. Network developed an analytics map⁶ to show ongoing clean-ups by fellow R.I.S.E. partners, and displays useful data on trash collected around Singapore based on geographical area, time period and waste type collected.

The Sustainable Bright Spot programme encourages residents to take strong ownership of the cleanliness of community spaces. Anchored on the tenet of personal responsibility to not litter and advocating for a clean neighbourhood, the programme was first introduced at 12 Residents' Committee (RC) zones in 2019. PHC worked closely with community leaders to implement programmes and identify opportunities to deepen engagement with residents. Residents are constantly reminded of the importance of keeping shared spaces clean and practising good personal hygiene. The programme reached out to more than 3,000 residents across 12 RCs.

Clipping the Wings of Dengue through Vector Control Efforts

The surge in dengue cases in 2019 in Singapore involved a reported 15,998 cases – almost five times more than the number reported in 2018. In 2019, NEA significantly stepped up vector control efforts – 1,529 dengue clusters were identified, about 900,000 inspections for mosquito breeding were conducted island-wide (including 6,400 at construction sites), 16,000 mosquito breeding habitats were uncovered, 10,500 enforcement actions were taken against owners of premises for mosquito breeding (including 590 summonses and 26 Stop Work Orders issued

⁶ Analytics map: www.rise-network.sg/rise/cleanup-map

to construction sites, and 23 contractors charged in court for repeat offences). Collective efforts with stakeholders and the public resulted in the closure of 95 per cent of the dengue clusters.

Galvanising Community Action by Sharing Information on Areas with a Higher *Aedes* Mosquito Population

As of 2020, more than 64,000 Gravitrap traps have been deployed islandwide at Housing & Development Board (HDB) and landed estates, allowing NEA to use this Gravitrap surveillance system to monitor the adult *Aedes* mosquito population, guide inspections, better allocate limited manpower, and remove adult *Aedes* mosquitoes (including dengue-infected female mosquitoes) from the environment. Areas with higher adult *Aedes aegypti* mosquito population have a higher risk of dengue transmission, especially during the peak dengue season. NEA made this information publicly available on the NEA website and myENV app since August 2019, to increase awareness of the risk of dengue for stakeholders and the community, and encourage them to take more proactive mosquito prevention measures.

Reviewing the Progress of Project *Wolbachia* for Dengue Control

Since 2016, NEA's Project *Wolbachia* – Singapore involved releasing male *Wolbachia*-*Aedes* mosquitoes at selected study sites to suppress the urban *Aedes aegypti* mosquito population. As of March 2020, the project has successfully expanded to cover approximately 40 per cent of HDB households at Yishun and Tampines. Preliminary data analysis showed that

there were 65 to 80 per cent fewer dengue cases at the release sites compared to non-release sites. NEA's new higher capacity mosquito production facility was officially opened in December 2019, to scale up the project. NEA was conferred the Distinguished Award for the project's achievements, at the Minister for National Development's R&D Awards in July 2019.

Implementing the First No Smoking Zone in Singapore

From 1 January 2019, NEA implemented the first No Smoking Zone (NSZ) in the Orchard Road Precinct, where smoking is only permitted in Designated Smoking Areas (DSAs). There are more than 50 DSAs located at regular intervals within the Orchard Road NSZ.

To ensure that the initiative is successful, NEA worked closely with various stakeholders and received strong support from the Orchard Road Business Association. Complementing enforcement measures on the ground, more than 100 volunteers were engaged to conduct regular patrols and give friendly reminders to help reinforce the right social behaviours. In addition, as part of our digitisation efforts, GovTech and NEA are collaborating to study the feasibility of using video analytics to detect smoking incidents in public areas, including within the NSZ.

In July 2019, NEA conducted a survey with about 1,000 respondents to understand public sentiments towards the implementation of the Orchard Road NSZ. It was found that 80 per cent of the respondents supported the NSZ, and cited the positive public health and environmental impact associated with it.

Enhancing Surveillance for Smoking Enforcement via Thermal Cameras

Given the dense living environment in Singapore, cigarette smoke is considered a major public disamenity. Since the extension of the smoking prohibition regulations to common areas of residential buildings in 2013, there has been an increase in feedback regarding smoking along the common corridors of residential estates. However, the traditional enforcement approach of conducting stake-outs is manpower-intensive and low in effectiveness as it is difficult for officers to patrol these areas without alerting the offenders. Smoking offences also tend to take place at random timings or late at night.

To improve the enforcement of the smoking prohibition regulations, NEA introduced the use of a camera surveillance system with thermal capabilities in 2019. The system can accurately identify a smoking offence, and has supported the apprehension of errant smokers.

Completing Phase 3B of the Choa Chu Kang Cemetery Redevelopment Programme

In December 2019, about 8,000 Muslim crypts were completed under the Choa Chu Kang Cemetery Phase 3B redevelopment programme. The peripheral roads were realigned to free up more land for burial as the crypt density had increased by 12 per cent. This is a part of the ongoing crypt redevelopment plan to supply and install crypts for burial to meet the growing demand in Singapore.

GOING FORWARD ►►

In the short-term, NEA's focus is to raise public hygiene standards which is vital amid the COVID-19 pandemic, as well as step up vector control efforts against dengue. Our medium-term priority is to deliver on key transformative initiatives such as Project *Wolbachia*, and uplift service quality of the funerary industry. NEA's vision is a clean and healthy Singapore with high public health standards, vital for good quality of life for residents.

► Spearheading National SG Clean Day

As part of Keep Clean, Singapore! 2020, the PHC will leverage SG Clean Day to urge Singaporeans to take personal responsibility for the cleanliness of their estates.

In 2021, the PHC will lead the National SG Clean Day, a collaboration with all 16 Town Councils to cease public cleaning in housing estates for one day. Residents would be mobilised in community clean-ups to emphasise collective responsibility for keeping public spaces clean.

► Improving Environmental Sanitation Standards

Following a spate of viral gastroenteritis outbreaks in pre-schools in 2018, NEA intends to introduce the Environmental Sanitation regime to tighten environmental sanitation controls and impose mandatory standards for high-risk premises, such as specifying the scope and frequency of periodic and routine cleaning and disinfection. Under the regime, premises have to be responsible for the implementation and compliance with the standards.

In August 2019, an Environmental Sanitation Technical Committee was formed with members from academia, government agencies and the industry. The members jointly developed a set of baseline cleaning and disinfection guidelines to enhance cleanliness standards and better safeguard public health. Subsequently, NEA convened sectoral implementation taskforces to determine the sector-specific requirements, which will be mandated in 2021 along with the implementation of the Environmental Sanitation regime.

► Introducing Inland Ash Scattering Services

Inland Ash Scattering (IAS) services will be introduced at Choa Chu Kang Cemetery Complex in 2020 and the new Mandai Crematorium, when the latter is completed in end 2021. These services will serve as additional options for the management of cremated human remains in Singapore. The initiative arose from a series of consultations with the industry and key stakeholders including religious groups, funeral directors, and general public. The consultations covered many different aspects of the IAS services such as design criteria, user experience, operational procedures, booking arrangements, and cultural and religious needs. Stakeholders were generally receptive to having IAS services at government-run facilities.

► Planning and Improving Memorial Facilities

Short-term plans that are projected to roll out or complete within the next one to two years:

- Construction of the new Mandai Crematorium is expected to be completed in end 2021

- Phase 3C Crypt Redevelopment Programme of Choa Chu Kang Cemetery has been completed in July 2020
- Phase 3D Crypt Redevelopment Programme of Choa Chu Kang Cemetery is expected to commence in Q4 2020 and be completed in Q4 2022

Within the next two to five years, NEA has the following plans in the pipeline:

- The Woodlands Industrial Park E8 funeral parlour (FP) site was launched for development via Government Land Sales in July 2020 while construction of the new FP complex in Bidadari estate is expected to start in the second half of 2021
- The Phase 4 Redevelopment Programme, and its four sub-phases, will be progressively launched from 2023 and completed by 2027

Safe, Healthy and Conducive Living Environment

NEA enforces strict regulations in line with international standards to limit emissions, and implements various initiatives to monitor, reduce and prevent environmental pollution. NEA plays a pivotal role to sustain clean air, good water quality and quieter surroundings for all Singaporeans.

Minimising Air Emissions and Ensuring Compliance

NEA has implemented measures to ensure that the incineration processes at our waste-to-energy (WTE) plants and crematoria do not pollute the environment. Air emissions from these facilities must comply with Singapore's Environmental Protection and Management (Air Impurities) Regulations⁷.

Design features incorporated into the two WTE plants ensure that flue gas emissions, which are cleaned prior to release through the chimney, are well within regulatory limits. Efficient process control systems are also set up at the plants to regulate the rate of air distribution and refuse feed. This ensures proper combustion in the furnace, leading to greater fuel efficiency and lower emissions.

Additionally, NEA installed a telemetric monitoring system (linked to the regulatory unit) that continuously monitors air emissions from our WTE plants. NEA also monitors air emissions from the Mandai Crematorium and Columbarium, to ensure that emissions are kept within limits⁸.

Air emissions recorded at the three facilities were below regulation limits from FY2015 to FY2018, with no smoky emissions and no odour detected at the facilities. In addition, NEA has put in place an effective environmental management system that consists of components tested to always meet the processes and practices that boost NEA's operational efficiency and minimise environmental impact. Through these measures, NEA reviews our performance periodically and consistently controls our operations so as to achieve our sustainability goals. There were no air pollution incidents in 2019.

Material Air Emissions						
NEA's Facilities ^[305-7]	Compounds Emitted	FY16	FY17	FY18	FY19	Emission Limit ⁹
Tuas Incineration Plant	Dust (mg/Nm ³)	22.90	28.30	16.60	13.80	< 50
	SO ₂ (mg/Nm ³)	76.10	73.10	38.10	84.20	< 1,700
	NO _x (mg/Nm ³)	343.00	236.00	217.00	346.70	< 400
Tuas South Incineration Plant	Dust (mg/Nm ³)	2.03	2.87	3.03	6.96	< 50
	SO ₂ (mg/Nm ³)	82.00	102.30	74.80	91.36	< 1,700
	NO _x (mg/Nm ³)	183.30	169.50	182.00	166.70	< 400
Mandai Crematorium and Columbarium	Dust (mg/Nm ³)	2.00	6.00	21.59	15.01	< 50
	SO ₂ (mg/Nm ³)	12.00	25.00	11.13	<0.10	< 1,700
	NO _x (mg/Nm ³)	289.00	318.00	327.04	362.78	< 400

⁷ Air emission limits extracted from: www.sso.agc.gov.sg/SL/EPMA1999-RG8

⁸ Although not a regulatory requirement, NEA conducts annual source-emission testing for the Mandai Crematorium and Columbarium and makes reference to the emission limits indicated in the Environmental Protection and Management (Air Impurities) Regulations

⁹ This set of emission limits reflects the updated limits from Singapore's Environmental Protection and Management (Air Impurities) Regulations, which has been effective since 1 July 2015. Existing plants have until 1 July 2023 to comply with the revised standards for particulate matter, nitrogen oxides, carbon monoxide and sulphur dioxide

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Annual Source-emission Testing Results				
MCC	FY16	FY17	FY18	FY19
HCl (mg/Nm ³)	3	45	<0.1	<0.1
Dust (mg/Nm ³)	2	6	21.6	15.0
SO ₂ (mg/Nm ³)	12	25	11.1	<0.1
NO _x (mg/Nm ³)	289	318	327.0	362.8
CO (mg/Nm ³)	3	13	2.5	4.3

Air Quality		
KPI	2019 Results	2020 Targets
PM _{2.5} (annual mean)	16 µg/m ³	12 µg/m ³
PM _{2.5} (24-hour mean, 99 th percentile)	62 µg/m ³	37.5 µg/m ³
PM ₁₀ (annual mean)	30 µg/m ³	20 µg/m ³
PM ₁₀ (24-hour mean, 99 th percentile)	90 µg/m ³	50 µg/m ³
SO ₂ (24-hour mean, max)	57 µg/m ³	50 µg/m ³
SO ₂ (annual mean)	8 µg/m ³	15 µg/m ³
O ₃ (8-hour mean, max)	125 µg/m ³	100 µg/m ³
NO ₂ (annual mean)	23 µg/m ³	40 µg/m ³
NO ₂ (1-hour mean, max)	156 µg/m ³	200 µg/m ³
CO (8-hour mean, max)	1.7 mg/m ³	10 mg/m ³
CO (1-hour mean, max)	2.3 mg/m ³	30 mg/m ³

Extending the Vehicular Emissions Scheme

Since taking effect in 2018, the Vehicular Emissions Scheme (VES) has been effective in encouraging the purchase of cleaner car and taxi models. About 28 per cent of cars and taxis registered in 2019 received VES rebates. Given a one-year extension, the scheme will now expire on 31 December 2020.

Implementing Additional Fuel Quality Parameters

Since 1 July 2019, NEA introduced limits for methanol, methylcyclopentadienyl manganese tricarbonyl (MMT) and phosphorus in petrol, and for fatty acid methyl ester and MMT in diesel, as these fuel additives have a negative effect on the environment and public health.

Conducting a Sulphur Dioxide Consultancy Study

In January 2020, NEA embarked on a one-year consultancy study to benchmark Singapore's sulphur dioxide emissions from the Shipping industry and the Petrochemicals and Power industry, against those of other cities. The study will evaluate the effectiveness and feasibility of available technological and policy abatement options, and provide insight into other countries' successful practices.

Reviewing Recreational Water Quality Guidelines

NEA chaired an Inter-agency Committee to review the water quality guidelines for recreational beaches. The review, which was completed in April 2019, concluded that the existing water quality parameters and guidelines for recreational beaches are still relevant, based on the assessment of international guidelines, such as those from the World Health Organization, European Union, Australia, USA and Canada. The

water quality of the seven popular recreational beaches in 2019 was graded "Good".

Water Discharge ^[306-1]					
	FY15	FY16	FY17	FY18	FY19
TIP Wastewater (m ³)	16,405	7,573	7,505	20,256	21,058
TSIP Wastewater (m ³)	78,471	82,971	83,176	55,407	56,340

Launching the Quieter Construction Innovation Fund

In incentivising construction companies to adopt quieter construction equipment and technologies, NEA launched a \$2 million Quieter Construction Innovation Fund (QCIF) on 1 April 2019. The QCIF aimed to encourage the wider adoption of innovative engineering solutions, which will go towards realising a quieter living environment and establishing higher standards in managing construction noise. The fund replaced the Quieter Construction Fund, providing a larger funding quantum for the purchase or lease of quieter piling and demolition equipment that can achieve a higher noise-reduction performance standard of 10 dBA or more. The funding limits for construction projects have also been increased to incentivise contractors to invest in a wider range of quieter equipment and innovative solutions. As of July 2020, NEA received 26 QCIF applications from contractors, amounting to \$1.9 million in grants.

GOING FORWARD ►►

As the steward of a safe, healthy and conducive environment, NEA's short-term focus is to roll out policies that reduce air pollution from vehicular sources. Our medium-term priority is to strengthen our monitoring network for Volatile Organic Compounds and air emissions. NEA's vision is a safe and healthy Singapore that is vital for good quality of life for residents.

► Establishing a Network of Low-cost Sensors for Air Quality Monitoring

NEA continuously monitors air quality across Singapore through a network of ambient air monitoring stations, with air quality information published on the NEA website hourly. We are working to enhance spatial resolution of air quality monitoring within localised areas, such as residential estates or major road intersections. Combined with air dispersion modelling capabilities, this would also allow NEA to better monitor the dispersion of air pollutants in the areas. In 2020, NEA will commence a two-year pilot to assess the performance of the low-cost sensors, develop operating requirements, and refine the air dispersion modelling with the use of the sensors' data.

► Introducing the Commercial Vehicle Emissions Scheme and Enhancing the Early Turnover Scheme

From 1 April 2021, NEA will introduce the Commercial Vehicle Emissions Scheme to promote the adoption of cleaner new light commercial

vehicles through offering an incentive, and discourage more polluting models by imposing a surcharge.

At the same time, the Early Turnover Scheme (ETS) will be enhanced to also benefit owners of Euro 4 diesel commercial vehicles who replace them with a new, cleaner option. It was first implemented in 2013, covering only pre-Euro and Euro 1 vehicles, but was extended in 2015 to Euro 2 and 3 vehicles. The ETS has shown to be effective, given that about 47,000 pollutive vehicles have been replaced under the scheme as of 31 December 2019.

► Mitigating Hydrofluorocarbon Emissions

To reduce Singapore's greenhouse gas (GHG) emissions, especially those that arise from the use of hydrofluorocarbons in the Refrigeration and Air-conditioning (RAC) sector, NEA announced the introduction of a climate-friendly label for household refrigerators and air-conditioners, restrictions on the supply of RAC equipment using high-global warming potential refrigerants from Q4 2022, and mandatory recovery of refrigerants from July 2021. NEA is also working with the Institute of Technical Education and Temasek Polytechnic to introduce training courses for household air-conditioner and chiller technicians to raise competencies.

The public sector will take the lead in switching to climate-friendly RAC equipment. NEA will work with the Economic Development Board and the Building and Construction Authority on a new grant to support and encourage companies to switch to climate-friendly water-cooled chillers.

A Sustainable and Resource Efficient Singapore

With Singapore's limited land and dense population, NEA understands that effective management of our water-energy-waste nexus is vital for a resource efficient and Zero Waste Singapore.

Launching the Zero Waste Masterplan

At Singapore's current rate of waste disposal, the nation's only landfill, Semakau Landfill, will run out of space by 2035.

To address this, the inaugural Zero Waste Masterplan was launched on 30 August 2019. The masterplan maps out the key strategies to build a sustainable, resource efficient and climate resilient nation. The key strategies were to adopt a circular economy approach to waste and resource management practices and shift towards more sustainable production and consumption.

In addition, the masterplan has set a new waste reduction target for Singapore, which is to reduce the amount of waste (per capita) sent to Semakau Landfill each day by 30 per cent by 2030 and therefore extend the landfill's lifespan beyond 2035.

This is in addition to the 2030 targets under the Sustainable Singapore Blueprint, which are to increase:

- overall recycling rate to 70 per cent
- non-domestic recycling rate to 81 per cent
- domestic recycling rate to 30 per cent

KPI	2019 Results
Domestic waste disposed of per capita	0.8 kg a day/person
Non-domestic waste disposed of per \$bn GDP	8.9 tonnes a day/GDP (\$bn)

Introducing the Resource Sustainability Act

The Resource Sustainability Act (RSA) was introduced in 2019 to give legislative effect to regulatory measures, targeting three priority waste streams — food waste, e-waste and packaging waste. The legislation mandates the segregation and treatment of food waste by large food waste generators, imposes the Extended Producer Responsibility framework on producers and retailers of regulated categories of electrical and electronic equipment, and it requires producers of packaged products and retailers to report packaging data and submit plans to reduce, reuse or recycle packaging.

Extending the Mandatory Waste Reporting Scheme

Following the amendments of the Environmental Public Health Act in 2014, managements of large commercial premises are required to report waste data and submit waste reduction plans, which includes the setting of recycling rate targets. Hotels with more

than 200 rooms and shopping malls with net lettable areas of more than 4,600m² are required to adhere to this regulation. As a result, the reporting exercise helped to increase awareness among premises operators of the potential to improve their waste management systems and reduce the waste generated.

Starting in 2020, the mandatory waste reporting scheme will be extended to include industrial premises with a gross floor area of more than 20,000m², warehouses with a gross floor area of more than 50,000m², and convention/exhibition centres with a gross floor area of more than 8,000m².

Driving R&D Programmes to Close the Waste Loop

In support of the Sustainable Singapore Blueprint's target to achieve a national recycling rate of 70 per cent by 2030, NEA is administering the \$45 million Closing the Waste Loop R&D Initiative to develop innovative solutions in resource recovery, conserve landfill space, and enhance the sustainability of our waste management system. To date, NEA has committed about \$27 million to fund 11 R&D projects that address the challenges in priority waste streams and incineration bottom ash (IBA).

A project by the Nanyang Technological University, Singapore (NTU Singapore) aims to develop a novel on-site food waste treatment system known as Eco-Stomach, that converts food waste into high-grade bio-fertiliser within eight hours. Located beside an NTU Singapore canteen, the system is undergoing a pilot trial to produce fungal mash — an enzymes mixture derived from food waste — to break down food waste into bio-fertilisers. These bio-fertilisers will also be used to grow vegetables as part of field

tests that are conducted in collaboration with the Singapore Food Agency and a local farm.

The NTU Singapore-CEA Alliance for Research in Circular Economy (SCARCE) is looking to develop prototypes to sort e-waste efficiently and employ green chemical processes that minimise the use and generation of hazardous substances to recover precious metals. For instance, SCARCE is developing a prototype to sort the different types of lithium-ion batteries based on the cell chemistry to ultimately facilitate the recycling of such batteries. SCARCE has also experimented with using fruit waste peels to successfully dissolve and recover metals such as nickel, manganese, cobalt and lithium from spent lithium-ion batteries, and was able to successfully demonstrate a proof-of-concept in reusing the recovered materials to produce a new form of battery whose performance is comparable to commercial ones. SCARCE attracted industry collaborators with these promising results and obtained about \$750,000 of industry spending and funding to date.

Developing Standards for the Application of NEWSand

In 2019, about 1,240 tonnes of IBA were sent to Semakau Landfill daily. To extend the lifespan of Singapore's only landfill, NEA has partnered with agencies to develop provisional environmental standards to facilitate the use of treated IBA in construction applications such as road base/sub-base and non-structural concrete. Such treated IBA and similar general waste residues that are environmentally safe for use in these applications are known as NEWSand.

