

ANNUAL & SUSTAINABILITY
REPORT 2017/2018

Driving Transformation for a Sustainable Future



Contents

PAGE

1	Vision, Mission, Roles and Core Values	27	Chapter 1	67	Chapter 3
2	Chairman's Foreword		Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore		Enabling a High Performance NEA
4	CEO's Message		a. High Standards for Public Health		a. Strengthen Operations and Service Delivery
6	Corporate Governance		b. Vibrant Hawker Centres and Trade		b. Adopt 'Right-Size' Regulations and Simplify Processes
	a. Board of Directors		c. Safe, Healthy and Conducive Living Environment		c. Build Robust Capabilities
	b. Senior Management		d. Resource Efficient and Sustainable Singapore		d. Develop and Engage Staff
	c. Sustainability Governance		e. Timely and Reliable Weather Information and Hazard Preparedness		e. Strengthen Corporate Practices and Governance
14	About the National Environment Agency	46	Chapter 2	100	Walking the Talk
	a. NEA's Strategy and Business Model		Engaging Our Partners and the Community	109	About This Report
	b. Risks and Opportunities		a. Develop and Promote the Environmental Services Industry		Integrated Reporting Approach
	c. NEA's Corporate Sustainability Material Issues		b. Partner Public Sector Agencies	111	GRI Content Index
			c. Engage and Nurture People and the Community		
			d. Collaborate and Advance International Interests		

VISION ^[102-16]

A clean environment,
towards a liveable and
sustainable Singapore

MISSION ^[102-16]

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

ROLES ^[102-16]

- 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]



Human activities are degrading the earth. We are a major cause of ongoing climate change.

Greenhouse gas emissions are at an all-time high. Sea levels continue to rise. Extreme weather conditions are resulting in severe floods and prolonged drought. Climate change is affecting every country in every continent. It is upsetting economies and affecting lives.

Our activities pollute the air, sea and land. In some places, pollution is causing severe ill health and increasing mortality rates. We cannot continue our current pace of consumption, greenhouse gas emissions and degradation of the environment. Our survival depends on us changing our ways.

As a small country, Singapore has done much over the years to pursue sustainable development. We industrialised and developed our economy while keeping an eye on our environmental impact. Our pioneers cleaned up the city and the waterways. They had the gumption to make long-term plans. They applied critical measures, including those that were difficult and unpopular. Their steadfastness created the clean, green and very liveable environment we enjoy today.

Tackling New Challenges

Rising incomes, availability of mass-produced goods, consumerism and a throwaway culture have increased the amount of waste we need to dispose of. Lack of social graces and poor personal habits among a minority of the population continue to result in litter that has to be removed by an army of cleaners.

Globalisation, resulting in increased movement of people and goods across borders, has intensified the challenge of defending against disease outbreaks. Growing industrial and agricultural activities around Singapore also subject us to transboundary pollution.

Galvanising Climate Action

Singapore has been active in galvanising international action to address climate change and pollution control over the years. By declaring 2018 as the Year of Climate Action, Singapore is leading by example to demonstrate our commitment to reduce our carbon footprint.

Our commitment is translated into actual actions. For instance, the carbon pricing bill was passed in Parliament in early 2018, which will pave the way for the introduction of a carbon tax in

2019. The carbon tax will incentivise our industries to reduce emissions.

Striving Towards Zero Waste

Another key step to reduce our carbon footprint is to strive towards a zero waste nation by reducing, reusing and recycling more. With NEWater, Singapore has closed the water loop and achieved a circular economy in our water sector. The aim now is to apply the circular economy concept to the waste sector.

One important aspect is bringing about more sustainable consumer habits. Beyond providing accessible recycling facilities or encouraging less single-use disposables, we need to also work on getting residents to relook the 'Reuse' component. As recent as perhaps a decade ago, we would take our faulty items to the neighbourhood handyman.

"The future is for us to shape. It is important that each and every one of us believe that we can and, by our every action, help make the vision of a wonderful, clean and liveable Singapore, and the world, come true."

Today, we quickly replace items which have broken down, or even when the item is working well – just to keep up with the latest models. There is much room to enhance a Reuse and repair culture.

E-waste has also been targeted as a priority. We will be implementing an e-waste management system based on the Extended Producer Responsibility concept by 2021. On the waste management front, we are also developing the Integrated Waste Management Facility, co-located with the Tuas Water Reclamation Plant, which will create synergies and enhance efficiencies when it is operational in 2023.

Keeping Singapore Clean

Visionary leadership is required for Singapore to be clean, and remain a great place to live, work and play. This

entails long term planning, sound laws and policies, good infrastructure, proper governance, effective execution and diligent enforcement on the ground. But all this will not be sufficient.

Ultimately, fulfilling this vision depends on our values and principles. We need to be considerate to one another, and mindful of how our actions affect the people and the world around us. We may consume what we need, but we need not waste.

In all communities, there will be a spectrum of people. There will be those who are good and considerate. They help keep the environment clean, they return trays at food centres and keep the public toilets clean for other users. They consume mindfully and do not waste resources. They avoid harming others.

They take care to prevent mosquitoes, rats and other vectors from breeding. They wear masks when they are unwell to avoid spreading infections. Through their actions, they make the world better, or at the very least do not cause disamenities.

But unfortunately on the flipside, there will be those whose actions, intended or through carelessness, create negative impact on others and the environment.

Margaret Mead said, "Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it is the only thing that ever has". We need more good citizens to step forward to lead by their words and actions. They can advocate, persuade, and nudge others to be considerate and create a positive impact on our environment.

The future is for us to shape. It is important that each and every one of us believe that we can and, by our every action, help make the vision of a wonderful, clean and liveable Singapore, and the world, come true.



Mr Liak Teng Lit
Chairman

CEO's Message^[102-14]



We are pleased to present you the National Environment Agency's (NEA) Annual & Sustainability Report for the Work Year 2017/2018. The past year has been a transformational one, with a strong continued focus on leveraging innovation and technology to enhance the way we operate. One significant initiative is the launch of NEA's Environmental Services Industry Transformation Map (ES ITM). Singapore relies on a large force of 78,000 workers in the cleaning and waste management sectors to keep the island clean and liveable.

The ES ITM involves driving innovation and widespread technology adoption and upskilling the workforce, to drive

the industry to remain competitive, and strive towards greater vibrancy, professionalism and sustainability.

At NEA, we are responsible for many strategic outcomes, such as ensuring a resource efficient and sustainable living environment, maintaining high standards of public health, fostering an active and gracious community, and many more.

Given the inter-related nature of our strategic objectives, the outcomes often converge. For instance, our hawker centres. What began as functional centres to provide affordable, clean and safe food for Singaporeans, have been transformed into social spaces, where everyone from all walks of life can eat and bond. In 2017, along with the newly launched hawker centres, we had also upgraded several more, to ensure that the spaces are bright

and well ventilated. In order to inject more colour and vibrancy, NEA also started working with community groups to hold regular activities in our hawker centres. The collaborations saw interactive art displays and workshops, music performances, and photography exhibitions, all of which were well-received by the hawkers and patrons alike. In addition, our tray return initiative to encourage positive social norms has also been gaining traction, with more diners exercising consideration for others by leaving their tables clean.

At our hawker centres, we had also initiated food waste reduction initiatives in early 2016. The digester at the Ang Mo Kio hawker centre is capable of converting a tonne of food waste generated by the centre's 155 hawkers daily, into non-potable water that can be used to self-clean the machines or

for other cleaning purposes. Following the success of this pilot, we will be implementing the digesters at two more hawker centres in late 2018 at New Upper Changi Road and Bedok South Road.

Some of our earlier efforts to reduce waste are also starting to show results. The Singapore Packaging Agreement (SPA), a joint initiative by the government, industry and NGOs, was initiated a decade ago to address the issue of packaging waste, which constituted about a third in weight of Singapore's total domestic waste. Since its inception, there has been a cumulative reduction of 39,000 tonnes of packaging waste, which translates to savings of \$93 million in material costs. To further boost these efforts, Minister Masagos announced at the SPA 10th Anniversary dinner, the implementation of mandatory reporting requirements for sustainable packaging waste

“At the end of the day, we need to go back to what sustainability means. Sustainability is defined as looking after a natural resource today, so that the next generation will also be able to enjoy it.”

management by 2021. This will require businesses to report the types and amounts of packaging they are putting out into the market annually, and include plans on how they intend to reduce it.

We have also taken steps to further protect non-smokers from the harmful effects of second-hand tobacco smoke by extending the smoking ban to more public places. Since 30 June 2017, food retail establishments will no longer be able to apply for smoking corners, and the existing smoking corners will only be allowed until their licences are terminated. Since 1 October 2017, smoking was also prohibited at more educational institutions, including public places within a five-metre radius from the compounds of educational institutions. In the coming months, Orchard Road will also be a No Smoking Zone. This is in line with

the Government's long-term goal to prohibit smoking in all public places, except at designated smoking areas.

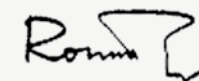
As NEA continues to scale up efforts to safeguard our environment, we have also been looking towards technology to ensure that the efforts are effective and sustainable. For example, NEA deploys a wide network of sensors and surveillance cameras to monitor our environment to ensure that the harmful effects of some pollutants are mitigated. In the near future, other sensors include an integrated analyser and sensor system which will be able to monitor nutrient and bacteria levels in inland water bodies. This near-real-time system will enable us to detect water pollution incidents and trace pollution sources in a timely manner.