At NTU Singapore's Waste-to-Energy (WTE) Research Facility, one type of NEWSand is being produced. This particular NEWSand is slag derived from the high-temperature gasification of municipal solid waste, and has been successfully used as material to build a footpath at Our Tampines Hub. It was also used to repave the concrete plaza of the Environment Building, and construct a concrete bench placed at the Eco-Garden of the same building.

Accelerating the Development of WTE Technologies

To accelerate the scaling and deployment of newly developed WTE capabilities, the WTE Research Facility plays an important role in building expertise and facilitating test-bedding and demonstration projects by the industry and academia. In October 2019, NEA obtained \$6 million in funding from the National Research Foundation, to support the facility's translation R&D projects, particularly for a test-bedding and demonstration scheme. In December 2019, NEA launched an open grant call requesting for WTE test-bedding and demonstration proposals.

Transforming the Waste Collection System in Singapore

Collecting waste is often seen as laborious work that deals with unpleasant odours and pests. Together with the other public agencies such as HDB, Urban Redevelopment Authority and JTC Corporation, NEA is working on automating this work, reducing nuisances and improving our environment through the Pneumatic Waste Conveyance System (PWCS).

The PWCS is an automated system that conveys waste by air suction from individual buildings through a network of pipes to a central location for collection. This removes the need for the manual conveyance of waste from individual refuse chutes and reduces the distance travelled by rubbish trucks. The enclosed system of the PWCS also ensures that waste is not exposed throughout the process, thereby reducing odour and pest problems. Effectively, the system increases efficiency in manpower and offers a cleaner and more liveable environment.

Some private and HDB developments have already incorporated the PWCS. Since April 2018, all new non-landed private residential developments with 500 dwelling units or more will be required to install the PWCS within their development.

To promote the adoption of PWCS on a national level, NEA amended the Environmental Public Health Act to allow the gazetting of District PWCS areas. This supports the connection of multiple developments to a central district level PWCS infrastructure, which improves the efficiency of waste collection at a district level. Following the amendment, NEA will implement the first District PWCS project at Kampong Bugis.

Moving forward, NEA will continue to work closely with other agencies to adopt innovative technologies and improve the waste management industry in Singapore.

Embarking on a Trial Deployment of Compactor Bins

NEA started a trial programme in December 2019 to improve the resource efficiency of bin emptying

process, deploying 20 compactor bins at remote locations in Singapore. These bins are capable of compacting and holding up to five times more waste in terms of volume, compared to regular bins. Bin sensors detect if the bins are full, and notify cleaners when the pre-set threshold level has been reached. Data from these sensors are then used to re-calibrate the schedule of emptying the bins.

In Phase 1 of the trial, the average frequency of bin emptying reduced from daily to twice a week and the average time taken to empty the bins decreased from 420 minutes to 120 minutes weekly. Public health standards have not been compromised despite emptying the bins less frequently. NEA will continue to monitor the results of subsequent trial runs to assess if compactor bins should be deployed around Singapore.

Launching the Singapore Standard SS 646

In 2019, NEA worked with Enterprise Singapore to develop the Singapore Standard SS 646 – Specification for water heaters for household use. Public consultation for the standard took place from June to August 2019, and the standard was launched on 27 September 2019.

Providing Energy Efficiency Incentives

The Energy Efficiency Fund (E2F) provides up to 50 per cent co-funding support for industrial facilities' energy efficiency efforts in facilitating the efficient design of new facilities, conducting energy assessments, adopting energy-efficient technologies, and adopting energy management information systems (EMIS).

In October 2019, NEA established funding support for the adoption of EMIS under E2F. The grant encourages industrial facilities to install EMIS and thus manage energy use in a structured manner, improve energy efficiency and reduce carbon emissions.

Building Energy Efficiency Capabilities

On 3 October 2019, a Memorandum of Understanding was signed between NEA and the Singapore Institute of Technology to formalise the Energy Efficiency Technology Centre initiative. It aims to address short- and long-term capability building needs within the local industrial energy efficiency ecosystem by:

- Catalysing energy efficiency improvement of small and medium enterprises through the provision of energy consultancy services
- Training undergraduate engineering students in industrial energy efficiency
- Upskilling existing engineers and energy efficiency practitioners

Improving Energy Efficiency for Common Industrial Equipment and Systems

To phase out the least efficient models and technologies and catalyse market transformation towards more energy-efficient ones, NEA introduced the minimum energy efficiency requirements for common industrial equipment and systems. This adoption of more energy-efficient equipment and systems will help facility owners reap life-cycle cost savings and reduce their carbon footprint.

In December 2019, it was announced that water-cooled chilled water systems will be regulated by the Minimum Energy Efficiency Standards. This will take effect from December 2020 for new industrial facilities, 2025 for existing industrial facilities regulated under the Energy Conservation Act, and 2029 for other industrial facilities.

In 2019, NEA conducted industry consultations on the extension of Mandatory Energy Labelling Scheme (MELS) and Minimum Energy Performance Standards (MEPS) to variable refrigerant flow (VRF) air-conditioners. Following this, the MELS and MEPS will be extended to VRF air-conditioners from April 2021 to drive the market towards more efficient models, and help owners of VRF air-conditioners reduce carbon footprint and benefit from the lower operating cost of more energy-efficient equipment.

Enhancing Energy Management Practices for Industry

On 31 December 2019, the Energy Conservation (Energy Management Practices) (Amendment) Regulations 2019 was gazetted to enhance energy management practices in the industrial sector. The regulation aims to introduce new requirements for registered corporations to conduct periodic Energy Efficiency Opportunities Assessments on all relevant business activities under their operational control. It would serve as a systematic means of identifying economically viable energy efficiency opportunities.

Making Progress toward Sustainable Singapore Blueprint 2030 Goals

KPI	2019 Results	2030 Targets
Overall recycling rate	0.6	0.7
Domestic recycling rate	0.2	0.3
Non-domestic recycling rate	0.7	0.8
Energy Consumption per dollar GDP: Improvements from 2005 levels	35.0% (2018)	35.0%

GOING FORWARD ►►

In the short-term, NEA's focus is to implement initiatives under our Zero Waste Masterplan and reduce GHG emissions to meet our obligations under the Paris Agreement. Our medium-term priority is to operationalise key waste management infrastructure for a Zero Waste Nation. NEA strives towards a circular economy and low-carbon economy, with reduced GHG emissions to address climate change.

► Acting on Our Commitment to the Paris Agreement

The household electricity use per capita in 2018 was 1.28 MWh per capita and the total greenhouse gas emissions for the same year was 52,167 KtCO₂e. In light of Singapore's commitment to the Paris Agreement, Singapore intends to peak emissions at 65 MtCO₂e around 2030.

In March 2020, Singapore further announced its aspiration to halve emissions from our peak to

33 MtCO₂e by 2050, with a view to achieving net-zero emissions as soon as viable in the second half of the century.

To help meet our pledge under the Paris Agreement, Singapore aims to achieve an energy efficiency improvement rate of one to two per cent per annum in the industrial sector, specifically the manufacturing industries. NEA contributes to this effort through regulations like the Energy Conservation Act and Carbon Pricing Act, which aim to strengthen energy management practices and uncover new energy efficiency opportunities in the industry sector.

► Developing the Integrated Waste Management Facility

NEA is making strides in the development of an Integrated Waste Management Facility (IWMF) to meet Singapore's long-term solid waste management needs. In FY2019, NEA completed the tendering of the Engineering, Procurement and Construction (EPC) Package 1 contract for the development of the WTE Facility and Materials Recovery Facility, awarded the 230 kV Electrical Substation contract for the IWMF project, and called the tender for EPC Package 2 for the development of the Sludge Incineration Facility and Food Waste Treatment Facility.

Upon completion in 2025, Phase 1 of the IWMF development will have the following facilities:

- WTE Facility (2,900 t/d)
- Materials Recovery Facility (250 t/d)

- Sludge Incineration Facility (800 t/d)
- Food Waste Treatment Facility (400 t/d)

The second phase will comprise another WTE Facility (2,900 t/d), and it is tentatively planned to be completed by 2028.

► Reducing Packaging Waste Among Producers

Starting from January 2021, companies with an annual turnover of more than \$10 million that supply regulated goods into the Singapore market will be required to report data on the packaging they put on the market annually. They will also be required to develop and submit plans to reduce, reuse or recycle packaging. These companies include manufacturers and importers of packaged products, as well as retailers such as supermarkets and F&B retailers. The data gathered from these companies will form the basis for the Extended Producer Responsibility (EPR) framework to manage packaging waste by no later than 2025, where producers will be responsible for collecting and recycling their product packaging.

To support companies in fulfilling their mandatory packaging reporting obligations, NEA has partnered the Singapore Manufacturing Federation on a joint capability development programme. The programme will offer companies workshops and training courses to familiarise themselves with the reporting framework and serve as a platform for companies to exchange best practices in sustainable packaging waste management.

► Preparing for Mandatory Food Waste Segregation and Treatment

Starting from 2021, developers of new large commercial and industrial premises — specifically those that are expected to generate large amounts of food waste — are required to provide space for on-site food waste treatment system in their design plans. Following this, such developers are to implement these on-site food waste treatment systems from 2024. Existing large commercial and industrial premises will also be required to segregate food waste for treatment from 2024. The treatment may be done by an on-site system or sent to an off-site treatment facility, such as the upcoming Tuas Nexus that is set to be operational in 2024.

The mandatory food waste segregation and treatment will apply to hotels and shopping malls with more than 3,000m² of F&B area, including function areas for hotels; as well as industrial premises that either house at least one food manufacturer of more than 750m², or are above 20,000m² and have more than 20 food tenants.

► Managing E-waste Among Producers and Retailers

To be implemented by 1 July 2021, the EPR framework will apply to producers and retailers of regulated electrical and electronic equipment. Under this framework, producers will be physically and/or financially responsible for the collection and treatment of end-of-life products. The EPR

framework is implemented under the Resource Sustainability Act, which regulates batteries, large household appliances and electric mobility devices, ICT equipment, solar photovoltaic panels and lamps. By weight, these categories will account for over 90 per cent of electrical and electronic products in Singapore.

Producers of regulated consumer products supplying such products at amounts above the stipulated threshold are required to join and finance a Producer Responsibility Scheme (PRS). The PRS operator will be organising the collection and treatment on behalf of these producers by sending the regulated products to licensed e-waste recyclers. Producers of regulated non-consumer products will have to provide free collection services of their products upon request and channel the collected products to either licensed e-waste collectors or recyclers.

Retailers of regulated consumer products will be required to provide free takeback services upon the delivery of new regulated products. Large retailers with retail outlets comprising a floor area of or above 300m² are also required to provide in-store collection services, limited to the regulated consumer product types that the retail outlet is selling. Retailers supplying regulated consumer products are required to send these collected e-waste to the PRS operator which will be sent to local e-waste recyclers for proper treatment.

► Addressing Excessive Consumption of Disposables with Citizens' Workgroup

In an effort to identify Singapore's way forward in tackling the excessive consumption of disposables, a Citizens' Workgroup will be set up, bringing together 50 citizens from diverse backgrounds and age groups to identify and discuss inclusive recommendations to collectively address the issue. Over the course of eight sessions scheduled between September 2020 and February 2021, citizens will be supported with resources to generate ideas and develop practical and inclusive recommendations, and consult subject matter experts and stakeholders from the people, private and public sectors to refine their ideas. Participants will present their recommendations at the final session, following which, MSE and NEA will review the proposals and trial them where feasible.

Timely and Reliable Weather and Climate Services

Situated near the equator, Singapore has a tropical climate that presents its own unique set of environmental challenges. To prepare for climate uncertainties, NEA's Meteorological Service Singapore provides reliable and responsive weather and climate services to contribute to public safety and a climate-resilient economy.

Developing a New Weather Prediction Model

It has been long established within the international weather forecasting community that predicting the occurrence of convective-scale weather systems such as thunderstorms in the deep tropics comes with its challenges.

In light of the objective to provide improved weather forecasts and warnings for Singapore and the surrounding region, NEA embarked on a collaboration with the United Kingdom's Meteorological Office (UK Met Office) from 2013 to 2018 to develop SINGV – NEA's convective-scale Numerical Weather Prediction (NWP) system.

In 2019, SINGV was operationalised in NEA's Central Forecast Office to provide additional guidance in

the provision of the weather forecast and warning services for Singapore and the surrounding region. NEA continues to further develop and refine SINGV to improve NWP's forecast performance. SINGV will also be tested for use as a Regional Climate Model in the upcoming Third National Climate Change Study.

Receiving Certification for the Upper-air Observatory

In May 2019, NEA's Upper Air Observatory was certified as a Global Climate Observing System Reference Upper-Air Network (GRUAN) station. GRUAN stations aim to ensure that high-quality measurements of the upper atmosphere are consistently collected. The data is used to determine climatic trends in the upper atmosphere, calibrate data from satellites, and for the study of atmospheric processes.

With the certification, NEA's observatory joins a global network of 11 certified stations as the first certified GRUAN station located in the equatorial region. In addition, this certification is a recognition of NEA's operation of a state-of-the-art measurement programme that supports the World Meteorological Organization Integrated Global Observing System.

Initiating the National Sea Level Research Programme

To enhance our current capabilities in projecting and adapting to the risks posed by long-term sea-level rise, the National Sea Level Research Programme was initiated by NEA's Centre for Climate Research

Singapore (CCRS) in 2019, bringing together researchers from CCRS, local universities and international experts to improve our understanding of sea-level science and develop more robust projections of sea-level rise affecting Singapore in the future.

GOING FORWARD ►►

NEA's short- and medium-term focus is to strengthen our weather forecasting and climate science capabilities. Our goal is to observe and understand the weather and climate affecting Singapore, and to provide services in support of national needs and international co-operation.

► Embarking on the Third National Climate Change Study

In 2015, Singapore's Second National Climate Change Study was published. Featuring the collaboration between scientists from CCRS and the UK Met Office Hadley Centre, the study provided an authoritative national perspective on future risks related to climate change, generating global climate model simulations, historical simulations, and future climate projections up to 2100 for Singapore and the surrounding region.

Since the 2015 study, significant advances in the science of global and local climate change projections have been made. Singapore will leverage these projections and the latest international scientific developments to deliver an update in the form of the Third National Climate Change Study in 2022. Delivered in tandem with the release of the AR6, the study will be an

updated national assessment of the long-term effects of climate change on Singapore and the surrounding region.

Preparations to conduct the study have commenced. These include the acquisition of more powerful High-Performance Computing resources from the National Supercomputing Centre, which are essential for running highly computer-intensive regional climate model simulations.

Vibrant Hawker Culture

Hawker centre dining is truly an integral part of Singapore's culture. As a natural extension of this culture, hawker centres have become time-tested institutions that serve as important places for community bonding in the heartlands.

Sustaining the Hawker Trade

On 20 January 2020, NEA and SkillsFuture Singapore launched the Hawkers' Development Programme, an initiative to equip aspiring hawkers with the relevant skills and competencies to run their hawker business. Trainees would undergo five days of classroom training and a two-month apprenticeship at veteran hawkers' stalls, after which they would operate their own stalls. For the first three months, they would receive mentorship under veteran hawkers.

The programme is a key idea from the Workgroup on Sustaining Hawker Trade, and was developed in consultation with hawkers and industry stakeholders to facilitate a continuous flow of new and younger hawkers, and complements existing efforts to sustain the hawker trade.

Celebrating Hawkers with the Hawkers' Seminar

Organised by The Federation of Merchants' Associations, Singapore and supported by NEA, the inaugural

Hawkers' Seminar was held on 30 September 2019 to celebrate the hawker spirit, and highlight the collective goal to remain relevant and provide Singaporeans with good and affordable meal options. Themed 'Hawker Trade Moving with the Times', the "by-hawker-for-hawker" event was attended by over 300 hawkers and stakeholders. Awards were also given out to recognise veteran hawkers, aspiring hawkers and hawkers' associations, who contribute to the sustainability of the hawker trade.

Reviewing Tender Specifications for the Management of New Hawker Centres

To improve Social Enterprise Hawker Centre management models, NEA reviewed the tender specifications for the appointment of socially-conscious operators. The tender evaluation criteria were revised to help safeguard the hawkers' interests, sustain the hawker trade, while still meeting the key social objective of having affordable food options for the public. To review an operator's ability to bring footfall and business success for hawkers, new KPIs were also included.

Installing Water Dispensers at All Hawker Centres

To support the national fight against diabetes by encouraging Singaporeans to cultivate the habit of drinking plain water, NEA has increased the availability and accessibility of drinking water for the community through our hawker centres. To date, water dispensers have been installed at almost all 113 hawker centres in Singapore.

Piloting the Adoption of Business Intelligence System

NEA piloted the use of Business Intelligence System (BIS) to analyse hawker centre-related data, to help NEA hawker centre place managers obtain greater insights into the hawker centres they manage. The dashboard's ability to compute the number and types of customer feedback received across various months and display any correlation to data obtained from inspections for a particular hawker centre, helps to promptly identify probable causes and address the issues. BIS' ability to compute and display the data stall occupancy rates against other operational data of hawker centres island-wide allows NEA to better monitor and take swift action where needed.

Introducing the Staggered Rent Scheme for New Hawker Centres

On 26 August 2019, NEA announced a new Staggered Rent Scheme (SRS) to support stallholders in the early years of the new hawker centres' operations. With the SRS, these stallholders will enjoy lower rentals in the first two years of the centres' operations – at 80 per cent and 90 per cent of stall rentals respectively. The SRS came into effect on 1 September 2019.

The scheme also includes extended rental remission of 10 per cent for a period of six months, from 1 September 2019 to 29 February 2020, to all eligible stallholders in new hawker centres that were in their second year of operations, as of 1 September 2019. These hawker centres are located at Yishun Park, Jurong West and Pasir Ris Central.

GOING FORWARD ►►

NEA's mission is to develop and manage hawker centres as vibrant communal spaces, offering affordable food options in a clean environment, together with a sustainable hawker trade. Our short- and medium-term focus is to complete the development of new hawker centres, and implement initiatives to enhance the vibrancy and productivity of hawker centres.

► Curating and Allocating Lock-up Stalls for Repair Services

In support of the larger Sustainable Singapore Movement, NEA focused on the approach of reducing waste and promoting a repair culture. To address this, NEA studied the curation of repair businesses and developed an allocation policy, which sets aside lock-up stalls for repair services such as watch, shoe and bag repairs. Moving forward, more stalls will be curated and allocated to sustain the initiative.

► Increasing Our Community Dining Rooms

To date, there are 114 hawker centres in Singapore. These include seven new hawker centres at Bukit Panjang, Ci Yuan, Kampung Admiralty, Jurong West, Our Tampines Hub, Pasir Ris Central and Yishun Park. Other new hawker centres that have been announced are located at Sembawang, Bidadari, Bukit Batok, Bukit Panjang North, Sengkang (Anchorvale, Fernvale and Buangkok), Punggol (Punggol Town Hub and Punggol Digital District) and Choa Chu Kang (Yew Tee and Town Centre).

The following are the status of the new and existing hawker centres¹⁰:

New Hawker Centres

Under Construction

- i. Bukit Canberra Hawker Centre, Sembawang (estimated to complete in 2021)
- ii. Anchorvale Village Hawker Centre, Sengkang (estimated to complete in 2022)
- iii. Fernvale Hawker Centre & Market, Sengkang (estimated to complete in 2021)
- iv. Punggol Town Hub, Punggol (estimated to complete in 2021)
 - Building and Construction Authority (BCA) Green Mark Platinum
- v. Senja Hawker Centre, Bukit Panjang North (estimated to complete in 2021)
 - Universal Design Mark Gold (Design)
 - BCA Green Mark Platinum
- vi. Woodleigh Village Hawker Centre, Bidadari (estimated to complete in 2021)
 - BCA Green Mark Gold^{PLUS}
- vii. Sengkang – Buangkok (estimated to complete in 2022)
- viii. Punggol Digital District (estimated to complete in 2023)

New Replacement Centres

Under Construction

- i. Margaret Drive Hawker Centre
 - Replaces Commonwealth Drive Food Centre
 - Estimated to complete in 2021

- ii. Market Street Food Centre
 - BCA Universal Design Mark Gold^{PLUS} (Design)
 - BCA Green Mark Platinum
 - Estimated to complete in 2021

Existing Centres

Completed and Operational

- i. Block 84 Marine Parade Central Market and Food Centre
 - Completed renovations in March 2019
 - Reopened on 1 May 2019

Interim Centre

Completed and Operational

- i. Market Street Interim Hawker Centre
 - Operational on 1 August 2017 (will shift back to the previous site once the redevelopment works are completed, likely by 2021)

¹⁰ Completion dates are subject to review due to COVID-19

CHAPTER 2

Together with Our Partners and the Community



Environmental Services Industry as a Force Multiplier for Mission Success

Singapore's commitment to environmental sustainability and economic growth is reflected in the Environmental Services Industry Transformation Map (ES ITM). NEA works closely with our stakeholders to form strategic partnerships, and recognise their sustainability efforts through awards and accolades.

Ensuring Sustainability of the Environmental Services Industry

As the regulator, enabler and service provider, NEA works closely with the industry to understand their needs and challenges in building a skilled, and resilient ES workforce. These are some of the strategies and initiatives under the ES ITM¹¹:

- Launched on 12 February 2020, the NEA-Industry Scholarship is a new scheme to attract young talent into the ES industry. For the first time, NEA partnered cleaning and waste management companies to offer 20 scholarship awards to Institute of Technical Education and Polytechnic students who are interested in pursuing a career in ES. Upon graduation, these scholars will be

employed by sponsoring companies to take on jobs such as data analysts, operations executives and assistant engineers, and groomed to be future leaders in the industry. The entry of a younger workforce that welcomes change and embraces technology will contribute to the long-term success of the ES industry

- The inaugural ES Star Awards launched in December 2019 recognises top employees in the ES industry across three sectors — Cleaning Services, Waste Management and Pest Management. Besides the 27 outstanding individuals who were award recipients, 268 employees from 45 companies were presented with Certificates of Excellence for their commitment and work excellence. The event also launched the refreshed Skills Framework for Environmental Services, adding a new chapter on the Pest Management sector into the publication
- Outcome-based Contracting (OBC) specifies the desired cleaning outcomes and expected performance levels instead of prescribing the required manpower headcount, giving service providers the flexibility to adopt technology and innovation, enhance processes and offer better solutions to improve productivity and deliver quality cleaning services. The importance of OBC is especially apparent as ES providers face manpower challenges amid the COVID-19 situation. Efforts to improve OBC adoption include

¹¹ For more details on the ES ITM, visit www.nea.gov.sg/industry-transformation-map

building competency and enhancing knowledge of procurement personnel by partnering training providers to conduct OBC courses for cleaning services, and providing one-to-one technical advice to service buyers to help them transition to OBC

Enhancing Grants to Improve Productivity in the ES Industry

As part of the Resilience Budget to address COVID-19, the Productivity Solutions Grant will be enhanced to provide funding support of up to 80 per cent of the qualifying cost, capped at \$350,000 per company, up from 50 per cent and a cap of \$250,000. The funding programme, a strategic tool under the ES ITM to raise the operational efficiency and productivity of the ES industry through technology adoption, is now also made available to pest management firms. The enhancement to the grant takes effect from 1 April 2020 to 31 December 2020. Approved grant applications would receive support of up to 70 per cent of the qualifying cost, starting 1 January 2021¹².

Developing Robotics for ES

Since late 2017, NEA has been managing the Environmental Robotics Programme with the support of the National Robotics Programme to encourage the greater use of technology and automation in the ES industry.

The Environmental Robotics Programme aims to:

- Enable productivity gains by reducing both NEA's and NEA contractors' manpower requirements for operations in an increasingly urbanised environment
- Enable sustainable manpower stream by transforming current manual tasks that are traditionally lower-skilled, lower-paying and strenuous, into jobs that are higher-skilled, better paying and more productive
- Enhance current capabilities and enable new ones by improving the safety and effectiveness of NEA staff and allowing them to better access confined and dangerous areas to carry out inspection, monitoring and sampling tasks

The programme is focused on developing robotics solutions for NEA's work areas in:

- Cleaning of Public Spaces
- Waste Management
- Inspection, Monitoring and Sampling

NEA secured additional funding of \$6 million for the Environmental Robotics Programme, through the National Robotics Programme. To date, five projects have been awarded under the Environmental Robotics Programme.

Of the five projects, the first two projects are awarded to develop Autonomous Environmental Service Vehicles for road cleaning, and the vehicle platforms are undergoing testing in preparation for the trials.

The remaining three of the five are new projects awarded in FY2019. Two projects are to develop robotic solutions for pavement cleaning, closed drain and false ceiling inspection, while one project is allocated for the automated production of the male *Wolbachia*-*Aedes* mosquitoes. The new projects will help to build up the expertise and experience of the parties involved, comprising small and medium enterprises, institutes of higher learning and research institutes, and to ultimately produce environmental robotic solutions that can be commercialised and exported.

Crowdsourcing Through the Open Innovation Platform Innovation Call

In April 2019, NEA participated in the Infocomm Media Development Authority's third Open Innovation Platform Innovation Call, a crowdsourcing initiative that connects and matches challenges of problem owners to a pool of problem solvers including start-ups, companies and researchers. NEA posed the following three problem statements and awarded four projects:

- To find solutions that enhance niche inspection and detect irregularities at public columbaria to improve operational efficiency and service delivery. The project was awarded to Senserbot Pte Ltd
- To find solutions that remotely detect smoky vehicles on roads and at land-entry checkpoints to enhance operational effectiveness in pollution control. The project was awarded to Hendricks Corp Pte Ltd

¹² Information is accurate as of 1 September 2020

- To find solutions that automate the call handling process of the NEA Contact Centre, and capture the feedback accurately into the Customer Relationship Management System, so as to achieve a higher standard of service delivery. The project was awarded to two companies, DHL Supply Chain Singapore Pte Ltd and Terra Systems Pte Ltd

STAKEHOLDER ENGAGEMENT HIGHLIGHTS

[102-43,102-44]

- Reached out to over 300 members of the industry, comprising plastic recycling companies, traders, public and general waste collectors, and the Waste Management and Recycling Association of Singapore, through a series of dialogue sessions, briefings and circulars between August and November 2019. To prepare the industry for the upcoming transboundary movement control of plastic waste under the Basel Convention by 1 January 2021, NEA explained the background to the inclusion of plastic waste under the Basel Convention, and gave an overview on the upcoming import, export and transit controls

Active Community as Stewards of the Environment

In partnering with the People, Public and Private sectors, NEA ensures that the community remains engaged in their environmental responsibilities. These sectors are key to Singapore's journey towards sustainability, as NEA continues to encourage environmental ownership as a way of life.

Implementing the 'Say YES to Waste Less' Campaign

On 8 June 2019, the 'Say YES to Waste Less' campaign was launched to build public awareness on the excessive consumption of disposables and its impact on Singapore's environment and future generations. The campaign's key message, 'Make the Right Choice. Choose Reusables', reached millions of people across traditional and digital channels, effectively bringing together 59 partners from more than 1,600 premises from F&B establishments, retail chains, supermarkets, hotels, educational institutions, NGOs and Community Development Councils.

The partners helped to encourage consumers to make the right choice at points of consumption through visual reminders at cashier points, and trained cashiers to engage patrons at the point of payment, as well as providing incentives for using reusables. Even after

the campaign period, several partners ran their own initiatives to sustain the movement.

Cultivating Good Recycling Habits Among New Homeowners

In August 2019, NEA and IKEA Singapore launched a joint recycling initiative to support the cultivation of good recycling habits in households and increase the rate of household recycling. About 18,000 new homeowners of HDB Built-to-Order flats received vouchers to redeem a free recycling bin sponsored by IKEA Singapore, which serves as a visual reminder to practise recycling when they move into their new homes.

Incentivising Singaporeans to Recycle Bottles and Drink Cans

In October 2019, NEA and F&N Foods Pte Ltd jointly launched the Recycle N Save initiative to encourage Singaporeans to recycle their empty plastic drink bottles and aluminium drink cans. The initiative rolled out Reverse Vending Machines (RVMs), which served as recycling points that rewarded users who deposited a minimum number of drink containers into the machines.

In March 2020, the initiative expanded its reach and placed RVMs in participating schools to encourage good recycling habits among the youth. By the end of March 2020, the initiative has managed to collect about 2.4 million drink containers.

STAKEHOLDER ENGAGEMENT HIGHLIGHTS

[102-43,102-44]

- In November 2019, NEA launched the 'Recycle Right' campaign to increase the public's familiarity with the blue recycling bins under the National Recycling Programme, help them remember and differentiate recyclables and non-recyclables, and reduce the contamination of recyclable materials with food or liquids. Publicity was targeted at households in HDB estates through channels such as HDB lift doors and notices, wallscapes at transport hubs, as well as social media posts and videos. In partnership with Grassroots Organisations and CDCs, more than 330 activations were organised, reaching out to over 54,000 residents through interactive games that reinforced the campaign's messages

Public Sector Taking the Lead in Environmental Sustainability

Public agencies in Singapore often come together to coordinate operations, share expertise and resources, and collaborate in inter-agency committees and task forces. To harness this synergy, NEA forms strategic partnerships with fellow public agencies, and plays an integral role in WOG programmes to drive sustainability across the public sector.

Reducing Consumption to Lead by Example

Committed to lead by example, the public sector is looking into the efficient use of resources such as energy, water, waste and recyclables. Through the Public Sector Taking the Lead in Environment Sustainability (PSTLES) initiative, the public sector agencies are closely monitoring their resource use, and they are on track to meet the committed FY2020 sustainability targets.

Key targets include reducing 15 per cent of its FY2013 electricity consumption by FY2020, reducing its water efficiency index by five per cent, and achieving Green Mark Gold^{PLUS} and Gold for large and mid-sized

premises. Moving forward, NEA is developing the programmes and measures for the next phase of the PSTLES initiative, which covers FY2021 to FY2030.

Promoting the Adoption of the Guaranteed Energy Savings Performance Contracting Model

A key thrust of the PSTLES initiative is improving energy efficiency. To address this, public agencies are encouraged to adopt the Guaranteed Energy Savings Performance (GESp) contracting model when carrying out retrofits of their major energy-consuming equipment. Under the GESp contracting model, an Energy Services Company (ESCO) is engaged to carry out an energy audit as well as identify and implement energy efficiency improvement measures. The ESCO also guarantees the performance of the retrofitted systems in terms of system efficiency or annual energy savings, over a three- to five-year period.

As of 31 March 2020, owners of 38 large and medium public sector buildings have adopted the GESp contracting model for their building retrofit works. On average¹³, the GESp contracting model will help public sector building owners save about 15 per cent of electricity use, which translates to \$13 million in savings annually for the public sector.

In September 2019, the GESp contracting model received the Silver award at the International Convention on QC Circles. It continues to drive improvement in the public sector today.

¹³ This is based on savings from 36 buildings with chiller retrofitted/being retrofitted using GESp contracting model. Excludes ~\$1mil savings from 2 buildings as their energy audit have not been completed

STAKEHOLDER ENGAGEMENT HIGHLIGHTS

[102-43,102-44]

- Inter-agency cooperation for implementation of GeoSpace-Sea, a national marine spatial data infrastructure through which NEA will provide coastal water quality data for inter-agency operation and incident management, and for national marine research. Led by the Maritime and Port Authority of Singapore, the committee comprises 11 public agencies and NEA. The development of GeoSpace-Sea commenced in Q3 2019

International Partnerships as Strategic Levers

The effects of climate change further intensify Singapore's vulnerability to transboundary environmental threats. To foster collaboration and knowledge exchange on the global stage, NEA engages our ASEAN and international counterparts, and leverages bilateral and multilateral platforms to promote Singapore's expertise in environmental management beyond our shores.

Catalysing Insights for Embracing a Circular Economy

To safeguard and advance Singapore's environmental interests, NEA regularly engages international experts on environmental issues and circular economy.

On 6 and 7 June 2019, NEA organised the CleanEnviro Summit Singapore Catalyst 2019 event in partnership with Temasek Foundation's Ecosperity Week 2019. Themed Circular Economy: Towards a Resource Efficient and Sustainable Business, the by-invitation event was held in conjunction with the Year Towards Zero Waste as a lead-up to the 2021 summit, and attended by over 160 C-suite delegates. The event was a global platform for thought leaders, technology innovators, policymakers and business leaders to share their vision for environmentally sustainable businesses, and recognise opportunities for business sectors to

embrace a circular economy. Renowned speakers included Mr Daniel Calleja Crespo, Director-General for Environment of the European Commission; Mr Hareld van den Brink, Co-Director Asia of Metabolic; and Mr Park Chun-kyoo, Vice Minister, Ministry of Environment, Republic of Korea.

In June 2021, NEA will be organising the next edition of the CleanEnviro Summit Singapore. The high-level plenaries and technical sessions will include topics such as sustainable energy, zero waste, climate change and public hygiene.

Co-hosting of Intergovernmental Panel for Climate Change Meetings

NEA and MSE co-hosted the Intergovernmental Panel for Climate Change (IPCC) Scoping Meeting for the Synthesis Report (SYR) of the Sixth Assessment Report (AR6), followed by the 57th Session of the IPCC Bureau. The IPCC is the United Nations (UN) body for assessing the science related to climate change, and is regarded as the authoritative voice on climate science.

This was the first time Singapore hosted meetings of the IPCC. In October 2019, 80 experts from 38 countries met in Singapore to discuss the outline of the SYR, an important report that provides key scientific information for policymakers to design policies addressing climate change. The 57th Session of the IPCC Bureau was a meeting of one of the highest bodies in the organisational structure of the IPCC, providing scientific and technical guidance to the IPCC as well as advice on related management issues.

Launching the Climate Action Package

Committed to supporting global efforts to address climate change, Singapore recognises the importance of regional and international cooperation on climate action. Singapore initiated the Special ASEAN Ministerial Meeting on Climate Action (SAMCA) and Expanded-SAMCA when the nation was the 2018 ASEAN Chair, and announced the launch of the Climate Action Package (CAP). To support the CAP, NEA conducted training programmes in 2019 under the Ministry of Foreign Affairs' Singapore Cooperation Programme training framework:

- Environmental Conservation and Sustainability
- Climate Change Adaptation and Mitigation Strategies
- Clean Energy and Emission Reduction
- Managing Coastal Biodiversity Under Urbanisation and Climate Change Pressures

These CAP programmes were implemented through the collaboration of lead agencies of the Resilience Working Group, the Inter-Ministerial Committee on Climate Change, institutes of higher learning, industries, and Professor Wong Poh Poh, the coordinating lead author of the 2007 IPCC report.

Enhancing Engagement and Collaboration with Foreign Counterparts

In 2019, NEA received visitors from foreign government agencies across more than 100 visits, which marked a 35 per cent increase from the previous year. These visits go towards fostering NEA's relationships with foreign counterparts through the exchange of experiences and views in addressing environmental challenges, as well as offering technical assistance in areas of mutual interest.

Addressing the Management of Hazardous Chemicals and Waste

From 2020 to 2022, Singapore, represented by NEA, will chair the ASEAN Working Group on Chemicals and Waste (AWGCW).

The AWGCW was established in 2016 as a regional platform for ASEAN Member States to strengthen regional coordination and cooperation in addressing chemical-related issues under the relevant multilateral environmental agreements, as well as to promote the sound management of chemicals and waste. It is one of seven working groups under the ASEAN cooperation on environment.

STAKEHOLDER ENGAGEMENT HIGHLIGHTS

[102-43,102-44]

- NEA exhibited Singapore's 'Year Towards Zero Waste' campaign at the High-level Political Forum on Sustainable Development (HLPF), held from 9 to 18 July 2019. The HLPF is the UN hub for the global review of progress towards the implementation of the Sustainable Development Goals. Our exhibition at the UN Headquarters in New York highlighted our circular economy approach and showcased our vision to become a Zero Waste Nation to delegates from around the world
- NEA's waste management facilities, air quality monitoring stations, and Environmental Health Institute were popular visit sites for foreign government agencies from all over the world, to learn about NEA's experience in managing these issues and operating the facilities. Overseas delegates involved in funerary and after-death arrangements also visited Choa Chu Kang Cemetery to have a better understanding of the after-death facilities and services in Singapore that serve the needs of the community

CHAPTER 3

Enabled by a High Performance and Future-ready NEA



TRANSFORMING NEA FOR THE FUTURE

NEA's strategic priorities are aligned with both the nation's agenda of a Sustainable, Resource Efficient and Climate Resilient Singapore, and MSE's priorities to ensure Climate Resilience, Resource Resilience and Economic Resilience.

To be a high performance and future-ready organisation well-poised to achieve our desired outcomes, NEA conceptualised the 3'C's framework to guide our transformation – Create Capacity, Build Capabilities, and Deepen Collaboration. An organisation-wide restructuring spanned 15 months, resulting in a new structure that will support the 3'C's, ensure better synergy and integration of functions, and build stronger capabilities for NEA. The new structure took effect on 1 September 2020, and will better position NEA to tackle the challenges ahead and emerge stronger as an organisation.

Creation of Capacity

NEA is consistently innovating to create capacity and achieve process excellence. As the demand for environmental services rises, it is essential to shift towards a pro-enterprise mindset through innovative solutions across regulations and practices, to ensure a safe and healthy environment for all employees.

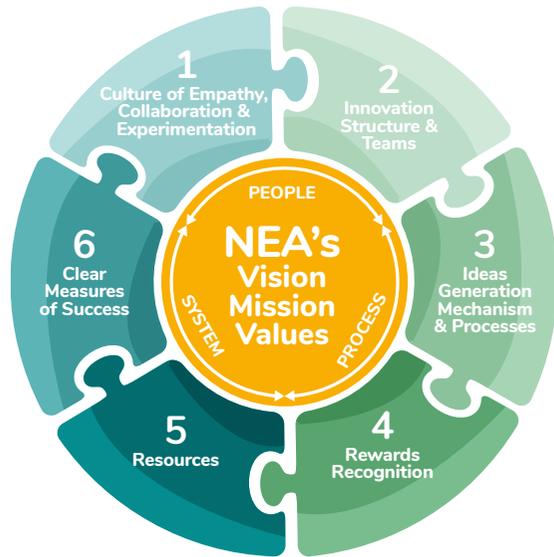
Driving Innovation Excellence in NEA

To cultivate and sustain an innovation-driven culture, NEA implemented an innovation framework founded on the tenets of organisation development and behavioural sciences. The framework streamlines NEA's systems and processes, to encourage idea incubation and drive innovation excellence.

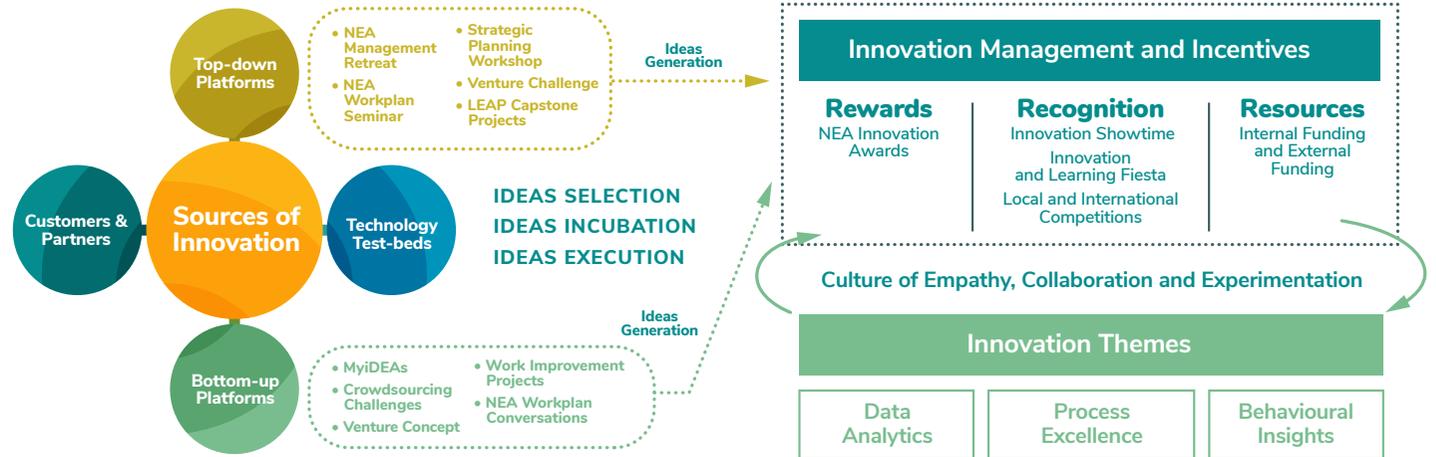
Various platforms have been established in NEA to solicit ideas at all levels of the organisation. These ideas are then harvested and evaluated for their feasibility and strategic fit. As a result, some are excluded while others are executed or incubated for future applications.

NEA's innovation process includes a systematic way of assembling agile teams and monitoring innovation metrics. A 'rewards and recognition' structure is also in place, along with communications, learning and staff appreciation via various platforms.

NEA's Innovation Framework



NEA's Innovation Process



Achieving External Recognition for Innovation Excellence

NEA nominates outstanding innovative ideas and projects for key local and international competitions. These awards are conferred on quality-focused organisations that have demonstrated excellence and proven results in their respective domains.

In FY2019, NEA garnered several innovation awards at the national and international levels¹⁴. These awards are a positive affirmation of NEA's commitment to

innovation and the proven strength of our innovation-driven culture.

Celebrating Innovative Efforts through Internal Recognition

In FY2019, NEA staff completed 100 innovation projects. NEA acknowledges outstanding innovative efforts to spur and inspire staff to continue innovating. The Innovation and Learning Fiesta was conceived to recognise individuals and project teams who have implemented innovative solutions to key challenges.

A highlight of the biennial event is the conferring of Best Performing Departments, Best Venture Projects and Best ExCEL Innovative Awards, which recognise positive outcomes from innovative efforts of departments and teams. Meanwhile, the Best Ideator and ExCEL Champion Awards honour outstanding contributions from innovative individuals. These awards exemplify NEA's continued commitment to cultivating the innovative spirit within the organisation, as well as nurturing an innovation driven culture.