NEA has also embarked on thematic research and development (R&D)

programmes, such as the Closing the Waste Loop R&D Initiative. One thrust of this initiative is the extraction of materials from waste. Many researchers around the world are developing solutions to recover metals from e-waste. One such example is a research project that was featured at the CleanEnviro Summit Singapore 2018 held in early July, which seeks to develop a new way of recovering precious metals from e-waste. This innovation could potentially help the industry save time, energy and cost, and mitigate the unintended negative environmental effects of e-waste recycling.

At the end of the day, we need to go back to what sustainability means. Sustainability is defined as looking after a natural resource today, so that the next generation will also be able to enjoy it. Whether through our industries embracing the concept of

a circular economy to ensure that resources are kept in circulation for as long as possible, or through individuals wasting as little as possible, we all play a key part in ensuring that all that we enjoy today will still be available to our future generations.



Mr Ronnie Tay
Chief Executive Officer

Corporate Governance ^[102-18]

BOARD OF DIRECTORS

The Board provides strategic direction and oversight of NEA's functions and goals, and steers the organisation in fulfilling its vision and mission. In FY2017, the Board comprised 14 members with diverse and extensive experience from both the private and public sectors. All members are appointed by the Minister for the Environment and Water Resources. Led by Board Chairman Mr Liak Teng Lit, the Board set up three Board Committees to assist it in the execution of its responsibilities for FY2017.

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, and internal control systems. Chaired by Mr Ong Chao Choon, the Audit Committee comprises Mr Sim Gim Guan, Ms Jackie Chew and Dr Chitra Rajaram (till 31 March 2018). The

Committee reviews the annual accounts, audit plans, internal control systems and audit reports of NEA 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 Liak Teng Lit, the Human Resource Committee comprises Mr Ronnie Tay, Chief Executive Officer (CEO) of NEA, Mr Lee Chuan Seng, Mr Tan Peng Yam (till 31 March 2018), Mr Zainal Bin Sapari (till 31 March 2018) and Mr Wong Mun Summ.

Finance Committee

Formed in 2017, the Finance Committee oversees matters in relation to the investment of surplus funds, cash and working capital management, and fund raising activities. Chaired by Mr Quek Suan Kiat, the Finance Committee comprises NEA's CEO Mr Ronnie Tay, Mr Lee Chuan Seng and Ms Lynette Leong Chin Yee.

Board Working Committees

Three new Board Working Committees (BWC) were formed in FY2017 in the areas of "Keep Singapore Clean", "Sustainable Singapore", and "Re-imagining Hawker Centres". These BWCs provide industry and expert perspectives and guidance on the strategies and visioning of these key areas of NEA's work, as well as advice on suitable strategic partnerships.

Code Of Conduct

The Board of Directors 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.

SENIOR MANAGEMENT

The senior management team is led by CEO, Mr Ronnie Tay. Together, the 21-strong team is responsible for assisting the CEO in implementing the strategic direction of NEA's programmes, as well as nurturing a high performance

organisation committed to fulfilling NEA's mission and roles. Each director manages the financial, manpower and operational resources of his or her own respective divisions or departments. Members of the senior management team 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 the agency in becoming more effective in its dual roles as regulator and champion for the environment. These efforts are aimed at improving how NEA is organised, leverages technology and utilises its

... continued from previous page ^[102-18]

resources, thereby enabling it to achieve better results by working smarter and striving for organisational excellence.

Enterprise Risk & Safety Steering Committee

The Enterprise Risk & Safety Steering Committee is chaired by NEA's Deputy CEO and is made up of the Director-Generals, Group Directors, Divisional Directors and Chairpersons of selected Safety Committees, with Head (Internal Audit) serving as an observer.

The Committee 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 Committee 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.

The Committee, in turn, reports to the CEO 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 its 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 NEA Handbook.

All new staff are informed about the NEA Person Code. Reminders on the

code are also regularly sent to NEA officers. 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 Department advises NEA's management and the Audit Committee on the system of internal controls in NEA. Reviews performed by the Internal Audit Department 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 about whether the Financial Statements as a whole are free from material misstatements. The External auditors conduct their audit in accordance with their audit plan presented to the Audit Committee for those internal controls they have considered to be relevant to the audit. They will report to management and Audit Committee any recommendations on internal controls that they have identified during the course of their audit work.

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. In order to maintain the independence of the external auditors, the external auditors are required to declare their state of independence to the Audit Committee prior to appointment.

Board of Directors ^[102-18]



Mr Liak Teng Lit

Chairman
National Environment Agency,
Group Chief Operating Officer
Perennial Real Estate Holdings Limited,
Chief Executive Officer
Perennial Healthcare Private Limited



Mr Lee Chuan Seng

Deputy Chairman
National Environment Agency,
Emeritus Chairman
Beca Asia Holdings Pte Ltd



Mr Ronnie Tay

Chief Executive Officer
National Environment Agency



Mr Ong Chao Choon

Deputy Chairman
PricewaterhouseCoopers Singapore



Ms Lynette Leong Chin Yee

Chief Executive Officer
CapitaLand Commercial,
CapitaLand Limited



Mr Sim Gim Guan

Chief Executive Officer
National Council of Social Service



Professor Ho Teck Hua

Senior Deputy President and Provost
National University of Singapore



Mr Wong Mun Summ

Founding Director
WOHA Architects Pte Ltd



Ms Jackie Chew

Chief Risk Officer
Prudential Assurance Company
Singapore (Pte) Ltd



Mr Choo Chee Wee, Bernard

Editor, Shin Min Daily News
Singapore Press Holdings Limited

... continued from previous page ^[102-18]



Mr Quek Suan Kiat
Former Vice Chairman
Barclays Bank PLC Singapore



Mr Tan Peng Yam
Chief Executive
Defence Science and Technology
Agency
(till 31 March 2018)



Mr Zainal Bin Sapari
Assistant Secretary-General
National Trades Union Congress
(till 31 March 2018)



Dr Chitra Rajaram
Head, Community Segment
MediaCorp Pte Ltd
(till 31 March 2018)



Ms Sylvia Choo Sor Chew
Director for International Affairs
National Trades Union Congress,
Executive Secretary
Singapore Industrial & Services
Employees' Union
(with effect from 1 April 2018)



Mr Ravinder Singh
President
Electronics,
President
Defence Business, Singapore
Technologies Engineering Ltd
(with effect from 1 April 2018)



Mr Suhaimi Zainul-Abidin
Chief Executive Officer
Quantedge Capital Pte Ltd
(with effect from 1 April 2018)

Accurate as of 1 April 2018

Senior Management ^[102-18]



Ronnie Tay
Chief Executive Officer



Khoo Seow Poh
Deputy Chief Executive Officer



Ananda Ram Bhaskar
Director-General, Environmental
Protection Division



Derek Ho
Director-General, Environmental
Public Health Division



Wong Chin Ling
Director-General, Meteorological
Service Singapore



Tan Eng Kim Francis
Group Director, Corporate Services
Director, Corporate Services &
Development Division



S Satish Appoo
Group Director, Joint Operations
& Technology



Cheang Kok Chung
Deputy Director-General,
Environmental Protection Division
Director, Environmental Protection
Policy & International Relations Division



Suanne Mocktar
Director, 3P Network Division



Ivy Ong Bee Luan
Director, Hawker Centres Division



Gloria Chin
Director, Human Resource Division



Lee Kheng Seng
Director, Joint Operations &
Planning Division

... continued from previous page ^[102-18]



Chua Yew Peng
Director, Public Health Policy &
Planning Division



Andrew Low
Director, Service Quality Division



Patrick Pang
Chief Technology Officer
Director, Environment Technology
Department



Dulcie Chan
Director, Corporate Communications
Department



Dalson Chung
Director, Industry Development &
Promotion Department



Jeffrey Sim
Director, Legal Department



Aw Eng Lim
Director, Singapore Environment
Institute



Elaine Phang
Chief Information Officer



Marcus Quek
Head, Internal Audit Department

Accurate as of 1 September 2018

Sustainability Governance ^[102-18]

NEA strives to be a leading agency in sustainable practices that benefit Singapore's environment, economy and society. To realise this goal, NEA has taken a comprehensive approach to develop the principles, processes and people that would steer the organisation through its long-term sustainability journey. Sustainability initiatives within NEA are guided by the principles of a sustainability framework, supported by a robust governance structure, and enabled through the core values of its people.

NEA'S SUSTAINABILITY FRAMEWORK

NEA's corporate sustainability framework is shaped by four guiding principles:

- W – Walk the Talk
- I – Innovate for Sustainability
- S – Share with the Community
- E – Embed Sustainability

W.I.S.E. supports NEA's key corporate sustainability pillars – environmental

sustainability, financial sustainability and social sustainability. The framework guides NEA in prioritising its work on internal sustainability and in implementing new initiatives.



NEA strives to be the leading agency in sustainability practices for the benefit of our **environment, economy and community** – today, for tomorrow



NEA'S SUSTAINABILITY GOVERNANCE STRUCTURE

NEA recognises the importance of a structured approach to drive corporate sustainability initiatives within the organisation. Accordingly, NEA set up the Sustainability Office in April 2010 to oversee and coordinate all internal sustainability efforts. This was followed by the development of the Sustainability Governance framework in April 2011.

NEA's Sustainability Governance Structure



... continued from previous page ^[102-18]

Senior Management's Support

The Organisational Development Steering Committee, made up of NEA's senior management and directors, is responsible for setting the sustainability direction for NEA. The committee meets every quarter to deliberate and endorse NEA's direction and sustainability initiatives.