¹⁴ For the full list of awards, visit: www.nea.gov.sg/corporate-functions/who-we-are/achievements

Adopting Pro-enterprise Mindset to Regulations and Regulatory Practices

Revising the Radiation Protection (Non-ionising Radiation) Regulations

After a review of the Radiation Protection (Non-ionising Radiation) Regulations to streamline the licensing regime, the revised regulations came into effect on 1 August 2019 with the following key amendments:

- The N2 licence may now be granted to the licensee in charge of two or more non-ionising irradiating apparatus, for example, one N2 licence may cover two or more of such apparatus. The renewal of the licence is no longer required, and to this effect, the yearly licence renewal fee of \$155 has been replaced with an annual fee of \$65 per apparatus
- The power output threshold, for which industrial ultrasound apparatus requires the N2 licence, is revised from 50W to 1,200W
- Medical and dentistry professionals registered with the Singapore Medical Council and the Singapore Dental Council no longer require N3 licences for the use of medical lasers in healthcare institutions, as defined in the Private Hospitals and Medical Clinics Act, if they have the consent of both of the following persons to use a medical laser at a healthcare institution:
 - a. the individual in charge of that healthcare institution; and
 - b. the licensee of the N2 licence granted in respect of that medical laser

As part of medium- to long-term plans, NEA will review and amend the regulations to take into account advancements in non-ionising radiation technologies. NEA will also identify and incorporate opportunities to further streamline the licensing regime.

Launching the Registered Noise Consultants Scheme

To reduce the processing time at the Temporary Occupation Permit stage, NEA introduced a Registered Noise Consultants Scheme that came into effect on 1 April 2019. Under this scheme, NEA will grant noise assessment report clearance within three working days if the assessment is carried out by a registered noise consultant, and complies with NEA's technical guidelines on air-conditioning and mechanical ventilation systems in non-industrial buildings. As of March 2020, there were 21 registered noise consultants listed on the NEA website.

Furthering Efforts to Digitalise NEA's Services

NEA is on track to achieve the Digital Government Blueprint's KPIs for digital end-to-end e-payment options, digital options for wet-ink signature, services pre-filled with government-verified data and transactions completed digitally end-to-end.

More than 100 services are in the pipeline for digitalisation and will be progressively launched from FY2020 to FY2022.

Promoting Wider Adoption of the Registered Noise Consultants Scheme

In collaboration with industry partners such as the Singapore Contractor Association Ltd, Singapore Institute of Architects, Institution of Engineers Singapore, and Association of Consulting Engineers Singapore, NEA aims to promote and encourage wider adoption of the Registered Noise Consultants Scheme by the industry. To expand the list of registered noise consultants together with the industry panel, NEA will continue to screen more qualified applicants to be included in the listing.

Strong Capabilities for Mission Success

To effectively build data analytics and overall process excellence, NEA works in tandem with a network of relevant partners to advance our capabilities through research and development. The key objective is to further optimise regulations and strengthen our science, technology and engineering resources to ensure a win-win situation for all stakeholders.

Revamping the Environmental Enforcement Management System

To improve oversight and management of enforcement cases and ensure that they are prosecuted swiftly, and within the statutory prescribed timelines, NEA revamped the Environmental Enforcement Management System and relaunched it as the Environmental Enforcement Management System 2 (EEMS2).

With the system revamp, new workflows were introduced to track the processing of a case from start to end – the start of investigations, the administrative application of summons, and the enforcement, prosecution and conclusion of the case. The system enables NEA to move on to other important enforcement tasks beyond the administration processes.

Furthermore, EEMS2 has digitalised and standardised many enforcement templates in NEA to increase the effectiveness and efficiency of work processes. The system also interfaced with many internal and external systems to automate the flow of data and streamline processes.

Migrating Systems to Government Commercial Cloud

By leveraging on leading ICT capabilities found in commercial cloud technology, NEA can develop better digital services to serve citizens and businesses. NEA is able to implement highly scalable systems that accommodate high loads in a very short period of time, and have the flexibility to reduce resources when the demand is low to reduce costs.

NEA aims to commence the implementation of five systems – e-Attendance, Funding Request Approval System, Ministry Family Mobile Apps, Temperature Declaration System, and Weather Information System – through the commercial cloud during FY2020. From FY2021 to FY2022, we plan to implement 10 more systems.

Digitalising NEA Services with the ePortal Project

In light of Singapore's Smart Nation vision and NEA's objective of "Serving Better" through the Digitalisation Plan, the NEA Digital Shopfront project known as ePortal was conceptualised. The ePortal is a unified online platform that delivers a user-centric and mobile-first digital experience for citizens to transact seamlessly with NEA anytime, anywhere, using any device.

The ePortal project aims to digitalise all 120-plus services from 14 NEA departments, and enable citizens to transact with NEA from end-to-end via mobile platforms, pre-filled forms and with e-payment options for all applicable services.

Following its launch on 28 August 2019 with 15 services, the ePortal's Onestop Payment Service was introduced in November 2019, allowing members of the public to make online transactions with NEA using internet banking and local or foreign debit and credit card payment options, both locally and overseas. The ePortal has enabled users to cut down the time taken to complete and submit applications from 10-15 minutes to 2-5 minutes.

Entering Phase 2 of the Integrated Field Operations System

NEA implemented Phase 1 of our Integrated Field Operations System (iFOS) in February 2017. This scalable mobile workforce solution enables NEA officers to respond swiftly and effectively to incidents on the ground, as well as perform day-to-day operations on-the-go. As part of Phase 2, the iFOS has been progressively extended to support more officers from other parts of NEA, streamlining task workflow, enhancing task and schedule planning, and reducing time spent on reporting. As of FY2019, the iFOS supports 1,400 officers across 11 operational domains.

Reviewing NEA's Field Engagement Approach

From December 2018 to October 2019, NEA evaluated the feasibility of embedding both Behavioural Insights (BI) and Behavioural Science strategies into field enforcement. Using Behavioural Insights (Singapore) Team's Target, Explore, Solution, Trial and Scale (TESTS) approach, NEA aimed to evaluate if offenders could be encouraged to take responsibility for their offences and cooperate with enforcement officers amicably.

Insights gathered at the explorative phase of the review led to the development of a modified engagement protocol that was piloted by five enforcement teams (10 officers in total). Although the treated protocol did not result in shorter engagements, participating officers reported that most offenders were more cooperative throughout the engagements. As a result, the officers felt more confident while carrying out their duties. The pilot study also led to further insights into how social influences, offenders' perception of fairness, and circumstances leading to "hot states" in engagements, would need to be considered when refining the engagement protocol.

Operationalising the Ambient Radiation Monitoring Network

In FY2019, NEA successfully commissioned a network of 40 Ambient Radiation Monitoring Network (ARMNet) stations nationwide, which will enable us to closely monitor radiation levels in the ambient air and water environment while establishing baselines. The ARMNet's passive monitoring sensors do not pose any

safety or environmental concerns. Operation of the network commenced in January 2020.

ARMNet's data will be integrated into relevant WOG systems, in compliance with prevailing IM8 policies, and NEA's Enterprise architecture framework for sensors. Over the next two to five years, NEA will continue to monitor radiation levels and establish baseline levels through ARMnet.

Building an Analytical Chemistry Laboratory

The development and commission of a new analytical chemistry laboratory are scheduled to take place in 2020. The facility will enable NEA to better investigate transient smell incidents, analyse harmful emissions from furnishing products, identify emerging chemical contaminants, and conduct post-registration surveillance of pesticides, to enhance NEA's operational and risk assessment capabilities.

Joining a Worldwide Network of Analytical Laboratories

Since commencing operations in 2018, the National Radiochemistry Laboratory (NRL) has embarked on the Environmental Baseline Radiation Monitoring Programme (EBRMP) to establish background radioactivity levels in the environment. In 2019, NRL became a member of the Analytical Laboratories for the Measurement of Environmental Radioactivity network of the International Atomic Energy Agency. NRL strives to be a laboratory of excellence, and will work towards attaining ISO 17025 accreditation within the next two to five years. NRL will also continue to expand the

EBRMP, and build technical competencies in environmental sampling and analysis.

Enhancing Mandatory Waste Reporting Data Collection Infrastructure

To foster operational cohesion among NEA departments that focus on waste management and resource conservation, the Waste and Resource Management System (WRMS) was put in place as a unified ICT platform for public sector agencies to submit consumption data and resource reduction plans through the system, which enabled NEA to track their progress and compliance under the Public Sector Taking the Lead in Environmental Sustainability Initiatives since July 2019. NEA will also be developing a new module in the WRMS, to facilitate and enhance the submission of waste and recyclables data and the waste reduction plans by large industrial premises, and convention and exhibition centres. Phase 2 of the WRMS is scheduled to be commissioned in September 2020.

Strong Corporate Practices for a Sustainable Organisation

It is crucial for NEA to build robust capabilities, given our scope of work and diversity of stakeholders that depend on our policies and services. Continuously improving our internal capabilities will allow NEA to respond swiftly and effectively in today's complex environment.

Fostering a Sense of Belonging and Professionalism

People are central to NEA's organisational performance and excellence. NEA continues to foster a sense of belonging and promote the development and professionalism of our people.

To achieve this, NEA has five long-term human resource (HR) strategies.

- i. Brand NEA to attract the right talent
- ii. Develop workforce capabilities
- iii. Build an engaged and resilient workforce
- iv. Grow leadership pipeline
- v. Improve HR processes and systems

Employment ^[401-1]

NEA creates a positive work environment for our employees through fair employment and work-life effectiveness.

Fair Employment

NEA management is actively involved in setting the vision and direction, policy formulation, implementation and feedback loop for fair employment practices.

NEA had signed the Employers' Pledge of Fair Employment Practices in April 2007, and employment practices are reviewed regularly to be in-line with the fair employment principles set out by the Tripartite Alliance for Fair Employment Practices (TAFEP). NEA's terms of employment are also guided by Singapore's legislations, including the Employment Act, the Workplace Safety and Health Act, and the Retirement and Re-employment Act.

Persons with Disabilities

To demonstrate senior management's strong support in the employment of Persons with Disabilities (PwD), NEA's Deputy CEO (Planning, Corporate & Technology) was appointed the Champion for Inclusive Hiring and steers the overall strategy in supporting the employment of PwD. Since early 2018, a holistic framework has been in place to encapsulate strategies, initiatives and action plans to support the employment of PwD. As of 31 March 2020, there were 23 PwD working in NEA, an increase of three officers compared to the year before.

NEA also supports SG Enable, an agency dedicated to enabling PwD, in various initiatives such as career

fairs, and internship programmes. NEA participated in the SG Enable Training and Career Fair on 14 September 2019 and was invited to the SG Enable Public Sector Networking Session on 6 February 2020 to share on our efforts on inclusive hiring and making the workplace more PwD friendly. NEA also participated in the SG Enable Virtual Career Fair portal held on 20 April 2020.

Labour Management Relations ^[102-41]

Staff are free to join unions recognised by NEA. Currently, 96 per cent of staff are eligible to join unions. NEA management works closely with the two active unions within NEA – the Amalgamated Union of Public Employees (AUPE) and the Amalgamated Union of Public Daily-Rated Workers (AUPDRW). On 25 July 2019, NEA and AUPDRW renewed the Collective Agreement (CA) for another three years, which signifies another key milestone of the strong partnership and labour management relations. In NEA, around 91 per cent of the monthly-rated employees (MRE) and 100 per cent of daily-rated employees (DRE) are covered by CAs.

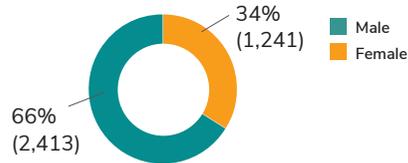
AUPDRW, with support from AUPE, had nominated both NEA and our CEO for the National Trade Union Congress May Day Awards 2020, to recognise our contributions towards improving the lifelong employability and welfare of the employees in NEA. NEA and CEO were conferred with the Plaque of Commendation (Gold) and the Medal of Commendation respectively for May Day 2020.

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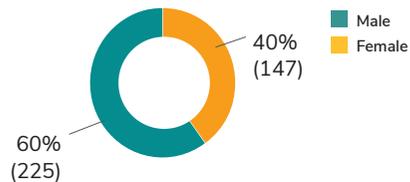
Staff Demographics

As at 31 March 2020, NEA had a diverse workforce of 3,654 working in various locations island-wide.

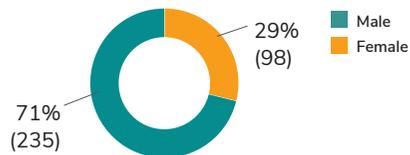
Number of Employees in NEA (Total: 3,654)



Number of Employees Recruited in FY2019



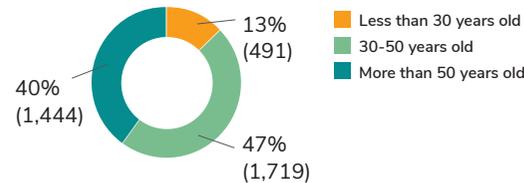
Number of Employees Who Left NEA in FY2019



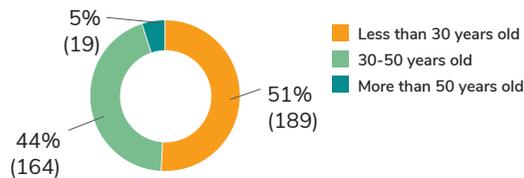
- Breakdown by Age**

In FY2019, NEA continued to recruit employees from all ages, with those below the age of 30 years old leading the group

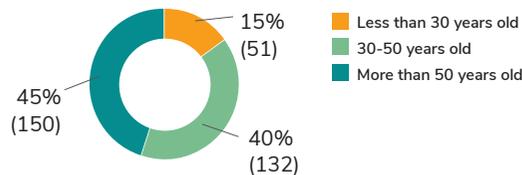
Number of Employees in NEA



Number of Employees Recruited in FY2019



Number of Employees Who Left NEA in FY2019



- Breakdown by Gender**

Due to the nature of NEA's operational work (which is skewed towards enforcement and field operations), there are more male applicants and hence higher chances of a male assuming the post. This trend continued in FY2019. Nevertheless, both genders are given equal consideration in the recruitment process

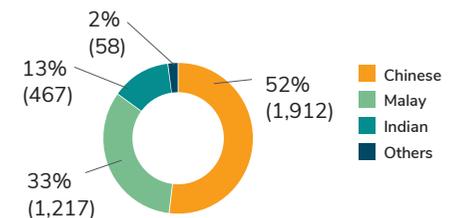
Breakdown of NEA Employees by Gender (as of 31 March 2020)

Number of Monthly-rated Employees	3,189	Male	2,082
		Female	1,107
Number of Daily-rated Employees	465	Male	331
		Female	134

- Breakdown by Ethnicity**

The ethnic composition of NEA employees was 52 per cent Chinese, 33 per cent Malay, 13 per cent Indian and two per cent Others

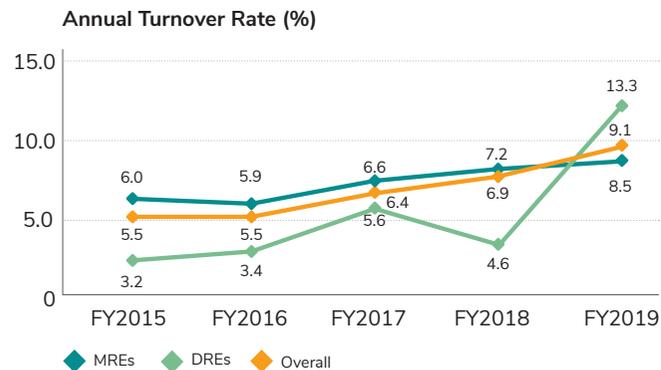
Breakdown of NEA Employees by Ethnicity



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- **Breakdown of Turnover Rate**

In FY2019, there was an increase in the annual turnover rates of MREs and DREs at 1.3 per cent and 8.7 per cent respectively. The former was mostly due to retirement and end of service cases, such as completion of contract and secondment. Notwithstanding, MRE retention rate has remained good – at the 75th percentile when compared to other Statutory Boards. The latter was mainly due to office relocation and the outsourcing of logistical and cleaning functions, which are planned one-off events and attrition is non-voluntary in nature



Retirement and Re-employment Policy

Following the enactment of the Re-employment Legislation in 2012, NEA has re-employed all our eligible retirees or given an Employee Assistance Payment if NEA was unable to offer re-employment.

Employees who failed to meet NEA's fitness criteria or performance conduct for re-employment were connected with organisations that assisted with employment opportunities outside NEA, such as the Employment and Employability Institute.

A large proportion of NEA employees are older workers, of which 40 per cent are aged 50 and above. NEA values our mature workers and provides them with equal opportunities. NEA does not discriminate against older workers when hiring.

Employee Benefits

Full-time and part-time employees are provided with the same set of benefits. For temporary staff hired via outsourced agencies, they are covered by their respective agency's benefits policy.

All NEA staff are covered under the Group Personal Accident Insurance and Work Injury Compensation Act (WICA). Under the Group Personal Accident Insurance Plan, NEA staff are provided a \$100,000 24-hour worldwide coverage for death, and permanent disablement due to accidental means, including non-work related accidents. The coverage ceases when the employee leaves NEA.

The Work Injury Compensation is provided for work-related injuries or death. It also includes occupational diseases, which are listed in the Second Schedule of

the WICA. For diseases not listed in WICA, MOM will evaluate them and determine if compensation can be provided for.

Staff also have the opportunity to take up the Public Officers Group Insurance Scheme – an additional voluntary cover for themselves, their spouses and eligible children. They will decide on the type of cover and purchase the insurance directly from Aviva Ltd at special rates for Public Service officers. Staff will bear the full cost of the premium.

The coverage will continue even if staff move to another government organisation. Staff can also choose to continue their coverage after retirement and up to 70 years old, provided that they:

- Leave the Public Service under the age limit, or choose early or optional retirement
- Retire under medical grounds
- Leave the Public Service under the Special Resignation Scheme or Special Gratuity Scheme

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Employee Engagement Framework

A review of NEA's Employee Engagement (EE) was done in June 2019 to ensure a more deliberate, systematic and structured way to drive employee engagement in NEA. The objective of the new Employee Engagement was to engage staff beyond their core work and our strategy is to engage all NEA staff by tailoring to their different needs through the EE Framework. The framework is also in line with NEA's Cultural Capabilities and Public Service Cares movement.

Engaging staff through the EE Framework helps employees enhance their work-life balance and harmony, so that they can continue contributing in a productive, committed and purposeful manner. NEA supports staff well-being through our work-life policies and EE initiatives.



Developing a Future-ready Workforce

NEA's journey towards a future-ready workforce led to the development of NEA's Cultural Capabilities aimed to guide our staff in acquiring desirable traits to cope with the transformation.

The three Cultural Capabilities and their respective desired traits are:

- i. Proactive Agility
 - Staying agile and nimble
 - Trying new ideas
 - Taking initiative
- ii. Collaborative Resourcefulness
 - Optimising available resources
 - Developing strong networks
 - Leveraging collaborations
- iii. Determined Fortitude
 - Developing strength of mind and character
 - Determination in achieving outcomes
 - Displaying the can-do spirit

... continued from previous page [201-3,401-2,404-2]

Work-life Approach

A comprehensive Work-life Harmony Framework has been put in place to address the needs of all NEA employees. The framework aims to help employees enhance their work-life balance and harmony, so that

they can continue to contribute in a productive, committed and purposeful manner.

NEA supports staff well-being through our work-life policies, work-life activities and union membership.

Work-life Policies

Over the years, various HR policies have been implemented and reinforced to support the Worklife Harmony Framework and its four focus areas of 'Self', 'Family and Friends', 'Community' and 'Work'. These include leave and medical benefits, some of which are offered to all employees – whether full-time, part-time or temporary, while others are offered to selected classes of employees. The table below lists the types of benefits provided to each class of employees.

NEA Initiatives that Support Work-life Harmony		
EE Dimensions	Initiatives	
Physical and Emotional	Annual health screening	Provision of gym, pantry and cafeteria for all staff
	Sports and recreational activities, such as Exercise Hour	Staff Care Support Programme (Phone Counselling)
	Personal wellness workshops and programmes	Healthy catering choices at corporate events
	Quarterly fruits distribution	Targeted intervention on weight management D.I.Y. Health Corner at ENV Building and offsite offices
Social	Festive celebrations	NEA interest groups, e.g. Communities of Practices and Interests
	NEAt Kids' Club for children and grandchildren of NEA staff	NEA Cohesion Games, Family Day, Dinner and Dance
	Medical benefits for dependents	Interact Point (activities for singles in NEA)
	Welfare gifts for NEA staff who are newly-wed or have a newborn	Leave benefits (e.g. adoption leave, childcare leave, parent/spouse care leave, birthday leave and examinations leave) on top of statutory leave benefits
'Eat with Your Family Day' and 'Bring Your Children to Work Day'		
Societal	Community Chest SHARE, a workplace giving programme	Fundraising activities such as the Vertical Challenge
	Community outreach and corporate volunteerism programmes	Food donation and Snacks container donation drives Volunteer leave
Occupational	Flexible working arrangements, such as part-time employment, staggered working hours and telecommuting	Lactation Room
Intellectual	Innovation initiatives, e.g. InNEAjam, MyiDeas, Ideathon	Induction and NEA milestone programmes to cater to staff's different learning milestones
	LEARN app for staff's online learning	

Types of Benefits Provided to Full-time, Part-time and Temporary¹⁵ Employees

Types of Benefits	Full-time Employees	Part-time Employees	Temporary Employees
Outpatient Medical Benefits	Yes	Yes	Yes
Flexible Benefits	Yes	Pro-rated	No
Paternity and Maternity Leave	Yes	Yes	Yes
Parent/Spouse Care Leave	Yes	Yes	No
Birthday Leave	Yes	Yes	No
Volunteer Leave	Yes	Yes	No
Compassionate Leave	Yes	Yes	No

¹⁵ Applicable only for temporary staff hired directly by NEA. Temporary staff hired through agencies are subject to the respective agency's benefits policy

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Under the 'Family and Friends' focus area, paid parental leave is provided to both male and female employees to encourage shared parental responsibilities and strengthen family bonds. All the employees subsequently returned to work after their parental leave had ended.