Middle Management's Support

To strengthen support from all levels of NEA's management, all heads of department, heads of regional offices and general managers of waste management facilities have been appointed as Sustainability Champions. Their support will help drive sustainability changes within their respective departments and at off-site premises.

The Sustainability Champions also meet quarterly at NEA Sustainability Committee meetings. Led by the Chair of NEA's Sustainability Committee, the Sustainability Champions will discuss, share and align sustainability efforts.

Staff Involvement

NEA staff are encouraged to take on greater roles and ownership in promoting the sustainability journey. Sustainability Champions nominate at least one staff to join the Eco-Office Committee and the Panel for Employee Engagement and Recognition Committee. Mechanisms have been put in place to regularly review and rotate the committee representatives. This will encourage new ideas and provide opportunities for more staff to be involved in NEA's sustainability journey.

At each of NEA's off-site premises, the Eco-Office Committee representative may also chair a sub-committee within the premises. The sub-committee is responsible for the implementation of site-specific Eco-Office initiatives, monitoring of action plans, gathering of feedback and advising staff on their performances.

NEA'S CORE VALUES AS ENABLERS

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

For example

- **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.

About the National Environment Agency [102-1,102-2,102-3,102-4,102-5,102-6,102-7,102-12,102-13]

The National Environment Agency (NEA) is the leading public organisation responsible for improving and sustaining a clean and green environment in Singapore. It was established on 1 July 2002 by the NEA Act (Chapter 195) as a statutory board under the Ministry of the Environment and Water Resources (MEWR).

NEA develops and spearheads environmental initiatives and programmes through partnership with the People, Public and Private (3P) sectors. Through these initiatives and programmes, Singaporeans are encouraged to take up environmental ownership and to care for the environment as a way of life.

By maintaining high standards for public health, nurturing vibrant hawker centres, protecting the environment from pollution, encouraging resource efficiency, and providing timely meteorological information, NEA endeavours to ensure a clean, liveable and sustainable Singapore for present and future generations.

As of end FY2017, NEA has a workforce of 3,859, and is governed by a 14-member Board of Directors.

NEA's work is highly diverse. The key areas underpinning its mission to ensure the sustainability of Singapore's natural and urban environments include:

- 3P (People, Public and Private) Partnership
- Energy Efficiency and Climate Change
- Environmental Training
- Hawker Centre Management
- Meteorological Services
- Pollution Control
- Public Hygiene and Cleanliness
- Radiation Protection and Nuclear Safety
- Solid Waste Management
- Vector-borne Disease Prevention and Control

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. The table below highlights NEA's key strategies to promote a liveable and sustainable Singapore:

NEA's Strategies	NEA's Work
Ensuring High Standards for Public Health	<ul style="list-style-type: none"> • NEA ensures high standards of public health, cleanliness and hygiene by: <ul style="list-style-type: none"> • maintaining high cleaning standards in public areas • enforcing against littering, smoking, food hygiene infringements and other public health breaches • building up capabilities and technologies, and conducting research in areas such as vector control and food hygiene • promoting socially responsible behaviour and a sense of community ownership among the public through campaigns and 3P collaborations • taking an integrated approach to controlling vectors and vector-borne diseases • planning for after-death facilities and services

... continued from previous page ^[102-2,102-7]

NEA's Strategies	NEA's Work
Facilitating Vibrant Hawker Centres and Trade	<ul style="list-style-type: none"> • NEA facilitates the provision of affordable cooked food at clean, hygienic and vibrant hawker centres by: <ul style="list-style-type: none"> • managing and regulating markets and hawker centres in Singapore • building new hawker centres where required • conducting cyclical repairs and redecoration works at existing MEWR-owned hawker centres • partnering community organisations to create social spaces and experiences at hawker centres
Achieving a Safe, Healthy and Conducive Living Environment	<ul style="list-style-type: none"> • NEA seeks to achieve a conducive living environment with clean air, land and water by: <ul style="list-style-type: none"> • formulating and enhancing environmental policies for cleaner air, land and water • controlling and monitoring air pollution, water pollution and noise levels • regulating the collection, transport, treatment and disposal of toxic waste and hazardous substances • ensuring that environmental considerations are integrated into land-use planning and development, as well as in the building controls of new developments

NEA's Strategies	NEA's Work
Promoting a Resource Efficient and Sustainable Singapore	<ul style="list-style-type: none"> • NEA promotes resource efficiency and conservation, and helps Singapore move closer to the national goals of zero waste and zero landfill by: <ul style="list-style-type: none"> • supporting industries and households in their energy efficiency efforts • building cost-effective waste management and waste-to-energy systems • optimising the use of Singapore's landfill to maximise its lifespan • encouraging waste minimisation and waste segregation at the source • cultivating a resource-efficient and 3R-oriented society
Mitigating Climate Change and Greenhouse Gas Emissions	<ul style="list-style-type: none"> • NEA is committed to addressing climate change through: <ul style="list-style-type: none"> • conducting research and working with partners to better understand Singapore's vulnerability to climate change • identifying and assessing mitigation and adaptation required to reduce greenhouse gas emissions and manage the impact of climate change • NEA contributes to the mitigation of greenhouse gas emissions in industries, households, buildings and waste sectors in Singapore through: <ul style="list-style-type: none"> • implementing the carbon tax, starting from 2019 to incentivise emissions reduction and the transition to a low-carbon economy • regulating energy-intensive companies through legislation such as the Energy Conservation Act • encouraging energy efficiency through incentive schemes such as the Energy Efficiency Fund • promoting climate action outreach and community initiatives

... continued from previous page ^[102-2,102-7]

NEA's Strategies	NEA's Work
Providing Timely and Reliable Weather Information and Hazard Preparedness	<ul style="list-style-type: none"> NEA delivers timely and reliable weather information by: <ul style="list-style-type: none"> ensuring round-the-clock monitoring, assessment and forecasting of the weather for the public, and for critical sectors like aviation and maritime conducting research on tropical climate and weather in the region NEA lays the groundwork for Singapore's hazard preparedness by: <ul style="list-style-type: none"> building Singapore's capabilities in detecting and monitoring radiation ensuring the safe use of ionising and non-ionising radiation coordinating with regional partners to monitor and address cross-border hazards, such as transboundary haze and forest fires
Developing and Promoting the Environmental Services Industry	<ul style="list-style-type: none"> NEA develops Singapore's environmental services industry by: <ul style="list-style-type: none"> building capabilities and providing opportunities for technology adoption, upskilling and outcome-based procurement under the Environmental Services Industry Transformation Map supporting collaboration on innovation projects, and the development and adaptation of green technology and products supporting local suppliers where possible as part of its sustainable procurement practices providing training through industry programmes co-developed between the Singapore Environment Institute (SEI) and Institutes of Higher Learning
Leading and Partnering Public Sector Agencies	<ul style="list-style-type: none"> NEA partners public agencies by advancing the Public Sector Taking the Lead in Environmental Sustainability initiative to encourage public agencies to take greater ownership of their own environmental sustainability efforts

NEA's Strategies	NEA's Work
Engaging and Nurturing People and the Community	<ul style="list-style-type: none"> NEA cultivates an environmentally responsible community by: <ul style="list-style-type: none"> encouraging greater environmental ownership and active citizenry through 3P partnerships promoting a culture of waste reduction, resource efficiency, and greener consumer and commuting choices organising public awareness and outreach campaigns, such as Clean & Green Singapore and 'Do the Mozzie Wipeout'
Collaborating and Advancing International Interests	<ul style="list-style-type: none"> NEA forges international partnerships to advance common environmental interests and share expertise by: <ul style="list-style-type: none"> conducting or co-organising international workshops, seminars and other events with opportunities to expand its mindshare becoming a party to strategic bilateral agreements and international treaties taking a proactive role in regional or ASEAN environmental and climate issues
Enabling a High Performance NEA	<ul style="list-style-type: none"> NEA pursues excellence in everything it does or strives to do by: <ul style="list-style-type: none"> strengthening operations and service delivery adopting 'right-size' regulations and simplifying processes building robust capabilities developing and engaging staff strengthening corporate practices and governance NEA provides training for staff, management and field officers through SEI NEA supports collaboration on innovation projects and the development and adoption of green technologies and products

NEA's Strategy and Business Model

NEA'S VISION AND STRATEGY MAP

NEA's mission is to ensure a clean and sustainable environment for Singapore. The NEA Strategy Map presents how NEA strives to achieve its mission through five key roles in public health, hawker centres, environmental management, energy and waste, and meteorological services.

NEA maintains high standards for public health by ensuring a good level of hygiene in retail food establishments and limiting incidences of vector borne diseases.

Efforts are already underway to strengthen the use of hawker centres as social spaces, while still ensuring that they offer a wide variety of affordable food in a clean and hygienic environment.

NEA is also the steward of a safe, healthy and conducive environment, where Singaporeans can enjoy clean air, pristine water quality and quieter surroundings.

NEA Strategy Map

VISION

A Clean Environment, Towards a Liveable and Sustainable Singapore

Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore



High Standards
for Public Health



Vibrant Hawker
Centres and Trade



Safe, Healthy and
Conducive Living
Environment



Resource Efficient
and Sustainable
Singapore



Timely and Reliable
Weather Information and
Hazard Preparedness

Engaging Our Partners and the Community



Develop and
Promote Industries



Partner Public
Sector Agencies



Engage and Nurture
People and the Community



Collaborate and Advance
International Interests

Enabling a High Performance NEA



Strengthen
Operations and
Service Delivery



Adopt 'Right-Size'
Regulations and
Simplify Process



Build Robust
Capabilities



Develop and
Engage Staff



Strengthen
Corporate Practices
and Governance

... continued from previous page

Sustainability is high on NEA's agenda, which is dedicated to the efficient use and conservation of resources. To help Singapore meet its goal of becoming a zero waste nation, NEA has also set its sights on reducing waste at source.

Last but not least, NEA's role also includes providing timely and reliable weather information services, as well as hazard warnings, such as seismic activity alerts.

NEA is able to achieve these outcomes by working closely with partners in the public and private spheres, as well as developing its in-house capabilities and talents to become a high performance organisation.

NEA'S PARTNERSHIPS

NEA continues to strengthen its public-private-people collaborative initiatives and widen its network of partners locally and abroad.

Many initiatives, campaigns and multi-agency task forces call for close collaboration between NEA and other public agencies. Where required, NEA takes the lead in driving waste minimisation and energy efficiency efforts in the public sector.

NEA not only supports local industries but also works with the private sector to identify new economic opportunities in emerging environmental industries, such as clean energy and technologies that could enhance operations and build new capabilities in Singapore. These efforts support local companies keen to secure a place in the global market for environmental services.

NEA is constantly reaching out to the community and its people to encourage sustainable living and environmental ownership. The achievement of NEA's desired outcomes is further supported by the active grooming of individuals to champion eco-friendly practices in the community.

Accompanying efforts within our shores, NEA also cooperates with strategic partners through various bilateral platforms and will continue to explore collaborations with like-minded partners in the international arena.

With the collective efforts of its various partners and the community, NEA is better positioned to bring forth a greater positive impact on Singapore's environment.

HIGH PERFORMANCE NEA

NEA seeks to maintain a highly efficient and effective workforce by leveraging new technologies to enhance operations and service delivery, and build up new technological and cultural capabilities.

There is also a strong emphasis placed on training and development so that all NEA staff are equipped with the right knowledge, skills and expertise to contribute throughout their careers.

Strong partnerships, coupled with a high performance workforce, have allowed NEA to strengthen its corporate brand and become future-ready to confront the challenges ahead.

NEA'S FUTURE

A robust organisational strategy, however, does not negate uncertainties in NEA's future. These uncertainties are likely to affect its business outcomes.

The impact of severe weather, climate and related environmental natural hazards are increasingly apparent and NEA is required to respond nimbly and flexibly. Both meteorologists and climate scientists are being called upon to support the effort of safeguarding lives and property. More than ever, the role of the meteorological community has expanded to include advising decision-makers in addition to issuing forecasts and advisories.



Above: NEA reaches out to the community to play their part in realising environmental sustainability and public health.

Sustaining the high standards of public health that have come to define Singapore has never been easy. Existing public health threats require diligent vector monitoring and control efforts, while new ones may capitalise on Singapore's global connectivity to make their way to our shores, like Zika did in FY2016. But with its operations and outreach strategies firmly in place, NEA is well-placed to take on public health threats together with its One Health partners.

The threat of food-borne pathogens is also of growing concern internationally. A preventive, rather than reactive, approach has always been crucial when it comes to food safety. To this end, NEA will continue to emphasise vigilance, training and good practices, so that the risk of food-borne disease transmission remains low in Singapore. Public education and coordination with industry stakeholders will play pivotal roles as well.

As NEA continues to pursue operational excellence through transformative changes in its work processes and workplace, it is also important that NEA ensures its workforce is adequately equipped and skilled to meet the challenges ahead. With rapid advances in automation and digitalisation, NEA will continue to ensure that no one is left behind.

Risks and Opportunities ^[102-11,102-15,201-2]

With commitment and ownership at all levels of the organisation, NEA is well-placed to manage risks and opportunities in its sustainability journey. Following a review of national and global trends, compliance requirements, and feedback received from internal stakeholders, NEA's management has identified the risks and opportunities concomitant with undertaking sustainability within the organisation.

Advancing Sustainability in NEA's Public Initiatives

Key Issues	NEA's Approach	Opportunities
<p>Greater public expectation for NEA to be the champion of the environment and to walk the talk</p> <p>The changing environment that organisations like NEA operate in:</p> <ol style="list-style-type: none"> Growing global environmental challenges such as climate change Greater push for sustainability reporting by organisations such as Singapore Exchange Higher cost of operations due to climate change ^[GRI 201-2] More requirements to comply with, such as Public Sector Taking the Lead in Environmental Sustainability 2.0, Energy Conservation Act, Environmental Protection and Management (Air Impurities) Regulations, among others 	<ul style="list-style-type: none"> Drive infrastructure enhancement and behavioural changes to achieve environmental sustainability within NEA Continue to innovate for sustainability and explore the possibility of further leveraging on technology Report on NEA's progress through sustainability reports ^[GRI 201-2] 	<ul style="list-style-type: none"> NEA will be able to do its part for the environment, gain public trust in its national policies, and work more closely with its partners in achieving environmental goals NEA, as one of the first public agencies to voluntarily report on sustainability, can help influence more to follow suit NEA will be able to identify areas for improvement within the organisation through sustainability reporting NEA will be spurred to adopt a rigorous risk management system to reduce its financial risk, such as the financial risk of climate change
<p>Complying with the Workplace Safety and Health Act, with attention to the needs for an aging workforce</p>	<ul style="list-style-type: none"> Undertake greater efforts to increase staff awareness on Workplace Safety and Health (WSH) 	<ul style="list-style-type: none"> NEA will be spurred to enhance WSH programmes and adopt a rigorous WSH risk management system
<p>The need to drive productivity and innovation so as to maximise human-capital output</p>	<ul style="list-style-type: none"> Emphasise innovation in every aspect of sustainability work Implement initiatives that drive greater productivity 	<ul style="list-style-type: none"> NEA will be able to leverage technology and innovative solutions to enhance its operations and achieve greater business excellence

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

Key Issues	NEA's Approach	Opportunities
The challenge of meeting NEA's manpower requirements with Singapore's greying population	<ul style="list-style-type: none"> Continue to enhance work-life harmony, leverage technology, redesign jobs, extend age of re-employment, and put in place talent management initiatives 	<ul style="list-style-type: none"> NEA will be able to put in place necessary preparations and processes ahead of a future manpower crunch
The need to meet the growing expectations of employees on work-life harmony and job satisfaction		<ul style="list-style-type: none"> NEA will be able to better retain talent as sustainable practices help contribute to staff well-being NEA will be able to realise its strong Employee Value Proposition¹ (EVP), and strengthen its brand as an employer of choice
The need to broaden its role from that of enforcer to that of facilitator and partner	<ul style="list-style-type: none"> Manage a broader role by creating awareness, putting in place supportive policies, processes and systems, and equipping staff with relevant skills 	<ul style="list-style-type: none"> NEA staff will be able to gain exposure to diverse roles and make contributions in new or different ways
The need to check for any possible corruption and fraud within the organisation	<ul style="list-style-type: none"> Provide guidance and training to increase staff awareness of the code of conduct at NEA workplace 	<ul style="list-style-type: none"> NEA will be able to uphold the highest standards of corporate integrity
The need to ensure prudent use of government funds	<ul style="list-style-type: none"> Put in place policies and standard operating procedures to manage NEA's finances 	<ul style="list-style-type: none"> NEA will be spurred to ensure accountability and optimisation of its resources NEA will benefit from instilling strong corporate governance and risk management practices
The need to strengthen NEA's corporate sustainability culture	<ul style="list-style-type: none"> Integrate NEA's core values into NEA's sustainability framework Emphasise engagement in every aspect of NEA's sustainability drive, capitalise on existing engagement platforms and create new ones 	<ul style="list-style-type: none"> A vibrant employee engagement programme will help reinforce NEA's corporate culture, nurture its staff to become environmental ambassadors and boost staff voluntarism through its community outreach programmes

NEA continues to closely monitor the above risks and opportunities, as well as identify new risks and opportunities. This will ensure that NEA's corporate sustainability efforts address all developing trends and risks.

¹ NEA's EVP was developed in 2013 using a ground-up approach. It positions NEA as an employer of choice and guides NEA's human resource strategies and policies.

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 risk in a structured, integrated and effective manner.

The ERM programme enables NEA to proactively identify, assess, prioritise, treat and monitor its 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

In planning ERM activities, NEA is guided by an ERM framework that features three thrusts:

Robust Risk Management Governance Structure

The Enterprise Risk and Safety Steering Committee (ERSSC) is responsible for overseeing risk management in NEA.

Enterprise Risk Management Framework



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

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

Each year, ERSSC also reports to the 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. 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. The Risk Champion is responsible for administering risk control policies and procedures, as well as documenting the department's risks and related control plans in 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 operations functions also conduct regular control self-assessments, called the Quality Assurance Self-Assessment (QASA). Introduced since August 2016, QASA helps the departments undergo self-assessment to determine the effectiveness of their internal controls and risk mitigation.

Questionnaires are provided to relevant departments in batches every quarter to facilitate self-assessments. The self-assessments are then validated, with the management being updated with the results periodically at ERSSC meetings.

Proactive Risk Management Culture

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

- **Risk Training Workshops**

These are 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.

The objective is to 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. This ensures that new hires 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 recorded in their staff appraisal and human resource records.