NEA saw a high retention rate among male and female employees who took parental leave in FY2018. This can be attributed to the appropriate HR policies

Total Number of Employees Who Utilised Their Parental Leave			
Type of Parental Leave	No. of Employees		
	FY17	FY18	FY19
Maternity leave for female employees	38	52	52
Paternity leave for male employees	82	89	85
Grand Total	120	141	137

Total Number of Employees Who Returned to Work After Their Parental Leave Ended			
Type of Parental Leave	No. of Employees		
	FY17	FY18	FY19
Maternity leave for female employees	38	52	50
Paternity leave for male employees	82	89	85
Grand Total	120	141	135

that NEA has put in place to support the career paths of employees with families, and NEA's continued commitment to equity and diversity in the workplace.

The tables below outline detailed information on male and female employees who took parental leave in FY2019 and those who returned to work in FY2019 after their parental leave ended, and the rate at which employees were still employed 12 months after their return to work from parental leave.

Total Number of Employees Who Returned to Work After Their Parental Leave Ended and were Still Employed 12 Months Later			
Type of Parental Leave	No. of Employees		
	FY17	FY18	FY19
Maternity leave for female employees	65	64	47
Paternity leave for male employees	108	105	84
Grand Total	173	169	131

Return-to-work and Retention Rates of Employees Who Took Parental Leave						
Type of Parental Leave	Male Employees			Female Employees		
	FY17	FY18	FY19	FY17	FY18	FY19
Return to work rate	100%	100%	100%	100%	100%	96%
Retention rate	96%	97%	99%	94%	98%	90%

• **Work-life Activities**

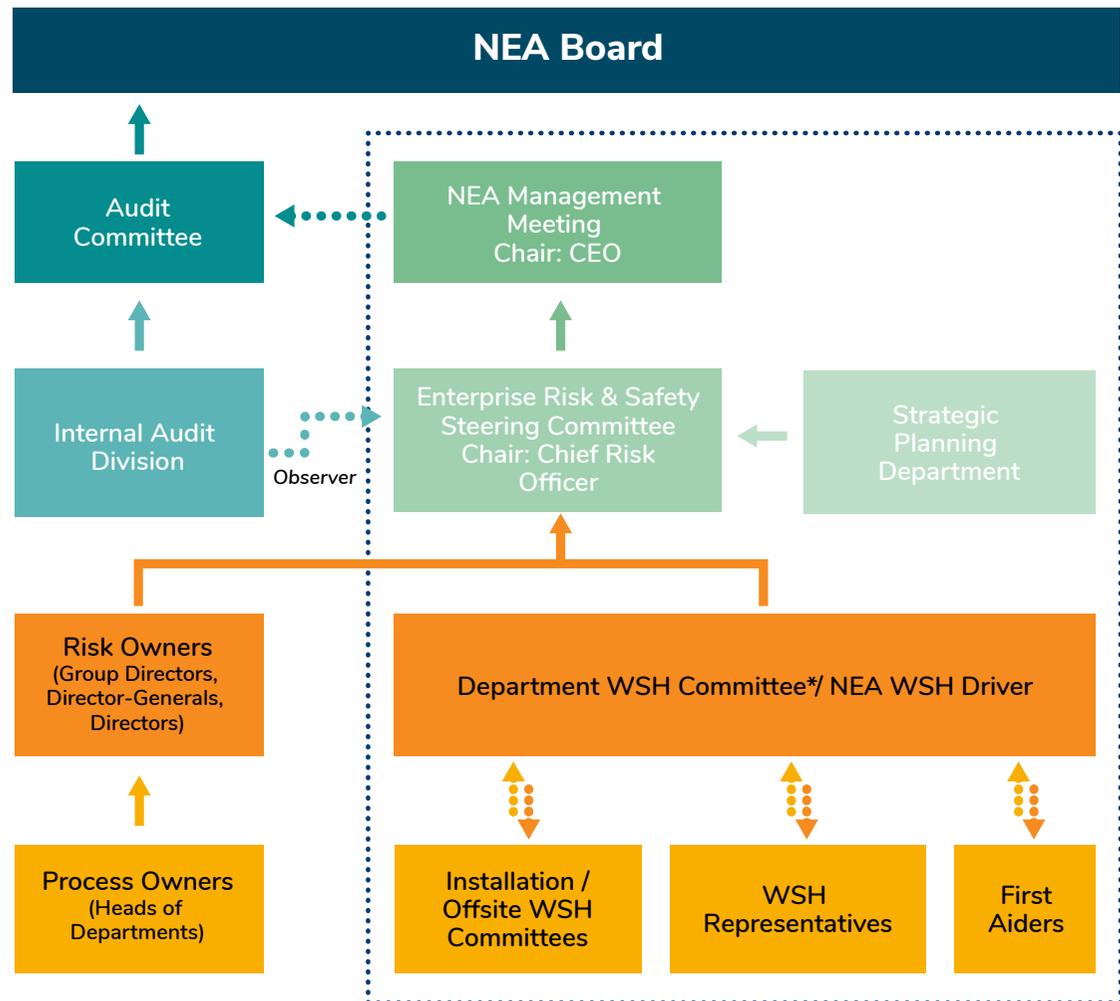
These entities help develop and implement work-life activities for NEA employees:

- NEA Sports and Recreation Club (NEASRC)¹⁶, which manages the gym and organises activities for staff, such as fitness classes, sports activities, Family Day, and Dinner and Dance
- Panel for Employee Engagement and Recognition (PEER)¹⁶, which focuses on engaging employees by encouraging staff volunteerism and philanthropy, and promoting racial harmony

Enhancing Workplace Safety and Health

NEA's Workplace Safety and Health (WSH) governance structure is continually enhanced in tandem with NEA's broader Enterprise Risk Management governance structure. In the current WSH governance structure, the Incident Reporting and Risk Committee has been absorbed into the Enterprise Risk and Safety Steering Committee (ERSSC). This ensures nimbleness when implementing WSH programmes.

Enterprise Risk Management Governance Structure



→ Reporting ••••▶ Collaborating * On need basis

¹⁶ Following NEA's review of Employee Engagement, NEASRC and PEER were merged to form NEA Sports and Social Committee on 1 January 2020. The Committee aims to promote a healthy and active workforce, and advocates positive relationships with colleagues, family and friends to maintain a harmonious and healthy workforce. These are achieved through the events and initiatives organised

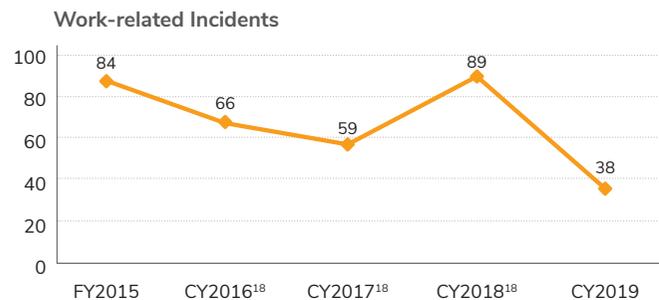
WSH Strategy Map 2018-2020

The WSH Strategy Map outlines the key strategic outcomes and strategies that enable the realisation of NEA's WSH vision. Endorsed by the ERSSC, it guides NEA's efforts to ensure a safe and healthy workplace for all employees.



Monitoring WSH Performance ^[403-2]

Under NEA's WSH governance structure, the ERSSC monitors and tracks workplace incidents, injury statistics, safety records, as well as NEA's health initiatives. The statistics for WSH incidents¹⁷ over the years are as shown in the graph below.



¹⁷ NEA has been reporting WSH incident statistics on a calendar year basis since 2016

¹⁸ Refers to work-related incidents involving NEA's MREs and DREs

Last year, NEA saw a record-low number of WSH incidents (57 per cent reduction) for past eight years. This could be accredited to the various programmes and initiatives at both operational and management level. Since 2012, NEA has not had a work-related fatality. In 2019, there were no cases of occupational diseases reported.

Of the 38 reported work-related incidents in CY2019, 21 per cent were reportable to MOM under the WSH Act (section on Incident Reporting Regulations). The most common incidents involved staff operating in the field suffering injuries caused by slips, trips and falls (STF), traffic accidents and injury by moving, fixed or stationary objects.

Staff Profile of WSH Incidents

In NEA, about 21 per cent of the staff population is aged 61 years and above. This age group is at the highest risk of WSH incidents. In 2019, of the 17 STF incidents, eight of them (47 per cent) were encountered by employees in this age group.

Additionally, consistent with the national figures, STF is a common incident type that affects NEA staff. In 2019, 17 out of 38 (45 per cent) WSH incidents were STF.

NEA has reviewed all injury cases and has implemented action plans, focusing on a zero-injury culture. NEA follows the national guidelines for reporting health and safety performance.

Types of Injuries	No. of Cases	Breakdown by Gender	
		Male	Female
Slips, trips and falls	17	Male	12
		Female	5
Traffic accidents	0	Male	0
		Female	0
Medical conditions	2	Male	1
		Female	1
Bitten by animals	3	Male	3
		Female	0
Aggressive/physical assaults	0	Male	0
		Female	0
Stung by insects	6	Male	5
		Female	1
Injured by moving, fixed or stationary objects	9	Male	8
		Female	1
Over-exertion/strenuous movements	0	Male	0
		Female	0
Others	1	Male	1
		Female	0

STRENGTHEN CORPORATE PRACTICES AND GOVERNANCE

NEA has put in place best practices to ensure continued transparency and accountability to stakeholders. Other government bodies, such as the Ministry of Finance and the Auditor-General's Office (AGO), serve as external controls to reinforce ethical and responsible conduct within NEA.

Pursuing Sustainability in Procurement Practices

NEA ensures that suppliers not only deliver quality goods and services but also operate in a responsible and

sustainable manner, by formulating a set of criteria to encourage potential suppliers to integrate sustainability practices into their work processes. Suppliers may need to declare their financial status, safety, health and the environmental best practices and processes that they will undertake in their quotations and tenders submissions. In compliance with the Instruction Manual on Procurement¹⁹, NEA ensures the three principles – transparency, open and fair competition, and value for money are met during the procurement process.

NEA established a Price Quality Scoring Framework for consistent and objective evaluation of quotations and tenders submitted by suppliers. To avoid any conflict of interest, approving authority for the awarding of quotations or tenders cannot be from the purchasing department. All quotations and tenders are to be posted on GeBIZ.

In FY2019, the 500 suppliers²⁰ who supported NEA in our operations were mostly local companies as part of our sustainable procurement practices²¹. Approximately one per cent were suppliers from countries such as USA, China, Canada, Germany and Netherlands.

Ensuring Accountability and Optimisation of Resources

NEA aims to promote and sustain a clean and healthy living environment for Singapore. For FY2019, NEA is allocated an operating grant of \$876 million. This grant is mainly used for the implementation of key

programmes to ensure that Singapore continues to have high standards of public health, a clean and sustainable environment, timely and reliable meteorological services and to promote resource efficiency and conservation in collaboration with NEA's partners and community. This aligns with NEA's environmental priorities and desired outcomes outlined in NEA's Strategy Map.

Development Expenditure

Major NEA projects funded in FY2019 include:

- Development of New Crematorium at Mandai (\$30m)
- Redevelopment of Choa Chu Kang Cemetery Phase 3 (\$13m)
- Development of New Hawker Centres at Fernvale, Bukit Panjang North and Anchorvale (\$16m)

Domain Area	Operating Grant for FY19 (\$m)	% (based on Baseline Block Budget Review allocation)
High Public Health Standards <i>(including Sustaining Low Endemicity of Dengue/Vector Control²² - \$145m and Cleanliness in Public Areas and Toilets - \$155m)</i>	310	34
Safe, Healthy and Conducive Living Environment	74	8
A Sustainable and Resource Efficient Singapore <i>(including Sustainable Waste Management - \$186m)</i>	199	22
Timely and Reliable Weather and Climate Services	34	4
Vibrant Hawker Culture	92	10
High Performance and Future-ready NEA	207	22
Total Expenditure (based on audited financial statements)	916	100

¹⁹ In 2010, the Public Sector Taking the Lead in Environmental Sustainability guidelines were updated to introduce additional measures. Under the green procurement requirement, public agencies should only purchase new office ICT equipment that can meet the latest ENERGY STAR® standards. Appliances acquired should also be cost-effective and take into account life-cycle costs. In addition, public agencies are encouraged to consider fuel efficiency and life-cycle costs when procuring passenger vehicles

²⁰ The suppliers and vendors include consultants and service providers for incineration plants, facilities management, public campaigns, conservancy, cleaning and maintenance, and IT

²¹ This figure excludes Small Value Purchases which may be done outside GeBIZ

²² Includes normal dengue operations, Project *Wolbachia* and rat control programme

Ensuring Financial Sustainability

NEA is funded mainly by government grants. It is vital that NEA makes financially responsible and sustainable decisions for daily operations. NEA puts in place the following practices to ensure financial sustainability:

Regular Review of Fees and Charges

Fees and charges are reviewed periodically and are set based on policy intent. The principles and policy considerations when setting fees and charges are:

- i. Recovering costs directly from the users of that service
- ii. Accounting for the full cost incurred in providing a good or service
- iii. Ensuring that NEA does not compete with the private sector in the provision of goods and services
- iv. Keeping costs affordable, and fees low, by striving to improve business processes

Continual Review of Financial Policies

To ensure resource optimisation and to uphold good corporate governance, NEA sets prudent financial policies and procedures, and reviews them regularly. These policies and procedures are published on NEA's intranet to ensure compliance as well as to standardise departments' practices.

Optimal Budget and Resource Allocation

Before the start of each financial year, the budget is presented and approved by the NEA Board of Directors. As fiscal resources are limited, the budget has to be allocated optimally among departments. To ensure accountability and responsible budgeting, NEA sets a budget utilisation rate of 95 per cent as a target for departments to achieve. Periodic performance against budget allocation are conducted with departments and reported at management meetings on a regular basis.

Audit

Each year, the NEA accounts are audited by external auditors, approved by the Board of Directors and published with our Integrated Sustainability Report. The appointment of auditors is approved by MSE in consultation with the AGO. In addition, the AGO and Accountant-General's Department also perform both scheduled and ad hoc audits to ensure that NEA continues to adhere to good governance practices.

Conducive Culture for Collaboration, Learning and Innovation

Aside from providing fair employment, a balanced work life and career opportunities, NEA is also committed to equip our employees with new skills, knowledge and qualities to further excel in their individual roles.

Conducting the Organisational Conditions Study

NEA commissioned a six-month study, led by a team of four from NEA's middle management, to identify key organisational conditions to improve and support various restructuring efforts.

Known as the Organisational Conditions Study, the study surveyed 104 NEA officers across all levels and conducted informal staff interviews with 124 officers.

As part of the study, NEA also reviewed the recent 2018/2020 Employee Engagement Survey, which had a response rate of 89 per cent with the participation of 3,224 NEA staff. The survey was reviewed for sense-making.

At the end of the study, NEA was able to generate key insights to inform possible recommendations that would improve organisational conditions.

Employee Development ^[404-2, 404-3]

Employee development at NEA is supported by a robust learning infrastructure and an enlightened senior management team. This enables a smooth and seamless execution of learning strategies. Before the start of each calendar year, all employees, including daily-rated employees, are encouraged to discuss their career aspirations with their supervisors during the performance management review. The employees then set career goals and development plans that are aligned with NEA's objectives.

In FY2019, close to 100 per cent of all employees completed their annual performance management review. NEA supports the career development plans set during the performance management review through available programmes under the learning infrastructure for employee development.

Completion of Performance Management Review Based on Gender			
Gender	Completion Rate		
	FY17	FY18	FY19
Male	99.0%	98.8%	98.2%
Female	98.0%	97.9%	97.3%

Completion of Performance Management Review Based on Job Grade			
Job Grade	Completion Rate		
	FY17	FY18	FY19
OSO ¹⁶ III to OSO IV (or equivalent)	99.0%	92.9%	100.0%
NX ¹⁷ 15 & NX 16 (or equivalent)	98.0%	100.0%	99.4%
NX 13(I) & NX 14 (or equivalent)	99.0%	99.4%	99.6%
NX 13 & Above (or equivalent)	97.0%	97.7%	96.5%

A comprehensive range of developmental initiatives have been put in place to develop NEA employees:

Developmental Initiatives for NEA Employees			
Initiatives	Objectives	Outcomes	
		FY18	FY19
Enhancement of Posting Framework (initiated in 2010)	Provides more structured posting plans for staff with three postings within the first 10 years and two postings in the next 10 years	In FY2018, about 10% of NEA's promising staff, who had spent three or more years on the same job, were posted to different portfolios	In FY2019, about 9% of NEA's promising staff, who had spent three or more years on the same job, were posted to different portfolios
Internal Market Place (IMP)	Provides staff the opportunity to fill internal positions and develop their career within NEA – all job openings are posted in the IMP and open for application by staff with at least two years of service in their current positions	In FY2018, 18 positions (7% of all openings) were filled internally by eligible NEA staff	In FY2019, 24 positions (6% of all openings) were filled internally by eligible NEA staff
Educational Upgrading	Supports staff in their pursuit of higher education, with opportunities for application of sponsorship even after their course had commenced, following enhancements to NEA's Sponsorship and Scholarship Scheme in 2013	In FY2018, 21 staff pursued higher qualifications through NEA's scholarship and sponsorship schemes	In FY2019, 15 staff pursued higher qualifications through NEA's scholarship and sponsorship schemes

Each year, NEA conducts a series of in-house training initiatives to develop our employees to their fullest potential. Programmes that build technical capabilities and competencies, such as training workshops and specialist courses, are regularly conducted to help employees stay ahead in a dynamic operating environment. Some of these programmes have been jointly developed with industry experts and training providers.

Employee Development Programmes Conducted by NEA			
Competencies to be Cultivated	Programme Name	No. of Participants	
		FY18	FY19
Enhancing workplace communication and coaching effectiveness	Communications Effectiveness and Coaching through MBTI	37	15
Building self-awareness to better perform in the current job role	Understanding Myself, Managing my Career	19	20

NEA Milestone Programme

The NEA milestone programme is aimed at broadening the horizons of newly promoted NEA officers to job grades NX12, NX11 and NX10 with the objective of deepening their appreciation of NEA's mission beyond their immediate work domain, expanding their perspective to take a WOG view as well as to forge networks and collaborations with other public agencies. The courses are curated with a view towards preparing the NEA officer for job enlargement at each stage of their career.

- **NEA Executive Training (NEXT) Course**
NEXT is a five-day course designed for NX12 staff who have been in service between two to five years, to help them acquire an organisational-wide perspective, and understand the principles and ideas underpinning NEA's mission for a sustainable and liveable environment
- **City Executive Leaders (City EXCEL) Course**
Targeted at newly promoted NX11 officers, the course is conducted by the Centre for Liveable Cities with the objective of enabling public officers to examine issues that cut across agencies and to expand their network within the Infrastructure and Environment sector
- **Leaders in Environmental Action Planning (LEAP) Course**
LEAP is a pinnacle milestone course in NEA for NX10 officers to help them acquire a WOG perspective. This course equips them with skills to conceptualise and oversee the successful implementation of environmental initiatives and projects, in collaboration with other agencies, to better contribute to NEA's mission to safeguard the environment

NEA Milestone Programme	No. of Participants
LEAP 2.0	14
City EXCEL	11
NEXT 2.0	76

Implementing Competency-based Training

The Job Competency Matrix (JCM) Framework was introduced in FY2018 to provide employees with a roadmap for acquiring relevant skills for their jobs, as well as support the development of deep expertise internally. NEA made significant progress in FY2019, completing six JCM tracks in the two domains of Environmental Protection and Environmental Public Health.

JCMs Completed in FY2019

Environmental Protection

- Pollution Control and Management
- Waste Management
- Radiation Protection and Nuclear Science

Environmental Public Health

- Cleanliness and Sanitation
- Vector-borne Diseases Control
- After-death Services

Learning Intervention Matrices were developed for functional competency categories identified through the JCMs, starting with the Environmental Planning track. NEA collaborated with Ngee Ann Polytechnic to develop and implement three new competency-based courses in the areas of water and vehicular pollution.

A Digital Literacy Competency Framework (DLCF) was also developed as part of the WOG push for digital transformation, cybersecurity, and data science and analytics. The DLCF, together with the completed JCMs and relevant WOG-wide competency

frameworks, were used to conduct the Learning Needs Analysis exercise for FY2020/2021, marking a major step in implementing competency-based training in NEA.