NEA's Corporate Sustainability Material Issues ^[102-15,102-40,102-46,102-47,103-1]

NEA constantly monitors and assesses its sustainability progress, as well as conducts regular staff engagement programmes, to obtain the latest inputs on materiality issues. From these inputs and from NEA's analysis of current risks and opportunities, NEA has identified eight material issues in FY2017 that are pivotal to its corporate sustainability drive. The principles of the GRI Standards form the basis of how NEA identifies and reports its key material issues.

The table below outlines the material issues, their impact and the stakeholder groups involved.

Material Focus Areas	Material Issues	GRI Topic-Specific Standards	Why the Topic is Material	Where the Impact Occurs	NEA's Involvement
Environmental Sustainability	Pollution Control Compliance	Air emission and compliance	<ul style="list-style-type: none"> Operations at waste treatment plants and crematoria have the potential to negatively affect their surrounding environments, primarily through emissions and effluents Impact on the environment and community depends on how pollution is managed 	Public / Community	<ul style="list-style-type: none"> NEA manages two waste-to-energy (WTE) plants and two crematoria Incineration processes result in air emissions Used water is collected from refuse bunkers and discharged from ash pits of WTE plants Effluent is sent for treatment, where its acidity is adjusted to a pH range between 6 and 9, before being discharged into the public sewers NEA regularly reviews and controls the operations of these facilities to ensure that their air emissions and effluent discharge are within regulatory limits
		Effluents and compliance			
	Resource Conservation	Energy	<ul style="list-style-type: none"> Singapore's energy needs are largely met by fossil fuels, most of which are imported Singapore is alternative energy disadvantaged Burning fossil fuels results in greenhouse gas emissions Fresh water supply remains scarce in Singapore due to land constraints for catchment Impact on the environment and community depends on how resources are managed and conserved 	Public / Community	<ul style="list-style-type: none"> Energy and water is directly consumed in NEA's offices and installations Consumption of electricity by NEA results in indirect greenhouse gas emissions NEA walks the talk in conserving energy and water, and in meeting the sustainability targets under the Public Sector Taking the Lead in Environmental Sustainability initiative NEA is installing solar panels to harness renewable energy at suitable managed premises
		Water			
		Waste	<ul style="list-style-type: none"> Limited space for waste disposal due to land constraints Impact on the environment and community depends on how resources are managed and conserved 	Public / Community	<ul style="list-style-type: none"> Waste is generated within NEA's premises as a result of day-to-day activities and work operations NEA walks the talk in reducing waste and practising the 3Rs within the organisation

... continued from previous page ^[102-15,102-40,102-46,102-47,103-1]

Material Focus Areas	Material Issues	GRI Topic-Specific Standards	Why the Topic is Material	Where the Impact Occurs	NEA's Involvement
Social Sustainability	Workplace Safety and Health	Occupational safety and health	<ul style="list-style-type: none"> Work-related incidents resulting in injuries to employees have occurred before As an employer, NEA is expected to provide a safe working environment for all employees 	Employees	<ul style="list-style-type: none"> Frontline officers performing outdoor activities, such as inspections or enforcement action, are exposed to a certain degree of occupational and health hazards NEA complies with the Workplace Safety and Health Act through enforcing strict safety protocols and providing relevant training for its officers
	People Excellence	Fair employment	<ul style="list-style-type: none"> NEA needs to align its employment practices with the Employment Act and comply with the Retirement and Re-employment Act NEA, as a public agency, is expected to adhere to fair employment practices 	Employees	<ul style="list-style-type: none"> NEA employs staff for a wide range of roles, from junior support staff to senior leadership positions NEA also employs persons with physical disabilities A positive work environment based on fair employment practices has been created for NEA's employees
		Training and education	<ul style="list-style-type: none"> Training and development drives organisational productivity and growth Employees get equipped with the right qualities and knowledge Provision of training to the industry and other external parties helps to lift professionalism and expand capabilities in different sectors of the economy 	Employees / Industry / Partners	<ul style="list-style-type: none"> NEA has put in place a robust learning framework NEA provides specialised training to the industry and external parties NEA will create more upskilling opportunities for the industry through the Skills Framework for Environment Services, an integral component of the Environmental Services Industry Transformation Map
	Staff Voluntarism	Giving back to the community and helping the less fortunate ²	<ul style="list-style-type: none"> NEA's community outreach programmes help support Singapore society Staff voluntarism can help staff feel more engaged and develop a stronger sense of identity and purpose with the organisation 	Employees / Community	<ul style="list-style-type: none"> NEA has developed an engaged and socially responsible workforce that gives back to the community

² Not relevant GRI Topic Specific Standards

... continued from previous page ^[102-15,102-40,102-46,102-47,103-1]

Material Focus Areas	Material Issues	GRI Topic-Specific Standards	Why the Topic is Material	Where the Impact Occurs	NEA's Involvement
Financial Sustainability	Finances	Optimisation of financial resources ³	<ul style="list-style-type: none"> Responsible use of resources is needed to address public concerns on how NEA manages its finances as a government-funded organisation 	Public	<ul style="list-style-type: none"> NEA has put in place stringent financial controls and reporting mechanisms to account for its use of financial resources
	Supply Chain	Procurement practices	<ul style="list-style-type: none"> NEA, as a public agency, is expected to adhere to fair and transparent procurement practices 	Public / Industry	<ul style="list-style-type: none"> NEA has put in place stringent procurement controls and review processes
	Innovation and Productivity	Maximising human capital output ³	<ul style="list-style-type: none"> Innovation is necessary to stay relevant, meet challenges, address risks and deliver better outcomes Business functions that consume the most manpower, such as operations and service delivery, will stand to benefit most from innovation and productivity improvements 	Employees	<ul style="list-style-type: none"> NEA cultivates and sustains a ground-up innovation culture NEA has put in place an innovation framework to encourage idea incubation and drive innovation excellence

³ Not relevant GRI Topic Specific Standards

CHAPTER 1

Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore

High Standards for Public Health

Our environment makes us who we are. Living in a healthy environment without the burden of disease imbues us with the well-being to lead fulfilling lives and contribute as productive individuals.

As the leading public agency responsible for our environment, NEA plays a pivotal role in sustaining a high standard of public health in Singapore. This is achieved through a diligent routine of ground surveillance, enforcement, outreach, licensing and research.

Each day, NEA officers conduct inspections, reduce public health risks and take swift action to control any outbreak. Their concerted efforts help to safeguard public health and keep the incidence of vector- and food-borne diseases low.

Sustaining a Relentless Effort to Keep Dengue in Check

In 2017, a total of 2,772 dengue cases were reported. This was the lowest since 2001. This comparatively low dengue incidence could be attributed to several key factors:

i. Low dengue incidence at the start of 2017

Due to the concerted efforts by all stakeholders in response to the Zika outbreak in the second half of 2016

ii. Removal of *Aedes aegypti* mosquitoes

By NEA's island-wide network of about 50,000 Gravitraps in 2017

Additionally, NEA has sustained its relentless effort to combat dengue through a series of initiatives and close collaboration with stakeholders.

The use of data analytics and risk stratification has been instrumental in the success of NEA's dengue control strategy. NEA closely monitors the data on mosquitoes caught in its Gravitraps. Areas with high *Aedes* mosquito populations are targeted for inspections. This risk-based approach has allowed NEA to streamline its resources for more effective dengue control.



Left: 'Do the Mozzie Wipeout' community awareness event that mobilised the public to join the fight against dengue. Middle: A young resident learning that male mosquitoes do not bite. Right: An example of a collateral from the 'Do the Mozzie Wipeout' campaign.



Dengue Control Efforts in 2017

1.2
Million
Inspections
Conducted
island-wide

~15,000
Mosquito
Breeding Habitats
Uncovered and
destroyed

Project *Wolbachia* – Singapore is the latest addition to NEA's dengue control initiatives. It involves the release of male *Wolbachia*-*Aedes* mosquitoes to suppress the urban *Aedes aegypti* mosquito population in Singapore. When male *Wolbachia*-*Aedes* mosquitoes mate with *Aedes aegypti* females in the community, the resultant eggs do not hatch.

Phase 1 of the field study concluded in 2017, yielding promising results – the releases had led to a 50 per cent suppression of the urban *Aedes aegypti* mosquito population at the study sites. It also surfaced unique challenges posed by Singapore's high-density and high-rise urban landscape.

Key Findings from Small-scale Field Study: Phase I



50%
of collected
Aedes
mosquito eggs
did not hatch
Key achievement



**High-rise and
densely built
environments affect
success rate**
Key challenge

Phase 2 has begun in April 2018 to enhance release methodologies and tactics.

In FY2017, NEA continued to coordinate mosquito control programmes with members of the **Inter-Agency Dengue Task Force**, which includes public agencies and all Town Councils (TCs). Bilateral discussions were held with member agencies to address dengue control and prevention measures in the areas under their respective care. NEA also trained operation managers from Ministry of Education schools on effective mosquito surveillance and control.



An NEA officer conducting a routine check for potential rat activities.

Held on 14 May 2017, the annual ‘Do the Mizzie Wipeout’ campaign mobilised the entire community to join the fight against dengue. Dengue Prevention Volunteers, along with representatives from the grassroots and public agencies, visited residents and shared useful tips on dengue prevention. NEA conducted training for volunteers and helped to raise public awareness of the dengue prevention message. Concerted community action remains a key pillar of NEA’s dengue control strategy.

Licensing General Waste Disposal Facilities to Safeguard Public Health

On 1 August 2017, NEA began licensing General Waste Disposal Facilities

(GWDFs) that receive, store, process, treat or recycle general waste. The licensing framework makes it a requirement for GWDFs to incorporate proper storage systems, and for the GWDF operators and owners to adopt strict measures to mitigate public health nuisances and potential fire risks.