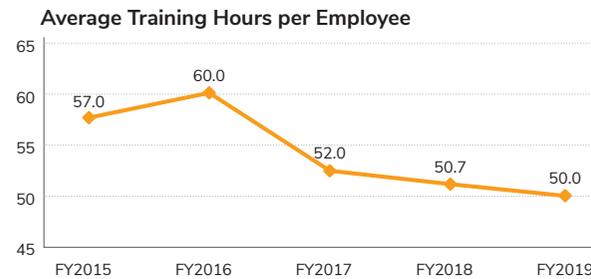
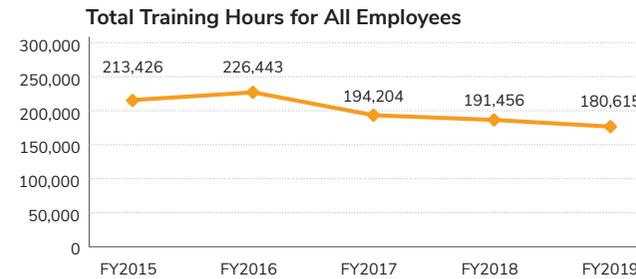
NEA also embarked on the development of core and leadership competencies, referencing the relevant competency frameworks and curating courses from training resources to meet the competency requirements. In FY2019, more than 1,000 training placements were completed to support Public Service Transformation and Digital Government Blueprint in areas of emotional resilience, problem-solving, digitalisation, and design and systems thinking. In February 2020, the 'NEA Digital PowerUp 2020' initiative was launched to drive the completion of the Basic Digital Literacy courses within WOG's timeline.

Training and Education ^[404-1,404-2]

NEA recognises the role of training and development in driving organisational productivity and growth. Our continued efforts in training and development ensure that employees will be equipped with the right skills and knowledge to discharge their duties effectively and to be able to meet future challenges. NEA's Singapore Environment Institute conducts competency-based training to build a relevant, resourceful and resilient NEA workforce. NEA's learning partners also work alongside our management team to help employees proactively plan and prepare for the future.

Besides competency-based training, NEA also encourages our staff to embrace continuous learning for lifelong employability through our learning policy. Budget is also set aside for officers to attend personal development courses for improvement and innovation.

In FY2019, NEA staff clocked 180,615 learning hours, with an average of 50 learning hours per employee. The following charts track the total and average learning hours for NEA employees.



The tables below provide the breakdown of average learning hours.

Average Learning Hours by Gender	
Gender	Average Learning Hours
Male	48
Female	54

Average Learning Hours by Employee Category	
Employee Category	Average Learning Hours
Monthly-rated employees	51
Daily-rated employees	26

Improving Knowledge Retention

NEA's technical knowledge is documented, retained and shared within the organisation as part of the Technical Knowledge Retention Programme. NEA officers can tap on the technical knowledge to shorten their learning curve and enhance operational efficiency. FY2019 saw the development of a more comprehensive Knowledge Management Framework to steer existing and future knowledge retention efforts across NEA.

The Expert Knowledge Retention initiative was extended to cover the management experience and technical expertise of NEA's senior leadership team. The NEA Knowledge Documentation initiative continued to distil knowledge from departments, and added six new topics for documentation, such

as policy documentations on mandatory waste reporting, and work area documentations that cover the management of good indoor air quality in air-conditioned spaces.

Embracing Learning Innovations

A learning innovation developed for the NEA Induction Course, the Amazing Environmental Race is an experiential learning activity hosted on a GPS-enabled mobile app known as PocketTrips. The mobile trail requires participants to form teams and embark on a race along the Singapore River, where they solve quizzes and photograph prominent landmarks to test their understanding of the history behind the clean-up of the Singapore River and the origins of hawker trade in Singapore. Launched for the FY2019 NEA Induction Course, the race received positive responses from the new hires.

Forming the Training and Skills Committee with Unions

In 2020, the Training and Skills Committee with Unions — which included the Amalgamated Union of Public Employees (AUPE) and the Amalgamated Union of Public Daily-Rated Workers (AUPDRW) — was established to upskill and reskill officers according to the changing environment, enabling them to be future-ready and foster a life-long learning culture. Together with the two Unions, NEA aims to identify the training gaps and needs of officers and develop continual education training programmes. This is to ensure that

officers are able to adapt and overcome the challenges of a continually changing workplace.

Information about union representation is available on NEA's intranet. All new employees are also informed, on their first day of work and during induction courses, that they may join the unions.

Nurturing a Caring Culture through Staff Volunteerism

NEA believes in developing an engaged and socially responsible workforce that makes a positive impact on the environment and the community, which ultimately, contributes to NEA's social sustainability goals.

Strategies and Initiatives

NEA provides volunteering opportunities for staff. Several strategies have been put in place to encourage staff volunteerism and enhance the impact of each volunteering activity. These include active efforts to publicise the volunteering opportunities within the organisation, providing resources and opportunities to staff volunteers and matching the skills and interests of staff volunteers to the needs of the activity.

An interdepartmental committee, the Panel for Employee Engagement and Recognition (PEER), organises various volunteering activities annually at the organisational level, while also incorporating the activities into departmental events to enhance volunteering opportunities for staff and promote intradepartmental bonding.

To ensure a better focus and alignment of NEA's CSR to our organisational strategy, our Corporate Excellence Department (CED) has been tasked to oversee CSR with effect from 1 January 2020. By having a dedicated department taking over the CSR portfolio, NEA can approach CSR from a more strategic and systemic angle, while tracking the effectiveness of the efforts. The CSR Framework has also been revised, which includes new strategies, initiatives and indicators, for a greater alignment to NEA's vision and mission. A new interdepartmental committee, led by the Director of Human Resource and Organisation Development Division, will be formed to support CED in carrying out the initiatives under the revised CSR Framework.

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NEA VISION, MISSION AND VALUES

PHILOSOPHY

CSR is a social investment, where an engaged, socially responsible workforce is an asset that creates value for NEA, our community and the environment. Our efforts contribute to our sustainability goals

OBJECTIVES

Develop an engaged and socially responsible workforce that makes a positive impact on the environment and the community

STRATEGIES

Close Partnerships

Collaborate with charities and agencies that are subject experts

Heightened Engagement

Increase staff awareness on community needs and opportunities to serve

Organisation Support

Enable staff volunteerism and embed CSR as an integral part of NEA's culture

INITIATIVES

Roll out programmes that match staff's skills, expertise and interests with charity's needs for deeper and meaningful engagement

Engage staff on the needs and opportunities to encourage staff volunteerism

Put in place systems (funds, education, recognition) to support CSR

INDICATORS

Total corporate-wide cash or in-kind contributions

Number of charities/ beneficiaries benefitted

Total unique number of staff volunteers

Number of staff appreciated/recognised in line with Captain Green Cares via official platforms

Number of volunteer hours logged by staff

Annual Contributions to Charity in FY2019

- SHARE contribution:
 - NEA's average Employee SHARE participation rate is at 91 per cent
 - Total contribution from Employee Payroll and Corporate Matching (where applicable): \$109,290
 - Total contribution from Employee Giro/ Credit Card: \$144
- Donations from the Festive celebrations and the Children Movie Charity event 2019: \$1,458 (estimated)
- Pledges from NEA for Vertical Challenge 2019: NEA raised \$38,042 for President's Challenge

Number of Staff Volunteers in FY2019

- 11 volunteers for Children Movie Charity Event in August 2019
- 21 volunteers for the Purple Parade in November 2019
- Nine volunteers for the Chinese New Year Celebration in February 2020

Walking the Talk

As an environmental steward, NEA seeks to lead by example. We hope that our efforts will inspire the public and private sectors to go the extra mile in their sustainability journeys.

SUSTAINABILITY GOVERNANCE ^[102-18]

Championing sustainability starts from within. NEA was the first public agency in Singapore to publish a sustainability report and will continue to be the lead agency for the Public Sector Taking the Lead in Environmental Sustainability (PSTLES) initiative.

NEA's Sustainability Framework

Four guiding principles shape NEA's sustainability framework, which was updated in 2019 for closer alignment to NEA's mandate, and guides NEA in prioritising our work on internal sustainability and in implementing new initiatives.



W.I.S.E. supports NEA's key corporate sustainability pillars. Our desired outcomes are:

Engagement

- To achieve a high level of public trust
- For all staff to be NEA ambassadors

Environmental Sustainability Pillar

- To achieve a resource efficient office
- To achieve a clean and eco-friendly working environment

Financial Sustainability Pillar

- To ensure responsible procurement, investments and operations

Social Sustainability Pillar

- To have good workplace health and safety
- To have an expert and professional workforce
- To achieve strong corporate social responsibility

NEA's Core Values as Enablers

NEA's core values are integral to the framework, governance and initiatives of our sustainability journey. They are beacons that guide the actions, behaviours and mindsets required to drive and implement NEA's sustainability goals:

- **Care** and **Innovation** are positioned as fundamental values pivotal to the organisation in NEA's sustainability framework
- **Teamwork** is emphasised by including staff engagement in all of NEA's sustainability initiatives
- **Integrity** is strictly upheld by exercising good corporate governance throughout NEA's sustainability journey
- **Professionalism** is assured through the benchmarking of NEA's sustainability efforts to national and international standards

NEA's Sustainability Governance Structure

A robust sustainability governance structure is set up to drive sustainability within NEA. NEA's senior management is responsible for setting the sustainability direction for NEA, meeting regularly to deliberate and endorse NEA's direction and sustainability initiatives.

At the middle management level, all NEA directors are Sustainability Champions, meeting quarterly at the NEA Sustainability Committee meetings to discuss and track environmental sustainability efforts, and review NEA's resource consumption trend. These meetings are also attended by Eco-office Champions – working level staff who are nominated on a rotational basis to encourage new ideas and provide opportunities for more staff to be involved in NEA's sustainability journey. NEA's Sustainability Division leads the planning and coordination of environmental sustainability initiatives within NEA, and provides Secretariat support to the NEA Sustainability Committee.



Conserving Resources Within NEA

As a responsible organisation, NEA is committed to conserving precious resources for our future generations. NEA tracks our usage of electricity, water and paper, and encourages staff to reduce consumption of resources by adopting sustainability measures and practices.

The three key achievements in FY2019 are:

Good Progress Towards FY2020 Sustainability Targets

Under the PSTLES 2.0 initiative, NEA has committed to achieve electricity savings of 15 per cent and water efficiency index improvement of five per cent from FY2013 baseline consumption by FY2020. As of March 2020, NEA has met both targets.

Green Mark Certification

PSTLES 2.0 requires all mid-sized public sector premises to achieve at least a Green Mark (GM) Certification Gold rating. All five mid-sized premises in NEA have attained Green Mark Certification Gold rating and beyond, with Tiong Bahru Market and Choa Chu Kang (CCK) Columbarium attaining GM Platinum rating. Both premises achieved high scores for good natural ventilation, energy efficient lighting installation, use of environmentally friendly products, and generation of on-site solar energy.

Green Mark Certification at NEA premises

NEA Premises	Awarded GM Rating	Date Attained
Tiong Bahru Market	Platinum (Super Low Energy)	Mar 2020
CCK Columbarium	Platinum (Positive Energy)	Feb 2020
Taman Jurong Market and Food Centre	Gold ^{PLUS}	Feb 2020
Golden Mile Food Centre	Gold ^{PLUS}	Nov 2019
Geylang Serai Market	Gold	Mar 2020

Eco-Office Plus Certification

All NEA premises successfully attained the Eco-Office in FY2018. With the release of new Eco-Office²³ Plus version by the Singapore Environmental Council in 2019, NEA was the first public sector agency to successfully undergo certification at NEA's newest premises at TechPlace II. NEA was awarded Eco-Office Plus Champion award, with a total green score of 88.6 out of 90 in November 2019.

Reducing Electricity Consumption within NEA

[302-1, 302-3]

NEA tracks our electricity consumption at NEA's offices and installations using two related indicators:

- Energy intensity, which is measured as the electricity used per occupant for NEA offices and installations; and
- Total electricity consumption

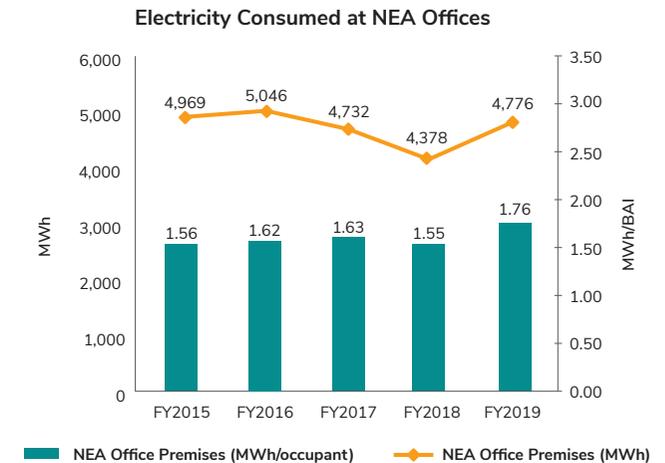
In FY2019, NEA's installations²⁴ accounted for approximately 97 per cent of NEA's total electricity consumption. The consumption at the installations has been fairly stable over the past four years, with less than 5 per cent deviation.

NEA's electricity consumption at offices has reduced over the years. However, with the expansion of NEA offices to occupy more floors at Environment Building, NEA's electricity consumption at offices increased by 9 per cent in FY2019, as compared to FY2018.

Key energy efficiency improvement measures implemented in FY2019 are:

- Switched off lights during lunchtime and after work
- Replaced existing lamps with energy-efficient LED lights at premises such as Tuas Marine Transfer Station (TMTS), where 101 units of sodium lights (high bay) and 29 units of street lighting were replaced with energy-efficient LED lights, and Environmental Health Institute where over 400 T8 lamps were replaced with LED lamps
- Installed motion sensors for toilet lighting at NEA regional offices

- Replaced air-conditioning units to 4-ticks energy efficient models at NEA regional offices
- Set the air temperature to 24 degrees Celcius or higher at all NEA offices
- Installed timer to switch off hot water dispensers after office hours
- Replaced rotary valves with direct chutes for the fly ash conveying system to improve the efficiency at Tuas Incineration Plant (IP)
- Replaced energy inefficient direct driven screw chillers with energy efficient inverter driven screw compressor chillers at Tuas South IP



²³ The Singapore Environmental Council's Eco-Office certification recognises offices that have demonstrated commitment towards environmental protection through implementation of corporate environment policy and responsibility, green purchasing practices, energy and water conservation, waste minimisation and recycling practices

²⁴ NEA's installations include CCK Crematorium, Columbarium and Cemetery, Mandai Crematorium and Columbarium, Semakau Landfill, TMTS, Tuas IP and Tuas South IP. Consumption at NEA installations is largely dependent on public demand for NEA's services

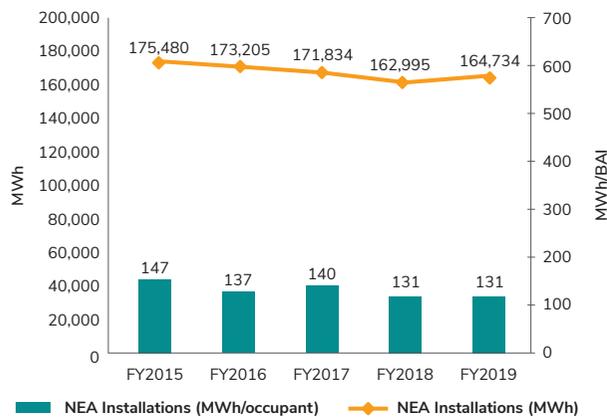
Generating Alternative Energy Sources

Aside from drawing electricity from the grid, NEA's premises also make use of solar energy and electricity generated from waste incineration.

A total of 12 NEA-managed premises are currently under the WOG SolarNova programme. In 2019, the solar photovoltaic systems at four hawker centres under the programme were commissioned. These, together with the existing solar photovoltaic systems at the Centre for Climate Research Singapore and Semakau Landfill, generated 322 MWh in FY2019.

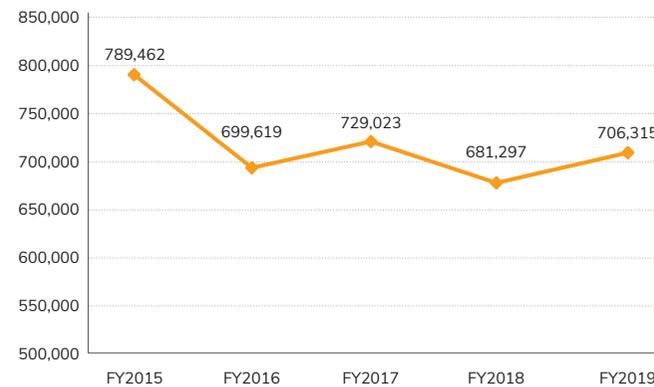
Electricity generated from waste incineration adds to NEA's pool of energy sources, powering the operations in the IPs and TMTS. Any excess energy from the waste-to-energy (WTE) incineration process is sold to the grid. The amount sold to the grid in FY2019 was 544,782 MWh.

Electricity Consumed at NEA Installations



In FY2019, the total electricity generated from solar and WTE incineration process was 706,315 MWh. The electricity generated is equivalent to the average annual electricity consumed by 166,000 Singapore households²⁵.

Total Electricity Generated from Solar and WTE Incineration Process (MWh)



Reducing Corporate Carbon Footprint

[305-1, 305-2, 305-4, 305-5]

Waste incineration is the main contributor to NEA's corporate carbon footprint (Scope 1 carbon emissions). Since the 1970s, Singapore incinerates waste in order to reduce waste volume and conserve landfill space. Today, all incinerable waste is incinerated while non-incinerable waste is landfilled. NEA is actively promoting the 3Rs to reduce waste generation and consequently, emissions.

Staff movement and expansion of NEA offices to occupy more floors has led to a higher electricity consumption at NEA offices, thus leading to an increase in Scope 2 carbon emissions in FY2019 as compared to FY2018.

NEA continues to encourage staff to take public transport or to car pool, where possible, to manage our Scope 3 emissions. There were numerous international events, presentations and award ceremony, as well as official business visits organised by stakeholders and partners overseas, which led to an increase in staff overseas travel in FY2019, thus leading to an increase in Scope 3 carbon emissions.

²⁵ Based on 2018's average monthly electricity consumption for four-room households of 354 kWh/month: www.ema.gov.sg/cmsmedia/Publications_and_Statistics/Statistics/BRSU.pdf

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Installations, Equipment and Vehicles	Type of Fuel Used	FY18	FY19
CCK Crematorium, Columbarium and Cemetery	Liquefied Petroleum Gas (LPG)	1.7 TJ	3.0 TJ
Mandai Crematorium and Columbarium	Town Gas	40.8 TJ	40.0 TJ
Landfill Equipment and Vehicles at Semakau Landfill	Diesel	49.6 TJ	41.4 TJ
Tugs and Barges to Transport Incinerated Ash and Non-incinerable Waste to Semakau Landfill	Diesel	17.5 TJ	21.8 TJ
Other NEA-owned Vehicles	Petrol	0.1 TJ	0.1 TJ
	Diesel	2.8 TJ	2.1 TJ
Total Fuel Consumption		112.5 TJ	108.4 TJ

Accounting for the Amount of LPG and Town Gas Used at CCK and Mandai

The amount of LPG used at CCK Crematorium and Town Gas used at Mandai Crematorium, are accounted for as part of NEA's corporate carbon footprint.

	Apr 19	May 19	Jun 19	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20
CCK (m³)	2,158	1,903	3,036	3,439	2,737	3,090	3,589	3,140	2,692	1,315	2,332	2,564
Mandai (m³)	153,621	162,865	169,739	178,105	186,264	175,878	183,128	174,427	191,204	202,180	179,484	194,561

The amount of Town Gas consumed was in tandem with the 15,693 cremations handled by Mandai Crematorium in FY2019. At CCK Crematorium, 31,995m³ of LPG was used. Consumption is expected to remain high for FY2020 due to the Phase 7 Exhumation Programme, which is expected to be completed by Q1 2021.