There are currently more than 300 GWDFs in Singapore. NEA has conducted briefings to the GWDF owners and operators to familiarise them with the licensing requirements. GWDF owners and operators must obtain a licence or submit an exemption declaration by 31 July 2018. This is part of NEA’s continued efforts to safeguard public health and safety.

Achieving Encouraging Results through Rat Control Efforts

The number of burrows detected in public areas has dropped by about 33 per cent, from 39,000 in 2016 to 26,000 in 2017. NEA was able to achieve the improvements through an integrated approach of surveillance, outreach and enforcement, as well as through the concerted effort of all stakeholders in sustaining rat control measures at their respective premises.

For public housing estates, NEA has been actively engaging TCs through initiatives such as the **TC Rat Attack programme**. Under the programme, TCs are encouraged to adopt a holistic approach when tailoring rat control efforts based on the rat situation in their respective housing estates.

In order to better monitor the situation in vacant tracts of land, the **Inter-Agency Rat Control Task Force** helps public land agencies coordinate rat control efforts. Agencies can synergise their operations to identify potential rat situations and implement pre-emptive actions.

Besides enforcement efforts, NEA engages operators of shopping malls, retail food establishments and other organisations through educational outreach. Operators are given guidance on the importance of denying rats access to food sources and on the procurement of pest control services to ensure effective control. NEA also carries out research to improve its understanding of the ecology and behaviour of rats.

With these programmes and efforts in place, NEA will continue to engage stakeholders in its integrated approach to manage the rat situation in Singapore.

Conducting Public Consultations on Inland Ash Scattering Facilities

The Government is exploring the implementation of inland ash scattering (IAS) services in Singapore at government-run facilities. With this implementation, the public will have an additional option besides placing the cremated ashes of their loved ones at home, in columbariums or via scattering at sea.

From July to December 2017, NEA conducted a series of consultations with relevant stakeholders, including religious groups, after-death care service providers and the general public. Feedback from the consultations will help guide various aspects of IAS implementation, such as facility design, user experience, operational procedures, booking arrangements, and cultural and religious needs.

Ensuring Safe Food Preparation at TCM Shops through Licensing ^[103-2]

Many Traditional Chinese Medicine (TCM) shops prepare food and drinks, such as herbal tea and tea-leaf eggs, for sale at their premises. Food preparation activities need to be conducted under hygienic conditions, or there could be a risk to public health. Licensing helps minimise this risk by ensuring that operators comply with the design and infrastructural requirements as stipulated in the Code of Practice for Environmental Health for food retail.

NEA consulted key stakeholders on a proposed licensing scheme for the on-site preparation of food and drinks.

These include the Singapore Chinese Druggists Association and TCM shops, whose feedback were evaluated and incorporated into the initial proposal, such as offering a longer compliance timeline.

Since 1 March 2018, new TCM shops that intend to prepare food and drinks within their premises are required to obtain a licence from NEA. Existing TCM shops must apply for a licence by 1 March 2019 to continue on-site food and drinks preparation.

Strengthening Regulatory Oversight of Piped Drinking Water ^[103-2]

NEA's Drinking Water Unit (DWU), together with PUB, Singapore's National Water Agency, oversees the regulation of drinking water quality in Singapore. In 2017, a strategic review of the regulatory framework for drinking water quality was carried out.

Arising from this review, DWU's regulatory powers will be extended to cover all drinking water provided in the course of business and to the public. This will be followed up with the necessary legislative amendments.



NEA ensures food handlers conduct food preparation activities under hygienic conditions.

Broadening Food Safety Management Requirements to Licensees with Permission to Provide Ancillary Catering ^[103-2]

The Food Safety Management System (FSMS) helps the food catering industry identify and reduce food-borne hazards at every stage of the food storage, preparation, cooking and delivery process. The scheme is part of NEA's continued efforts to improve food hygiene standards in the industry.

Since the launch of the FSMS scheme in 2014, NEA has been engaging the catering industry to promote better

understanding of the benefits and challenges of FSMS. The industry shared that FSMS had improved hygiene standards, reduced food wastage and raised productivity.

Following the encouraging feedback, NEA will be extending the FSMS requirements to all existing and new licensees with permission to provide catering as an ancillary service. This will take effect from 1 April 2019.

NEA will continue to engage the licensees and ensure that they comply with the FSMS hygiene requirements.

Vibrant Hawker Centres and Trade^[103-2]

Through the decades, the function that hawker centres serve in our lives has greatly evolved. In the 1970s, the main purpose of hawker centres was to allow street hawkers to sell food in a hygienic setting with proper sanitation.

Hawker centres today are known for their wallet-friendly dining options. NEA is responsible for managing and improving Singapore's hawker centres, ensuring that people from all walks of life can enjoy affordable cooked food in a clean and hygienic dining environment.

Many Singaporeans have also come to regard our hawker centres as 'community dining rooms', where we bond and interact through our shared love for food. In view of this, NEA supports community efforts that enhance and improve the vibrancy of our hawker centres as social spaces.

Building New Hawker Centres and Improving Existing Ones

NEA has been actively involved in the planning and development of new hawker centres, as well as renovating existing ones. The number of hawker centres and markets in Singapore has grown to 114. These are managed by NEA or through NEA-appointed managing agents.

The Government had previously announced that 20 new hawker centres will be built by 2027. This collective addition of more than 800 cooked food stalls will help moderate rentals and sustain market competition, thereby ensuring that food prices remain affordable over time.

In 2012, the Ministry of Environment and Water Resources (MEWR) announced the building of 10 new hawker centres throughout Singapore. Seven hawker centres have already been completed and are operational – Ci Yuan, Bukit Panjang, Our Tampines Hub, Kampung

Admiralty, Yishun Park, Jurong West and Pasir Ris Central. Development is underway for the three hawker centres at Punggol, Sembawang and Sengkang.

In 2015, MEWR announced the building of 10 more new hawker centres, of which five will be located at Bidadari, Bukit Batok, Bukit Panjang, Choa Chu Kang and Sengkang. Two more hawker centres were announced at Punggol and Sengkang in June 2017.

These new hawker centres incorporate design elements that promote a better dining experience for all. Their ceilings are built higher with powerful fans to allow for more ventilation, while passageways are more spacious for the comfort of patrons, cleaners and stallholders. Landscaping is also designed to help lower the building's ambient temperature. Tray return facilities have been installed throughout the premises so that diners can help to keep the table clean for the next diner.

Productivity solutions have also been deployed to enhance centre-level operational efficiency and dining convenience. These include centralised dishwashing, automated tray return systems, and electronic payment methods via mobile apps or QR codes.

To promote environmental sustainability, many green features such as waste recycling facilities, bicycle parking fixtures, energy-efficient lighting and water-efficient taps are also being implemented at the new hawker centres. Additionally, NEA is also conducting pilots at several centres to assess the feasibility of waste conveyance facilities and how energy needs can be augmented with solar panels.

Completed New Centres

- A** Ci Yuan Hawker Centre
(commenced operations on 6 August 2015)
- B** Bukit Panjang Hawker Centre & Market
(commenced operations on 29 December 2015)
- C** Hawker Centre @ Our Tampines Hub
(commenced operations on 9 November 2016)
- D** Kampung Admiralty Hawker Centre
(commenced operations on 12 August 2017)
 - i. **Excellent:** 5 awards achieved
Excellence in Public Service – Best Practice Award (Inter-Agency Collaboration) 2017
MND Minister's Award (Team) 2017
MEWR Team Contribution Award 2018
BCA Universal Design Mark Platinum
BCA Green Mark Platinum
 - ii. **Affordable:** At least two ≤\$2.80 budget meals made available at every stall
 - iii. **Innovative:** Automated tray return system, centralised dishwashing and e-payment options
 - iv. **Healthy:** At least one healthier food option made available at every stall, except for drinks and desserts stalls
- E** Yishun Park Hawker Centre
(commenced operations on 20 September 2017)
 - i. **Excellent:** 2 awards achieved
BCA Green Mark Gold (New Non-Residential Buildings)
BCA Universal Design Mark Gold
 - ii. **Affordable:** At least one \$3 budget meal made available at every stall
 - iii. **Vibrant:** 2 incubator stalls set aside for new hawker entrants, and weekend programmes promote community and family bonding
 - iv. **Innovative:** Automated tray return system, centralised dishwashing, and mobile app with e-payment and loyalty programme functions
- F** Jurong West Hawker Centre
(commenced operations on 3 October 2017)
 - i. **Excellent:** 2 awards achieved
BCA Green Mark Gold (New Non-Residential Buildings)
BCA Universal Design Mark Gold

Building New Hawker Centres with Affordable Food and Vibrant Spaces

- ii. **Affordable:** Two \$2.80 or below basic meals made available at every stall
 - iii. **Vibrant:** 6–10 stalls set aside for aspiring local hawkers under the Happy Hawkerpreneur Programme
 - iv. **Innovative:** Automated tray return system, centralised dishwashing, e-payment options and self-payment kiosks
 - v. **Healthy:** Two healthier food options made available at every stall, except for drinks and desserts stalls
- G** Pasir Ris Central Hawker Centre
(commenced operations on 25 January 2018)
 - i. **Excellent:** 2 awards achieved
BCA Green Mark Gold^{PLUS} (New Non-Residential Buildings)
BCA Universal Design Mark Gold^{PLUS} (Design)