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NEA Corporate Carbon Footprint ²⁶	FY17 Tonnes of Carbon Dioxide (% of total aggregate)	Rank	FY18 Tonnes of Carbon Dioxide (% of total aggregate)	Rank	FY19 Tonnes of Carbon Dioxide (% of total aggregate)	Rank
Direct Carbon Emissions (Scope 1)						
Waste incineration ²⁷	898,510 (96.41%)	1	957,270 (96.45%)	1	868,800 (93.96%)	1
NEA-owned vehicles ²⁸	4,717 (0.51%)	3	5,243 (0.53%)	3	4,861 (0.53%)	3
LPG and town gas ²⁹	24,601 (2.64%)	2	26,047 (2.62%)	2	46,429 (5.02%)	2
Sub-total CO₂ emissions (Scope 1)	927,828		988,560		920,090	
Indirect Carbon Emissions (Scope 2)						
Electricity (NEA's office premises) ³⁰	2,008 (0.21%)	4	1,835 (0.18%)	4	2,000 (0.22%)	4
Electricity (NEA's installations) ³¹	1,568 (0.17%)	5	1,493 (0.15%)	5	1,545 (0.17%)	5
Sub-total CO₂ emissions (Scope 2)	3,576		3,328		3,545	
Indirect Carbon Emissions (Scope 3)						
Local ³² staff business travel	342 (0.04%)	6	348 (0.04%)	6	327 (0.04%)	7
Overseas ³³ business travel (flights only)	228 (0.02%)	7	267 (0.03%)	7	699 (0.08%)	6
Sub-total CO₂ emissions (Scope 3)	570		615		1,026	

²⁶ NEA's corporate carbon footprint is calculated in accordance with the GHG Protocol Corporate Accounting and Reporting Standard set by the World Business Council for Sustainable Development and World Resources Institute. This is in line with the Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories, which is used in Singapore's international reporting to the UN Framework Convention on Climate Change. The computations for GHG emissions from waste incineration at the Tuas IP and Tuas South IP are in accordance with the 2006 IPCC Guidelines for National GHG Inventories

²⁷ Consumption at IPs is largely dependent on public demand for NEA's services

²⁸ Carbon emissions for NEA-owned vehicles is calculated based on amount of fuel (diesel and petrol) used. Since FY2017, diesel consumed by vehicles, equipment and marine vessels used at TMTS and Semakau Landfill were also included in the calculation of carbon emissions

²⁹ Carbon emissions is calculated for LPG and Town Gas used at CCK Crematorium and Mandai Crematorium respectively. The emissions are impacted by factors beyond NEA's control, such as the number of after-death services required. There was an increase in LPG usage at CCK Crematorium in FY2018 and FY2019 due to an increase in exhumation activities

³⁰ Grid-average emissions factor data is used to calculate GHG emissions from electricity NEA purchased from the national grid. FY2019 carbon emissions is calculated based on 2018 electricity grid emission factors: 0.4188 kg CO₂/kWh (www.ema.gov.sg/cmsmedia/Publications_and_Statistics/Statistics/18RSU.pdf)

³¹ Since FY2017, the electricity consumed at Tuas South IP, Tuas IP and TMTS was excluded from the carbon emissions calculation, as the electricity used at these premises is self-generated. For Semakau Landfill, the electricity consumed was generated by diesel generators on the landfill. The diesel consumed by generators had been accounted for under Scope 1 – NEA-owned vehicles

³² Carbon emissions is calculated based on local business travel by staff vehicles, excluding the travel journeys of NEA staff to and from their homes. According to the Land Transport Authority, cars and motorcycles are fuelled by petrol with average motor vehicle fuel efficiency of 10.45 L/100 km ('Singapore Land Transport Statistics in Brief', 2009)

³³ Carbon emissions factor and flight distance travelled in FY2019 are based on VITAL's Overseas Travel Report, while calculations for FY2017 and FY2018 are based on www.icao.int/environmental-protection/CarbonOffset/Pages/default.aspx and www.gcm.com. While there was a 16 per cent increase in air travel in FY2019, a higher carbon emissions factor was used in the FY2019 methodology – the average emissions factor in FY2019 was 0.11 kg/km as compared to 0.05 kg/km in FY2018. This was the main factor behind the increase in associated emissions from FY2018 to FY2019

Comparison of NEA's Corporate Emissions Intensity

	FY16	FY17	FY18	FY19
Indirect Carbon Emissions/Tonne CO₂ (Scope 2 and 3)³⁴	77,457	4,146	3,943	4,571
Occupants³⁵	4,410	4,134	4,067	3,973
Carbon Emissions Intensity/Tonne CO₂ per Occupant³⁶	17.56	1.00	0.97	1.15

Promoting Water Conservation within NEA ^[303-3]

In FY2019, NEA's installations consumed about 72.5 per cent of the organisation's total water usage. Water consumption at NEA offices and installations has been fairly constant over the years. This can be attributed to NEA's continual efforts to walk the talk in conserving scarce water resources.

NEA has achieved the Water Efficient Building certification issued by PUB, Singapore's National Water Agency, for all our premises. Aside from installing water-saving fittings, NEA has also implemented the following water conservation measures:

- Implemented rainwater harvesting
- Installed waterless urinals at NEA's regional offices and HQ

- Ran campaigns to encourage staff to conserve water
- Conducted regular monitoring and reporting of water usage, so that any spike in consumption can be investigated and rectified quickly
- Established guidelines for irrigation to reduce excessive water usage

Water is also reused as much as possible across NEA's installations. For instance, at the Tuas IP, water is drained from its boiler for use in general cleaning, such as the washing of Reception Hall and quenching the bottom ash at the wet ash extractor.

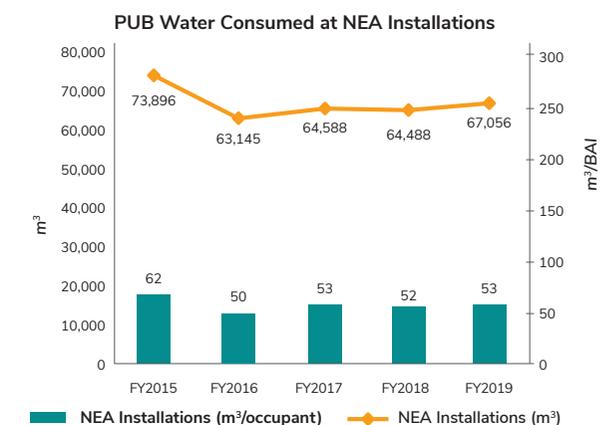
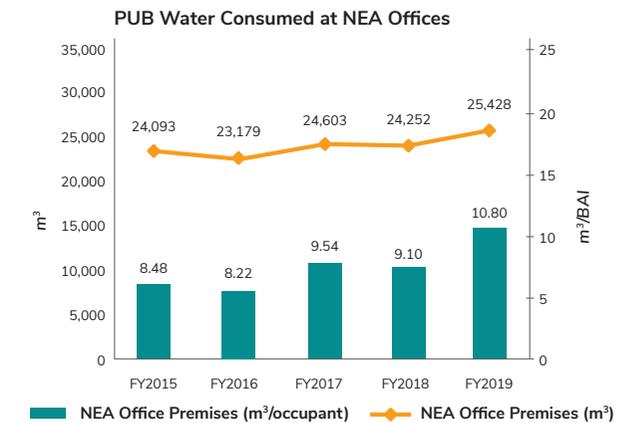
Utilising Alternative Water Sources

NEA uses two alternative water sources other than PUB's potable water at NEA's installations – NEWater and rainwater.

NEA's IPs consumed 387,972m³ of NEWater in FY2019, for purposes including general cleaning, cooling of hot ash, suppressing of dust and the production of demineralised water for boiler usage.

As part of NEA's water conservation efforts, NEA set up rain-harvesting systems at several NEA premises. The rainwater collected is used to irrigate the grounds, and to clean and run NEA's operations, such as the

cooling of hot ash and suppression of dust at IPs and TMTS. Only Tuas South IP and TMTS are equipped with meters to track the amount of rainwater used. The total volume of rainwater used in FY2019 was 48,856m³, which is equivalent to the average amount of water consumed by about 949 Singapore residents in their homes annually³⁷.



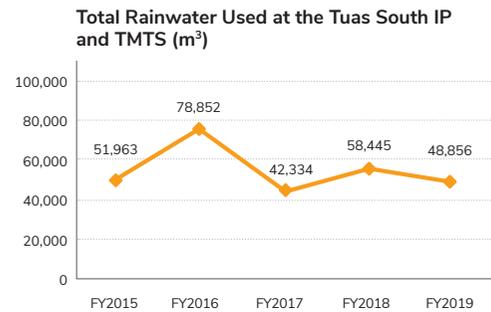
³⁴ Only carbon emissions from Scope 2 and 3 are included as NEA has greater control over the business processes reported under these two scopes. Scope 1 carbon emissions, which were included in the FY2016 figure, are highly dependent on the demand for NEA services, such as the number of after-death services required and waste incineration. NEA's indirect carbon emissions in FY2017 to FY2019 excluded electricity generated and consumed at NEA's IPs and TMTS

³⁵ Defined as the number of occupants (including the number of visitors, contractors and sub-contractors who had visited NEA's premises)

³⁶ Carbon emissions intensity is derived as indirect carbon emissions (Scopes 2 and 3) per occupant

³⁷ Based on Singapore's annual household water consumption per capita of 141 l/d in 2019 (www.pub.gov.sg/watersupply/singaporewaterstory)

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Improving Water Efficiency at Mosquito Production Facility

EHI's *Wolbachia*-*Aedes* mosquito production facility at Techplace II is equipped with a water recycling system to improve water efficiency. The system couples reverse osmosis and UV sterilisation to purify and recover wastewater from larval rearing. At the current scale of production, the estimated water saving is 41,600L per annum. The savings will grow as production capacity increases in the next few years.

Reducing Waste Generation within NEA ^[306-2]

Singapore has limited land space for waste disposal. To help extend the lifespan of Singapore's only landfill, NEA seeks to reduce our waste generation and increase recycling.

The bulk of the waste generated comes from the offices. To encourage staff to recycle, recycling bins have been placed at all printing rooms and pantries at NEA Headquarters and in convenient locations at offsite premises. Recycling bins for toner cartridges and e-waste were also set up at NEA Headquarters. In FY2019, NEA collected a total of 7,667 kg³⁸ recyclables consisting of paper (88 per cent), plastics (6 per cent), metals (6 per cent).

To optimise paper usage and reduce wastage, NEA encourages our staff to embrace digital methods of sharing or viewing documents and to print only when necessary. Since August 2014, NEA has also progressively replaced our existing printers with new printers that come with the print-count feature. This feature has enabled NEA to identify paper-intensive processes and look into digitalising some of these processes. For example, NEA's Singapore Environment Institute no longer prints training materials for their participants. Instead, the presentation slides and notes are emailed to the participants. As a result of these measures, paper consumption at NEA's premises has fallen by 58 per cent from FY2009 to FY2019.

Biohazardous Waste Disposal ^[306-2]

In FY2019, 20,880L of biohazardous waste was generated from laboratory work at the Environmental Health Institute. While this cannot be recycled, NEA has put in place strict disposal processes to prevent contamination of the environment. The biohazardous waste is stored in purpose-built waste bins before collection by licenced biohazardous waste collectors – Asia Medical Enviro Services Pte Ltd and Cramoil Singapore Pte Ltd in FY2019. The biohazardous waste is then transported to a dedicated incinerator for incineration.

Duration of FY19	Vendor	Quantity of 240L Bins	Total Amount of Biohazard Waste
Apr 19 to Jan 20	Asia Medical Enviro Services Pte Ltd	70	16,800 L
Jan 20 to Mar 20	Cramoil Singapore Pte Ltd	17	4,080 L
Total Volume			20,880 L

³⁸ The total weight of recyclables collected is mostly measured manually by NEA staff, and may be understated because the figure only takes into account the amount of recyclables collected at premises managed by NEA. For premises not managed by NEA (such as tenanted premises), building owners are unable to provide the recycled amount contributed by NEA's office activities. This information is therefore omitted from tabulation

About This Report [102-10,102-45,102-46,102-50]

In this Integrated Sustainability Report 2019/2020, NEA provides an account of our corporate, financial and sustainability performance in FY2019 (1 April 2019 to 31 March 2020). There were no significant organisational changes during the reporting period.

This year, in line with integrated reporting principles, emphasis was placed on strategic focus and future orientation to show how NEA creates value in the short-term, medium-term and long-term.

Additionally, we hope that this report will serve as a useful reference for other organisations and agencies, and inspire them to embark on their own journey of sustainability.

STANDARDS IMPLEMENTED

This Report has been prepared in accordance with:

- i. The Global Reporting Initiative (GRI) Standards – Core option with submission to the GRI for the Materiality Disclosures Service. GRI Services reviewed that the GRI content index is clearly presented and the references for Disclosures 102-40 to 102-49 align with appropriate sections in the body of the report
- ii. The Integrated Reporting Framework set by the International Integrated Reporting Council, to ensure efficient reporting and effective communication across stakeholders

REPORTING SCOPE

This report documents organisational activities, achievements and financial performance across NEA's 20 key premises, unless otherwise stated.

NEA's Office Premises

In FY2019, there are five stand-alone and nine tenanted office premises.

- **Stand-alone Office Premises**
 - i. Centre for Climate Research Singapore at Kim Chuan Road
 - ii. NEA Regional Offices:
 - a. Eastern Regional Office at Tannery Lane
 - b. Eastern Regional Office (Satellite Office) at Sin Ming Drive
 - c. Central Regional Office at Jalan Bukit Merah
 - d. Western Regional Office at Albert Winsemius Lane
- **Tenanted Office Premises**
 - i. Environmental Health Institute at Biopolis
 - ii. Environmental Health Institute at Ang Mo Kio Tech Place II
 - iii. Hawker Centres Division at the HDB Hub
 - iv. Meteorological Service Singapore at Changi Airport

- v. National Radiochemistry Laboratory at CREATE
- vi. NEA Headquarters at Environment Building
- vii. Secondary Standards Dosimetry Laboratory at Health Sciences Authority
- viii. Singapore Environment Institute at Lifelong Learning Institute
- ix. Pollution Control Division at Bukit Merah Central

NEA's Industrial Premises

- i. Choa Chu Kang Crematorium, Columbarium and Cemetery
- ii. Mandai Crematorium and Columbarium
- iii. Semakau Landfill
- iv. Tuas Marine Transfer Station
- v. Tuas South Incineration Plant
- vi. Tuas Incineration Plant

Note:

The consumption data for hawker centres currently managed by NEA is not included in this report

Integrated Reporting Approach

ASSURANCE

The data included in this report had undergone rigorous internal processes such as data monitoring and verification to ensure accuracy. While data and information were reviewed by external sustainability consultant, we have not sought external assurance for this reporting period.

ENQUIRIES ^[102-53]

As part of NEA's environmental conservation efforts, the report is not printed. Digital copies of past and current report can be found on NEA's corporate website:

www.nea.gov.sg

For feedback or enquiries, please contact the NEA Corporate Communications Division:

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Ms Eleanor Goh

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This report has been prepared with reference to the International Integrated Reporting <IR> Framework. Integrated Reporting is a process founded on integrated thinking that results in a report demonstrating how we create value over time with our strategy, governance, performance and prospects.

We use the Content Elements and Principles of <IR> as a guide to improve our internal planning and external reporting. For the purpose of this report, NEA defines the following timeframes:

- Short-term: 1 to 2 years
- Medium-term: 2 to 5 years
- Long-term: 5 years and beyond

Integrated Reporting Index	
Content Elements	Chapter Reference
A. Organisational overview and external environment	Vision, Mission, Roles and Core Values, pg 1 About the National Environment Agency, pg 10
B. Governance	Corporate Governance, pg 4 - 9 Walking the Talk, pg 61 - 62
C. Business model	NEA's Value Creation Model, pg 11
D. Risks and opportunities	NEA's Material Issues, pg 12 - 15 Risks and Opportunities, pg 16 - 19
E. Strategy and resource allocation	Chairman's Foreword, pg 2 CEO's Message, pg 3 NEA's Value Creation Model, pg 11
F. Performance	NEA's Value Creation Model, pg 11 Ensuring a Clean and Sustainable Environment for Singapore, pg 21 - 34 Together with Our Partners and the Community, pg 35 - 40 Enabled by a High Performance and Future-ready NEA, pg 41 - 68
G. Outlook	Chairman's Foreword, pg 2 CEO's Message, pg 3
H. Basis of preparation and presentation	NEA's Material Issues, pg 12 About This Report, pg 69 - 70

GRI Standards Content Index ^[102-55,102-56]

For the Materiality Disclosures Service, GRI Services reviewed that the GRI content index is clearly presented and the references for Disclosures 102-40 to 102-49 align with appropriate sections in the body of the report.



GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
GRI 101: Foundation 2016			
General Disclosures			
Organisation Profile			
GRI 102 : General Disclosures 2016	102-1 Name of the organisation	Pg 10: About the National Environment Agency	—
	102-2 Activities, brands, products, and services	Pg 10-11: About the National Environment Agency	—
	102-3 Location of headquarters	Pg 10: About the National Environment Agency	—
	102-4 Location of operations	Pg 10: About the National Environment Agency	—
	102-5 Ownership and legal form	Pg 10: About the National Environment Agency	—
	102-6 Markets served	Pg 10: About the National Environment Agency	—
	102-7 Scale of the organisation	Pg 10: About the National Environmental Agency	—
	102-8 Information on employees and other workers	Pg 47: Strong Corporate Practices for a Sustainable Organisation	A significant portion of NEA's activities are performed by workers who are not NEA employees. These activities include waste collection, public cleaning services, pest-control services, public hygiene enforcement and call-centre services There are no significant variations in the numbers reported in this Disclosure Numbers reported in this Disclosure are compiled from NEA's HR management system
	102-9 Supply chain	Pg 53-54: Strong Corporate Practices for a Sustainable Organisation	—
	102-10 Significant changes to the organisation and its supply chain	Pg 69: About This Report	—
	102-11 Precautionary Principle or approach	Pg 16: Risks and Opportunities	—
	102-12 External initiatives	Pg 38: Public Sector Taking the Lead in Environmental Sustainability	NEA also aligns our HR practices with the Tripartite Guidelines on Fair Employment Practices
	102-13 Membership of associations	Pg 10: About the National Environment Agency	—

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GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
General Disclosures			
Strategy			
GRI 102 : General Disclosures 2016	102-14 Statement from senior decision-maker	Pg 2: Chairman's Foreword Pg 3: CEO's Message	—
	102-15 Key impact, risks, and opportunities	Pg 12-15: NEA's Material Issues Pg 16-19: Risks and Opportunities	—
Ethics and Integrity			
GRI 102 : General Disclosures 2016	102-16 Values, principles, standards, and norms of behaviour	Pg 1: Vision, Mission, Role and Core Values	—
Governance			
GRI 102 : General Disclosures 2016	102-18 Governance structure	Pg 4-5: Corporate Governance Pg 61-62: Walking the Talk	—
Stakeholder Engagement			
GRI 102 : General Disclosures 2016	102-40 List of stakeholder groups	Pg 12: NEA's Material Issues	—
	102-41 Collective bargaining agreements	Pg 46: Strong Corporate Practices for a Sustainable Organisation	—
	102-42 Identifying and selecting stakeholders	Pg 12: NEA's Material Issues	—
	102-43 Approach to stakeholder engagement	Pg 37: Environmental Services Industry as a Force Multiplier for Mission Success Pg 38: Active Community as Stewards of the Environment Pg 39: Public Sector Taking the Lead in Environmental Sustainability Pg 40: International Partnerships as Strategic Levers Pg 80-83: Annex	No engagement was undertaken specifically as part of the report preparation process
	102-44 Key topics and concerns raised	Pg 37: Environmental Services Industry as a Force Multiplier for Mission Success Pg 38: Active Community as Stewards of the Environment Pg 39: Public Sector Taking the Lead in Environmental Sustainability Pg 40: International Partnerships as Strategic Levers Pg 80-83: Annex	—

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GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
General Disclosures			
Reporting Practice			
GRI 102 : General Disclosures 2016	102-45 Entities included in the consolidated financial statements	Pg 69: About This Report	—
	102-46 Defining report content and topic Boundaries	Pg 12-15: NEA's Material Issues Pg 69: About This Report	—
	102-47 List of material topics	Pg 12-15: NEA's Material Issues	—
	102-48 Restatements of information	—	There were no restatements
	102-49 Changes in reporting	Pg 12: NEA's Material Issues	—
	102-50 Reporting period	Pg 69: About This Report	—
	102-51 Date of most recent report	—	The previous report was published in September 2019
	102-52 Reporting cycle	—	This report will continue to be published on an annual basis
	102-53 Contact point for questions regarding the report	Pg 70: About This Report	—
	102-54 Claims of reporting in accordance with the GRI Standards	—	This report has been prepared in accordance with the GRI Standards: Core option
	102-55 GRI content index	Pg 71-78: GRI Content Index	—
102-56 External assurance	Pg 70: Assurance	—	
Topic-specific Disclosures			
Economic Performance			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 15: NEA's Material Issues	—
	103-2 The management approach and its components	Pg 54-55: Strong Corporate Practices for a Sustainable Organisation	—
	103-3 Evaluation of the management approach	Pg 54-55: Strong Corporate Practices for a Sustainable Organisation	—

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GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
Topic-specific Disclosures			
Economic Performance			
GRI 201 : Economic Performance 2016	201-1 Direct economic value generated and distributed	Refer to Annual Financial Statement Pg 60: Conducive Culture for Collaboration, Learning and Innovation, Annual Contributions to Charity in FY2019	—
	201-2 Financial implications and other risks and opportunities due to climate change	Pg 18: Risks and Opportunities Pg 32: Timely and Reliable Weather and Climate Services	—
	201-3 Defined benefit plan obligations and other retirement plans	Refer to Annual Financial Statements, Defined Contribution Plan Pg 48: Strong Corporate Practices for a Sustainable Organisation	—
	201-4 Financial assistance received from government	Pg 54: Strong Corporate Practices for a Sustainable Organisation	—
Procurement Practices			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 15: NEA's Material Issues	—
	103-2 The management approach and its components	Pg 53-54: Strong Corporate Practices for a Sustainable Organisation	—
	103-3 Evaluation of the management approach	Pg 53-54: Strong Corporate Practices for a Sustainable Organisation	—
GRI 204 : Procurement Practices 2016	204-1 Proportion of spending on local suppliers	Pg 54: Strong Corporate Practices for a Sustainable Organisation	—
Energy			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 13: NEA's Material Issues Pg 26: A Sustainable and Resource Efficient Singapore	—
	103-2 The management approach and its components	Pg 28-29: A Sustainable and Resource Efficient Singapore Pg 63-65: Walking the Talk	—
	103-3 Evaluation of the management approach	Pg 63-65: Walking the Talk	—