- ii. **Affordable:** At least two budget meals priced from \$2.80 made available at every stall
 - iii. **Vibrant:** 22 stalls set aside for new hawker centres and 'hipster' hawkers
 - iv. **Innovative:** Automated tray return system, centralised dishwashing and e-payment options
- ### New Centres Under Construction/Planning/Design
- H** Sembawang
(estimated to be completed in 2020)
 - I** Sengkang – Fernvale
(estimated to be completed in 2020)
 - J** Bukit Panjang North
(estimated to be completed in 2020)

- K** Woodleigh Village Hawker Centre, Bidadari
(estimated to be completed in 2021)
– **Excellent:** 1 award received
BCA Green Mark GoldPLUS (New Non-Residential Buildings)
- L** Sengkang – Anchorvale
(estimated to be completed in 2022)
- M** Sengkang – Buangkok
(currently in the planning stage)
- N** Punggol
(currently in the design stage)
- O** Punggol North
(currently in the design stage)



Legend

- Completed New Centres
- New Centres Under Construction/Planning/Design

New Replacement Centres

- A Marsiling Mall Hawker Centre**
 - Replaces the hawker centre at the Old Woodlands Town Centre
 - Commenced operations on 15 December 2017
 - Marsiling Mall development was awarded the BCA Green Mark Gold (New Non-Residential Buildings) and Universal Design Mark Gold
- B Replacement Centre for 1A/2A/3A Commonwealth Drive**
 - Replaces the Commonwealth Drive Food Centre
 - Estimated to be completed in 2020
- C Market Street Food Centre**
 - Replaces the original Market Street Food Centre
 - Estimated to be completed in 2021

Existing Centres

- D Block 163 Bukit Merah Central Food Centre**
 - Completed renovations on 7 November 2017
 - Commenced operations on 3 February 2018
- E Block 69 Geylang Bahru Market and Food Centre**
 - Completed renovations in December 2017
 - Commenced operations on 1 January 2018
- F Block 84 Marine Parade Central Market and Food Centre**
 - Closed for renovation on 1 March 2018
 - Estimated to be completed in the first quarter of 2019

Interim Centre

- G 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

Rejuvenating Old Hawker Centres through Renovation and Replacement



Legend

- New Replacement Centres
- Existing Centres
- Interim Centre

Improving Facilities and Facade through Improvement Works

In 2017, NEA completed Repairs and Redecoration (R&R) works at five hawker centres, each within a span of two to three months. The hawker centres were the Beo Crescent Market, Berseh Food Centre, Bukit Timah Market, Chomp Chomp Food Centre and Tiong Bahru Market. The R&R works ranged from landscaping, painting, toilet renovations, to the repair and replacement of fixtures.

Advancing Recommendations of the Hawker Centre 3.0 Committee

The Hawker Centre 3.0 Committee was formed in January 2016 to review and make recommendations to improve the management of hawker centres and ensure the sustainability of the hawker trade.

Through MEWR and NEA, the Committee engaged over 800 stakeholders including hawkers, members of the public, patrons of hawkers centres, cleaning companies and The Federation of Merchants' Associations, Singapore.

Following the extensive engagements, the Committee made recommendations on four key areas:

- Sustain the hawker trade and support new entrants
- Improve productivity in hawker centres
- Enhance hawker centres as social spaces and improve vibrancy of hawker centres
- Promote graciousness in hawker centres

Sustaining the Hawker Trade and Supporting New Entrants

In FY2017, NEA implemented several initiatives to provide more training and support for aspiring hawkers. These build upon the recommendations of the Hawker Centre 3.0 Committee to sustain the hawker trade.

The **Hawker Fare Series** of culinary classes was launched in May 2017 through the joint efforts of NEA and the People's Association. Open to the public, the classes invited veteran hawkers to guide participants on preparing popular hawker fare such as *chicken rice* and *roti prata*.

The Series aims to generate interest in hawker food and culture, and has since received an overwhelmingly positive response. A total of 180 participants attended the 17 classes, which were held from May to August 2017 and from January to April 2018.

Aspiring hawkers can now attend a new short course on how to manage and operate their hawker business. The three-day course, titled '**Introduction to Managing a Hawker Business**', was jointly developed by NEA and the Institute of Technical Education (ITE). The topics taught include managing finances, marketing and stall presentation.

To date, 119 aspiring hawkers have completed the short course, with the inaugural class conducted from 25 to 27 July 2017. Due to popular demand, ITE increased the class size from 15 to 25, and added four more classes in 2017. Another four classes will be held in 2018.

On 23 February 2018, NEA launched the **Incubation Stall Programme**. It provides eligible aspiring hawkers an opportunity to try out and learn the ropes of the trade, before committing to become a hawker.

Each successful applicant will be offered a stall at half of the assessed market rent for a period of six months, and each stall comes pre-fitted with basic equipment. These help to lower the upfront cost barrier for the new incubation stallholders.

Existing and new hawkers will find help and advice even more accessible with the new **One-Stop Information and Service Centre (OSISC)** at the Toa Payoh HDB Hub. Launched on 9 October 2017, the OSISC functions as the go-to resource centre for all hawker-related queries and matters. Short talks and workshops related to the hawker trade are also held regularly at the OSISC.

Improving Productivity in Hawker Centres

In line with the Hawker Centre 3.0 Committee's recommendation to reduce the hawkers' workload, overcome manpower challenges, and enhance productivity in our hawker centres, centre- and stall-level productivity initiatives will be introduced progressively at up to 25 existing hawker centres.

Productivity initiatives were first implemented at the new Marsiling

Mall Hawker Centre since its opening on 15 December 2017. These include an automated tray return system (ATRS) and centralised dishwashing. The same productivity initiatives were also introduced at the newly renovated Block 163 Bukit Merah Central Food Centre.

At both hawker centres, the ATRS charges a deposit in order to nudge patrons to return their trays and crockery after their meals. The ATRS' integration with the centralised dishwashing area helps in the streamlining of cleaning work and tray return processes. This enables the cleaners to focus on the cleaning of tables and common areas, allowing for a faster turnaround of tables.

Hawkers can concentrate on their core business of food preparation and food serving instead of spending time and effort on washing their crockery. NEA co-funds stallholders up to 70 per cent of the cost for two years, to encourage them to make the transition to adopting the centralised dishwashing service, which will help them realise manpower and cost savings in the longer term.

For patrons, the tray return initiative would also mean a faster turnaround of tables, as well as a cleaner and more hygienic dining environment. To encourage patrons to return their trays, ambassadors, volunteers, stallholders, as well as NEA officers, were on hand to spread the message of the tray deposit, sometimes by simply pointing to one of the tray return notices displayed prominently throughout the hawker centre.

Stallholders looking to lighten their workload or improve the processes of their cooked food stall can now tap on the **Hawkers' Productivity Grant (HPG)**.

Launched on 9 October 2017, NEA co-funds the purchase of suitable kitchen automation equipment for three years.

Under HPG, each eligible stallholder may be reimbursed 80 per cent of the equipment's qualifying cost, up to \$5,000 within the three-year period. As at 31 March 2018, 71 HPG applications amounting to \$148,000 have been approved. NEA is conducting briefings at hawker centres and the OSISC on how to apply for HPG and the types of eligible equipment.

In August 2017, NEA, together with the Housing & Development Board (HDB),

Monetary Authority of Singapore, and Smart Nation and Digital Government Office, jointly issued a Request for Information for electronic payment solutions. This initiative aims to support micropayments at hawker centres, HDB coffee shops and industrial canteens.

Enhancing Hawker Centres as Vibrant Social Spaces

In line with the Hawker Centre 3.0 Committee's recommendations, NEA works with community groups to adopt or partner hawker centres to hold regular events and activities there over a sustained period.

Creating a vibrant hawker centre through live musical performances organised by Siglap South Community Centre at East Coast Park Lagoon.





Sharing tables is an act of graciousness that enhances the dining experience at our hawker centres.

The events and activities will help enhance the hawker centres' vibrancy and the patrons' dining environment. This further strengthens the use of hawker centres as social spaces for communities to come together not just for food but also to take part in community activities.

Launched on 10 June 2017, the **Vibrant Hawker Centres Programme** encourages public and private partners, grassroots

and community organisations, as well as educational institutions, to adopt hawker centres and organise activities there on a sustained basis.

As of 31 March 2018, a total of 32 events have been organised by 15 adopters' across 20 hawker centres. The collaborations include workshops, music performances, art displays, photography exhibitions and outreach events.

Promoting Graciousness in Hawker Centres

Acts of graciousness help enhance the dining experience at our hawker centres. To reinforce tray return as a form of kind and considerate behaviour, NEA collaborated with key stakeholders such as cleaning contractors to promote tray return.

Safe, Healthy and Conducive Living Environment^[103-1,103-2]

A safe and conducive living environment is crucial to the quality of our lives. The presence of environmental hazards and pollution is detrimental not only to our health, but also to the nation's economy and competitiveness.

NEA does not take chances when it comes to safeguarding Singapore's air, land and water environment. Strict regulations in line with international standards help limit emissions, while many initiatives have been implemented to monitor, reduce and prevent environmental pollution.

With our crucial role as the steward of a safe, healthy and conducive environment, NEA strives to sustain clean air, pristine water quality and quieter surroundings for the benefit of all Singaporeans.

Extending the Smoking Ban to More Public Places

The Government's long-term goal is to prohibit smoking in all public places, except at Designated Smoking Areas. This serves to protect non-smokers from the harmful effects of second-hand tobacco smoke.

In 2017, NEA expanded the list of smoking prohibited places in Singapore after taking into account public feedback and conducting extensive consultations with relevant stakeholders.