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GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
Topic-specific Disclosures			
Energy			
GRI 302 : Energy 2016	302-1 Energy consumption within the organisation	Pg 63-65: Walking the Talk	NEA's total energy consumption was 1300 tera-joules during the reporting period
	302-2 Energy consumption outside of the organisation	—	Information unavailable NEA has not started tracking energy consumption outside of the organisation
	302-3 Energy intensity	Pg 63-64: Walking the Talk	—
	302-4 Reduction of energy consumption	Pg 63: Walking the Talk	—
	302-5 Reductions in energy requirements of products and services	—	Not applicable to NEA
Water			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 12-13: NEA's Material Issues Pg 24: Safe, Healthy and Conducive Living Environment Pg 26: A Sustainable and Resource Efficient Singapore	—
	103-2 The management approach and its components	Pg 25: Safe, Healthy and Conducive Living Environment Pg 67-68: Walking the Talk	—
	103-3 Evaluation of the management approach	Pg 67-68: Walking the Talk	—
GRI 303 : Water 2016	303-1 Water withdrawal by source	Pg 67-68: Walking the Talk	Water consumption is tracked using water meters
	303-2 Water sources significantly affected by withdrawal of water	—	No water sources were significantly affected as a result of water consumption at NEA's premises and installations
	303-3 Water recycled and reused	Pg 67-68: Walking the Talk	—
Emissions			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 12-13: NEA's Material Issues Pg 24: Safe, Healthy and Conducive Living Environment	—
	103-2 The management approach and its components	Pg 24-26: Safe, Healthy and Conducive Living Environment Pg 64-67: Walking the Talk	—
	103-3 Evaluation of the management approach	Pg 64-67: Walking the Talk	—

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GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
Topic-specific Disclosures			
Emissions			
GRI 305 : Emissions 2016	305-1 Direct (Scope 1) GHG emissions	Pg 66: Walking the Talk	—
	305-2 Energy indirect (Scope 2) GHG emissions	Pg 66: Walking the Talk	—
	305-3 Other indirect (Scope 3) GHG emissions	Pg 66: Walking the Talk	—
	305-4 GHG emissions intensity	Pg 67: Walking the Talk	—
	305-5 Reduction of GHG emissions	—	Information unavailable. NEA did not track reductions in GHG emissions for specific initiatives or projects
	305-6 Emissions of ozone-depleted substances (ODS)	—	Not material as NEA is not a significant emitter of ODS
	305-7 Nitrogen oxides (NO _x), sulphur oxides (SO _x), and other significant air emissions	Pg 24: Safe, Healthy and Conducive Living Environment	Under the Environmental Protection and Management (Air Impurities) Regulations, air emissions is reported based on mg/Nm ³
Effluents and Waste			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 12-13: NEA's Material Issues Pg 24: Safe, Healthy and Conducive Living Environment Pg 26: A Sustainable and Resource Efficient Singapore	—
	103-2 The management approach and its components	Pg 25: Safe, Healthy and Conducive Living Environment Pg 26-31: A Sustainable and Resource Efficient Singapore Pg 68: Walking the Talk	—
	103-3 Evaluation of the management approach	Pg 68: Walking the Talk	—
GRI 306 : Effluents and Waste 2016	306-1 Water discharge by quality and destination	Pg 25: Safe, Healthy and Conducive Living Environment	—
	306-2 Waste by type and disposal method	Pg 68: Walking the Talk	We are working towards collecting general waste data
	306-3 Significant spills	—	NEA has not had any significant spills
	306-4 Transport of hazardous waste	Pg 68: Walking the Talk	NEA does not import or export hazardous waste
	306-5 Water bodies affected by water discharge and/or runoff	—	No water bodies and related habitats were significantly affected by water discharges or runoff

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GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
Topic-specific Disclosures			
Environmental Compliance			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 12: NEA's Material Issues Pg 24: Safe, Healthy and Conducive Living Environment	—
	103-2 The management approach and its components	Pg 24-26: Safe, Healthy and Conducive Living Environment Pg 44: Strong Capabilities for Mission Success	—
	103-3 Evaluation of the management approach	Pg 24-26: Safe, Healthy and Conducive Living Environment	—
GRI 307 : Environmental Compliance 2016	307-1 Non-compliance with environmental laws and regulations	—	NEA did not receive any environmental fines and sanctions
Employment			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 15: NEA's Material Issues	—
	103-2 The management approach and its components	Pg 46, 48: Strong Corporate Practices for a Sustainable Organisation	—
	103-3 Evaluation of the management approach	Pg 46, 48: Strong Corporate Practices for a Sustainable Organisation	—
GRI 401 : Employment 2016	401-1 New employee hires and employee turnover	Pg 47-48: Strong Corporate Practices for a Sustainable Organisation	—
	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	Pg 48: Strong Corporate Practices for a Sustainable Organisation	—
	401-3 Parental leave	Pg 51: Strong Corporate Practices for a Sustainable Organisation	—
Occupational Health and Safety			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 15: NEA's Material Issues	—
	103-2 The management approach and its components	Pg 52-53: Strong Corporate Practices for a Sustainable Organisation	—
	103-3 Evaluation of the management approach	Pg 53: Strong Corporate Practices for a Sustainable Organisation	—

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GRI Standard Number	Disclosure No.	Page No. / Section Titles	Direct Answers / Reasons for Omission
Topic-specific Disclosures			
Occupational Health and Safety			
GRI 403 : Occupational Health and Safety 2016	403-1 Workers representation in formal joint management-worker health and safety committees	—	NEA has a Workplace Safety and Health (WSH) Driver and WSH Representatives from each department and offsite premises. All NEA staff are represented by the safety committee
	403-2 Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	Pg 53: Strong Corporate Practices for a Sustainable Organisation	—
	403-3 Workers with high incidence or high risk of diseases related to their occupation	—	None of our workers are at risk of occupational diseases
	403-4 Health and safety topics covered in formal agreements with trade unions	—	Not material
Training and Education			
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 15: NEA's Material Issues Pg 55: Conducive Culture for Collaboration, Learning and Innovation	—
	103-2 The management approach and its components	Pg 55-59: Conducive Culture for Collaboration, Learning and Innovation	—
	103-3 Evaluation of the management approach	Pg 56, 58: Conducive Culture for Collaboration, Learning and Innovation	—
GRI 404 : Training and Education 2016	404-1 Average hours of training per year per employee	Pg 58: Conducive Culture for Collaboration, Learning and Innovation	—
	404-2 Programs for upgrading employee skills and transition assistance programs	Pg 57-58: Conducive Culture for Collaboration, Learning and Innovation	—
	404-3 Percentage of employees receiving regular performance and career development reviews	Pg 56: Conducive Culture for Collaboration, Learning and Innovation	—

Annex

HR Statistics in FY2019



15

Annual Health Screenings

conducted at NEA premises with a total of 1,100 participating staff, of which 561 staff took up the complimentary influenza vaccination



Lunch Time Talks

on health and wellness topics conducted, with participation from 441 staff



3

Mental Health Training

to provide support to staff experiencing difficulties coping with mental health and to equip them with self-care knowledge and skills at the workplace



>40

HR Roadshows

conducted to cascade the EES results to all divisions/departments



8

Merdeka Generation Briefing sessions to share more about the Merdeka Generation Package (MGP) attended by a total of 434 staff



NEA Intra-Challenge

with a total of 549 registered staff participating in the challenge as part of the National Steps Challenge Season 5



>350

Staff and Their Families attended 2 movie screenings and an art jamming workshop organised by NEA Kids club



3

Fruits Distribution Sessions

were organised in 2019



Interact Point Activities

such as bubble soccer and baking workshops were organised for single employees



~140

Staff participated in the 'Pick It Up' initiative



35

Participants attended Walk the Ground with Me over seven sessions



215

NEA Employees Promoted in April 2020



516

Long Service Award (LSA) Recipients

*Due to the COVID-19 outbreak, the annual LSA & SAA ceremony was not held this year

161

Special Appreciation Award (SAA) Recipients



61

Participants for the following HR programmes

- Communication Effectiveness & Coaching Through MBTI
- Public Service Coaching Programme
- Management Development Programme run by CSC and PSD



34

Internships from tertiary institutions



10,396

Undergraduates from local universities voted NEA as among the top 100 most attractive employers in Singapore where NEA ranked 15th and 4th under the public and private sectors combined, and Public Sector respectively

Engaging NEA's Stakeholders: Business Community, NGOs, Partners and Public Sector Agencies ^[102-43,102-44]

NEA engages with stakeholders in the Business Community, NGOs, Partners and Public Sector Agencies to gather feedback on our programmes, policies and services. These feedback help NEA identify areas where we can improve service delivery experiences for our stakeholders. We also engage our stakeholders to update them on upcoming programmes and policies, and encourage them to adopt our existing programmes.

Stakeholder Engagement Methods	Engagement Activities		
<ul style="list-style-type: none"> Surveys, meetings, discussions, advisories and circulars 	<ul style="list-style-type: none"> Environmental Control Officers (ECOs) are engaged by construction companies to advocate good environmental practices within construction sites. To further understand the demographics of ECOs, the nature of their work and to seek 	<p>their views on the existing Code of Practice for ECO, an online survey was conducted from October to November 2019. The inputs from the survey will help NEA to facilitate the work of</p>	<p>the ECOs and enhance their competencies. More than 200 ECOs had responded to the survey</p>
<ul style="list-style-type: none"> Voluntary programmes, initiatives, meetings and seminars 	<ul style="list-style-type: none"> NEA organised six Tray Return Partnership meetings in 2019, to share good tray return practices and discuss projects to raise awareness for tray return. At these bimonthly meetings, NEA also provides regular updates on our efforts to promote Tray Return, to encourage partners to drive Tray Return initiatives. Formed in 2013, the Tray Return Partnership has grown to 88 members from the food court and Quick Service Restaurant sectors 	<ul style="list-style-type: none"> Singapore Packaging Agreement (SPA), a voluntary joint initiative by government, industry and NGOs to reduce packaging waste, has more than 240 signatories as of November 2019. The SPA signatories have cumulatively reduced about 54,000 tonnes of packaging waste, and this has resulted in estimated packaging material cost savings of \$130 million for locally consumed products. 19 signatories of the SPA were recognised for their efforts in packaging waste reduction at the SPA Awards 2019 	<ul style="list-style-type: none"> The 2nd biennial 3R Awards & Seminar for Shopping Malls saw a total of 31 participants, comprising 28 mall operators and three retail tenants. 14 shopping mall operators and one retail tenant were recognised for their 3R efforts, more than double the number of winners at the 1st 3R Awards ceremony. Informative 3R solutions for malls and retail tenants were shared at the accompanying 3R seminar and mini exhibition
<ul style="list-style-type: none"> Dialogue sessions, briefings and industry consultations 	<ul style="list-style-type: none"> NEA has set up an Advisory Committee on Radiation Protection and Nuclear Science, which comprises representatives from government agencies, local industry and academia. The 10-member Advisory Committee convenes two to three meetings yearly, enabling NEA to access expert 	<p>advice on international trends and developments in radiation protection and nuclear science, industry/medical nuclear application issues and to identify potential issues relating to ionising and non-ionising radiation. The Committee offers a platform for NEA to collate feedback to formulate Singapore's</p>	<p>medium-term training needs for local industries, such as the development of the International Atomic Energy Agency five-year Country Programme Framework for Singapore</p>
<ul style="list-style-type: none"> MOC collaboration Initiative 	<ul style="list-style-type: none"> Through a Memorandum of Cooperation (MOC), the Republic Polytechnic and Ngee Ann Polytechnic has taken over from NEA the conduct of the basic ionising radiation and laser radiation safety courses for industries with effect from April 2019. Our industry participants will now benefit from our training partners' educational expertise, training and 	<p>laboratory facilities as well as engage in hands-on learning in this new training partnership. This collaboration also facilitates better alignment of the industry training courses with the continuous education and training pathway administered by educational institutions in the upskilling of the industry workforce where the courses are SSG endorsed and enjoys</p>	<p>Skillsfuture's funding. NEA continues to work closely with both partners on curriculum and assessment matters to safeguard training standards and quality of training delivery, and in the timely update of new legislation-related content in the course materials</p>

Engaging NEA's Stakeholders: Schools, Public and the Community ^[102-43,102-44]

NEA engages stakeholders in schools, the public and the community, to gather their feedback on existing and proposed programmes and policies, and update them on our upcoming initiatives. We also organise engagement activities to raise public awareness of and interest in environmental issues.

Stakeholder Engagement Methods	Engagement Activities		
<ul style="list-style-type: none"> Surveys, public communication channels, public consultations 	<ul style="list-style-type: none"> Household perception survey of 500 respondents from September 2019 to February 2020 at Project <i>Wolbachia</i> – Singapore Phase 3 study sites in Nee Soon and Tampines, to gauge the level of public awareness on <i>Wolbachia</i> technology and understand the public sentiments on the ground 	<ul style="list-style-type: none"> Public communication channels, such as telephone, emails, letters, social media, online feedback form and myENV app, serve as platforms for the public to submit their feedback. NEA received more than 340,000 cases in FY2019 	
<ul style="list-style-type: none"> Visits to NEA facilities 	<ul style="list-style-type: none"> Learning journeys for the public, as part of Clean & Green Singapore 2019 and in support of the Year Towards Zero Waste. Participants visited sites in Singapore that are involved in processing the waste we generate every day, such as Semakau Landfill and the SembWaste Materials Recovery Centre. The 12 tours comprised about 400 participants NEA's incineration plants and Semakau Landfill received 777 and 5,027 visitors respectively in FY2019. Visitors included international delegates and students, who learnt more about waste management in Singapore through site tours of the facilities, presentation and Q&A sessions during their visits 	<ul style="list-style-type: none"> Hosted more than 1300 visitors at NEA's Environmental Health Institute's Laboratory at Biopolis and NEA's Mosquito Production Facility at Techplace II, to increase awareness and appreciation of the science and innovation behind the fight against vector-borne diseases. Visitors included residents and grassroots leaders from the Project <i>Wolbachia</i> – Singapore study sites, as well as other stakeholder groups such as Ministers, Advisers, teachers and students, government agencies, Dengue Prevention Volunteers, media personnel, scientists and researchers, staff of private companies, and international visitors and experts such as WHO 	
<ul style="list-style-type: none"> Public events, exhibitions, activities, educational materials 	<ul style="list-style-type: none"> Launch of annual Clean & Green Singapore (CGS) carnival on 2 November 2019 to build environmental awareness and encourage the community to keep the environment clean and green. Comprising one main carnival and four district carnivals, CGS 2019 featured a special showcase in support of the Year Towards Zero Waste, to help the public understand the various waste management plans and initiatives to address Singapore's waste challenges. With a wide range of workshops, interactive games, exhibits and performances to inspire and teach the public how to lead more environmentally-friendly lifestyle, CGS 2019 attracted over 35,000 visitors and reached approximately 2.4 million people through publicity channels Launch of the annual National Dengue Prevention campaign on 7 April 2019 to rally the community to stay vigilant and do 	<p>the 'Mozzie Wipeout' regularly. The campaign emphasised that a small drop of water was all it took for mosquitoes to breed, and highlighted common breeding areas that the public should be aware of. Publicity for the campaign, which ran from 7 April to 30 June 2019, reached approximately 3.7 million people across television, print, outdoor media, digital and social media platforms; on-ground engagements such as house visits by volunteers engaged close to 70,000 people from April 2019 to March 2020</p> <ul style="list-style-type: none"> Organised the annual Youth for the Environment Day (YED) to engage youths to champion environmental ownership by leading, organising and participating in programmes to show their passion and commitment towards global and local environmental issues. Themed 'Towards Zero Waste', YED 2019 aimed to encourage our youths to lead a zero-waste lifestyle through exhibition booths and interactive activities by NEA partners, and was attended by more than 310 students from 38 schools. Nine schools were recognised for their food waste reduction efforts under the 'Love Your Food @ Schools' project, which required students and staff from 10 schools to set up and implement a closed-loop food waste management system within the schools to generate greater awareness on managing food waste Organised the Community Volunteer (CV) Workshop and Appreciation Lunch in July 2019 to thank the CVs for their efforts in engaging environmental offenders. During the annual workshop, NEA took the opportunity to gather views on ways to further improve the programme. CVs participated in the focus group discussion, and shared their views on improving engagement of environmental offenders 	

Engaging NEA's Stakeholders: Employees ^[102-43,102-44]

NEA engages our employees to understand the challenges they face at work, so that we can provide relevant training opportunities to elevate their competency levels, and inform them of our key policy and process changes. Through employee engagements, NEA promotes a culture of ownership and accountability among our employees, which in turn enhances our governance in different areas. We also promote environmental consciousness, employee bonding, and innovation and safety cultures through these engagement activities.

Stakeholder Engagement Methods	Engagement Activities
<ul style="list-style-type: none"> Surveys, dialogue sessions, roadshows, emails, e-newsletters, staff meetings, sharing sessions, Workplace by Facebook 	<ul style="list-style-type: none"> Organised two NEA Workplan Conversations sessions for staff at NEA Headquarters and Regional Offices (RO) in October 2019 to share key NEA workplan initiatives and highlights, gather staff views and feedback on the three NEA Cultural Capabilities (CC) to transform NEA into an agency that is change-responsive and future-ready, celebrate our CC champions, and cascade work processes following the integration of five ROs to three ROs Carried out targeted pre-audit health checks on 50 per cent of NEA's department official records between May and July 2019. This was followed by two briefings to 250 staff and another three briefings to 50 staff of 15 depts with projects shortlisted for external audit, to address concerns departments have on managing, handling and storage of their official records Worked with GovTech and its vendor Anacle from June 2019 to January 2020, for the File Inventory Management System (FIMS), a physical file inventory management and RFID tracking system. Prior to FIMS going live on 15 January 2020, 27 NEA departments had been contacted in preparation to onboard FIMS with an estimated total of 49,225 files to provide efficient record management of official physical files Designed an Operational Exercise for NEA's Vector Control (VC) officers to evaluate their proficiency in engagement, inspection and sampling protocols, and their ability to manage simple WOG feedback. A fully scaled and furnished HDB apartment was used as a controlled simulation, with non-VC officers playing the role of the home owner and evaluator. The aim was to provide VC officers with a dip-stick assessment of their competencies, for an additional avenue to improve operational standards NEA organised a lecture on Intellectual Property Law in FY2019 for NEA officers, conducted by invited speakers from local law firm Dentons Rodyk LLP. The topics included basic legal knowledge in the various areas of Intellectual Property Law, including patent, copyright, trademarks and confidential information. The lecture was attended by 118 NEA officers Developed in-house training capability in analytics with a new course introduced in FY2019, 'Intermediate Data Science using R', and enhanced an existing course, 'Introduction to Storytelling using Data Visualisation'. Attended by 72 NEA officers, the courses imparted valuable analytics and data science skills to drive decision making and enhance operational effectiveness
<ul style="list-style-type: none"> Competency-based training, knowledge retention programmes, technical knowledge sharing portal, sharing sessions 	<ul style="list-style-type: none"> Conducted seven sessions of File Plan Finalisation Clinics between 27 August and 5 September 2019, to guide NEA departments on structuring their folders for filing of their official NEA records into the NEA eRegistry. To ensure that official records are properly filed, managed, handled and stored, complying to IM4L governance, departments were guided to obtain approved appraisals for their records series, which are not part of standard IM4L Appendices Developed NEA's staff capability in Robotic Process Automation (RPA), the use of software with capabilities to handle high volume, repeatable tasks that previously required humans to perform. The development of in-house capability ensures departments are more resilient to make changes to the codes and reduce the reliance on vendors, allowing them to explore new ways of working using new tools and technologies Hosted the International Atomic Energy Agency (IAEA) Regional Workshop on Challenges in Applying the IAEA General Safety Requirements (GSR) Part 3 between 15 to 18 April 2019. The workshop was attended by 30 foreign participants from IAEA Member States and 12 NEA staff. NEA staff had a better understanding of GSR Part 3 requirements through learning from other participants and experts Hosted the US Nuclear Regulatory Commission (NRC) Industrial Radiography Workshop held between 17 to 22 June 2019, which was attended by 16 NEA staff. The workshop covered US NRC's regulatory requirements for industrial radiography, with a focus on the role of US NRC inspectors in ensuring radiation safety and radioactive materials safety Hosted the self-assessment workshop for IAEA Integrated Regulatory Review Service (IRRS) mission that was held from 18 to 20 February 2020. NEA had invited IAEA to conduct the workshop on IAEA self-assessment methodology in preparation for IAEA's IRRS mission to Singapore in 2H 2022.

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Stakeholder Engagement Methods	Engagement Activities
<ul style="list-style-type: none"> Competency-based training, knowledge retention programmes, technical knowledge sharing portal, sharing sessions 	<ul style="list-style-type: none"> Implemented the NEA Mental Health Framework in 2019 to empower NEA officers to embrace mental wellness, and rolled out various initiatives to support the mental well-being of NEA officers. As this is a shared responsibility among NEA leaders, supervisors and employees, leaders, selected HR staff and supervisors went through self-care knowledge and skills training sessions to be supportive leaders at the workplace Conducted bi-annual Procurement Outreach for about 270 staff, and Forum for Department Procurement Officers for 48 attendees, to educate them on procurement guidelines and enhance their procurement knowledge Partnered the Council for Third Age (C3A) to equip our employees with the knowledge to overcome challenges faced in ageing and skills upgrading. Specially curated courses in Ageing, Mind and Body, Digital Readiness, and Financial Planning were established in the Active Seniors Plan and rolled out to NEA employees. 479 daily-rated employees have attended the mandatory course on 'I'm Senior and I'm Loving It', and 293 monthly-rated employees have attended the mandatory course on 'Staying Well to Age Successfully'
<ul style="list-style-type: none"> Participation in environmental celebrations and events 	<ul style="list-style-type: none"> Organised 'Pick It Up', a regular litter-picking event where employees interact and build camaraderie through the bonding activities held after litter-picking. Litter-picking is regarded as one of NEA's flagship environmental activities. As part of the 'Captain Green Cares' initiative, employees are given opportunities to participate in NEA's environmental initiatives and other volunteerism activities



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