Since 30 June 2017, NEA has stopped accepting new applications for smoking corners in food retail establishments island-wide. Existing smoking corners are allowed to remain until their licences are terminated or cancelled.

Since 1 October 2017, smoking was also prohibited at:

More Educational Institutions

- Compounds of Autonomous Universities
- Compounds of Private Education Institutions
- Public places within a five-metre radius from the compounds of educational institutions

More Types of Public Service Vehicles

- Private-hire cars, when used to provide paid chauffeured services
- Trishaws
- Excursion buses

Tightening Emission Standards for New Petrol and Diesel Vehicles

Air pollution is one of the key threats to public health in many cities around the world. According to the World Health Organization, air pollution is the biggest environmental health risk.

Over the years, various initiatives have been introduced to reduce emissions from vehicles, which collectively, are a key source of air pollutants such as ozone and particulate matter. These initiatives include the introduction of Euro VI emission standards, the Vehicular Emissions Scheme, the Early Turnover Scheme for commercial vehicles, and the tightening of in-use emission standards for vehicles.

In FY2017, NEA introduced these emission standards:

Implementing Euro IV Emission Standards

New Motorcycles with Engine Capacity > 200cc	New Motorcycles with Engine Capacity ≤ 200cc
--	--

Since 1 January 2018	To be implemented from 1 January 2020
----------------------	---------------------------------------

Implementing Euro VI Emission Standards

New Petrol Vehicles	New Diesel Vehicles
---------------------	---------------------

Since 1 September 2017	Since 1 January 2018
------------------------	----------------------

The tightened Euro VI standards include an emission limit for Particle Number for petrol and diesel vehicles, which helps to control emissions of fine particulate matter (<2.5 microns) and minimise health risks.

Tightening Fuel Quality Standards for Petrol and Diesel ^[103-2]

NEA has also tightened fuel quality standards in FY2017. Improving fuel quality reduces harmful emissions, and will help vehicle owners better meet the new and more stringent emission standards.

An enforcement blitz in March 2018 targeted motorcycles that emitted smoke and excessive noise.



In FY2017, NEA introduced the Euro V fuel quality standard (latest EU standard) for these fuels:

Implementing Euro V Fuel Quality Standards

Diesel

From 1 January 2017⁴

Petrol

From 1 July 2017⁵

Minimising Air Emissions and Ensuring Compliance ^[103-2]

NEA has implemented measures to ensure that the incineration processes at its two waste-to-energy (WTE) plants and two crematoria do not pollute the environment. Air emissions from these facilities must comply with Singapore's Environmental Protection and Management (Air Impurities) Regulations⁶.

For instance, design features incorporated into the two WTE plants ensure that emissions from flue-gases, which are cleaned prior to release through the chimney, are well within regulatory limits.

Efficient process control systems were 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 has installed a telemetric monitoring system (linked to the regulatory unit) that continuously monitors air emissions from its WTE plants.

NEA also monitors air emissions from its main crematorium, the Mandai Crematorium and Columbarium, to ensure that emissions are kept within limits⁷.

⁴ Companies have until 1 January 2018 to comply with the regulations on density and T95 distillation temperature for diesel.

⁵ Companies have until 1 December 2018 to comply with the regulations on aromatics for petrol.

⁶ Air emission limits extracted from: <https://sso.agc.gov.sg/SL/EPMA1999-RG8?DocDate=20080131>

⁷ Although not a regulatory requirement, NEA conducts annual source-emission testing for the Mandai Crematorium and Columbarium and makes reference to the emission limit indicated in the Environmental Protection and Management Act, Section 37.

The data recorded for material air emissions at three of NEA's facilities from FY2015 to FY2017 are as shown below.

NEA's Facilities ^[305-7]	Compounds Emitted	FY2015	FY2016	FY2017	Emission Limit ^a
Tuas Incineration Plant	Dust (mg/Nm ³)	18.30	22.90	28.30	< 50
	SO ₂ (mg/Nm ³)	59.00	76.10	73.10	< 1,700
	NO _x (mg/Nm ³)	288.00	343.00	236.0	< 400
Tuas South Incineration Plant	Dust (mg/Nm ³)	2.60	2.03	2.87	< 50
	SO ₂ (mg/Nm ³)	84.00	82.00	102.30	< 1,700
	NO _x (mg/Nm ³)	212.20	183.30	169.50	< 400
Mandai Crematorium and Columbarium	Dust (mg/Nm ³)	31.40	2.00	6.00	< 50
	SO ₂ (mg/Nm ³)	< 1.00	12.00	25.00	< 1,700
	NO _x (mg/Nm ³)	644.30 ⁹	289.00	318.00	< 400

The data showed that air emissions recorded at the three facilities were below regulation limits from FY2015 to FY2017. Furthermore, there have been no smoky emissions and no odour detected at the facilities.

In addition, NEA has put in place an effective environmental management

system. This consists of a set of processes and practices that boosts NEA's operational efficiency and minimise environmental impact. Through the system, NEA is able to periodically review its performance and consistently control its operations so as to achieve its sustainability goals.

Treating Effluent and Ensuring Compliance ^[103-2,103-3,306-1]

NEA tightly controls the quality of effluent generated from its two WTE plants.

During the incineration process, effluent is collected from refuse bunkers and ash pits. The effluent is then sent for treatment, where its acidity is monitored and adjusted to a pH range between six and nine, before being discharged into the public sewers.

Samples of the treated effluent are sent on a monthly basis to independent laboratories for testing. The various components tested have always met

Singapore's Allowable Limits for Trade Effluent Discharged into a Public Sewer.

The volume of effluent discharged from NEA's WTE plants into the public sewers from FY2015 to FY2017 are indicated in the table below. Effluent collected in public sewers are further treated by PUB, Singapore's National Water Agency, before discharging into the sea or for reclamation.

Through the years, NEA has been successful in complying with the Sewerage and Drainage Act and the Sewerage and Drainage (Trade Effluent) Regulations.

Amount of treated effluent discharged into public sewers

NEA Facilities	FY2015 (m ³)	FY2016 (m ³)	FY2017 (m ³)
Tuas Incineration Plant	16,405	7,573	7,505
Tuas South Incineration Plant	78,471	82,971	83,176

^a 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.

⁹ The NO_x figure of 644.30 mg/Nm³ for FY2015 is still within the emission limit of 700mg/Nm³, based on the grace period granted for existing plants.

Resource Efficient and Sustainable Singapore ^[103-1,103-2]

Urban living in Singapore is shaped by global trends and the evolving demands of the environment. Globally, climate change and resource scarcity are challenging how cities stay sustainable. With Singapore's limited land area and dense population, effective management of our water-energy-waste nexus has become increasingly vital towards ensuring a resource efficient and 'Zero Waste' Singapore.

NEA is the agency charged with developing infrastructure to meet Singapore's long-term waste management needs. New waste-to-energy (WTE) plants are under development to improve resource utilisation in Singapore.

NEA also promotes the efficient use of energy and resources in the industry, households, retail and public sectors,

thereby contributing to Singapore's efforts in mitigating climate change. Initiatives are also in place to reduce waste at the source and promote the 3Rs, so that the lifespan of our only landfill can be maximised.

ENERGY

Improving Energy Efficiency in the Industrial Sector

NEA administers the Energy Conservation Act (ECA), which requires energy-intensive companies in the industrial sector to implement energy management practices. On 20 October 2017, NEA announced the addition of new measures under the ECA to further improve energy efficiency in the industrial sector.

With effect from October 2018, companies investing in new energy-intensive industrial facilities or in major expansions are required to perform a review of the facility design to identify technically and economically feasible energy efficiency improvement

opportunities. Companies must also plan for and install instruments and meters for key energy-consuming systems in these facilities, to report the energy performance of their systems based on measured data.

For existing energy-intensive facilities, companies are required to conduct periodical assessment of energy efficiency opportunities. The first assessment is due in 2021. Companies regulated under the ECA will be required to implement a structured energy management system from 2021 onwards.

These new measures will help Singapore achieve its pledge under the Paris Agreement on climate change to reduce emissions intensity¹⁰ by 36 per cent from 2005 levels by 2030, and to stabilise greenhouse gas (GHG) emissions with the aim of peaking around 2030.

Exploring Opportunities to Improve Industrial Energy Efficiency

A local study commissioned by NEA to determine the energy efficiency of

common industrial equipment and systems was completed in April 2017. Recommendations made included technically and economically feasible levels of energy efficiency, and how these could be achieved through suitable policies and programmes. NEA will next conduct a feasibility study and hold industry consultations to follow up on the study's recommendations.

Develop Industrial Capability to Support and Sustain Energy Efficiency Efforts

In FY2017, NEA continued to help companies develop capabilities to support and sustain energy efficiency efforts through the Energy Efficiency National Partnership (EENP) and Singapore Certified Energy Manager (SCEM) programmes. As of March 2018, there were:

262
EENP
Partners

447
Certified
SCEMs



¹⁰Emissions intensity refers to GHG emissions per dollar of GDP, measured in CO₂-equivalent per dollar.

Revising and Developing Reference Manuals for the SCEM Programme

In FY2017, NEA embarked on an exercise to revise the reference manual for Motor Driven Systems – an SCEM Professional Level module. There are also plans in FY2018 and FY2019 to develop three more reference manuals for Steam and Compressed Air Systems, Combined Heat and Power Systems, and Energy Recovery and Reuse. The manuals will serve as useful references for candidates undergoing SCEM training, and for practising energy managers and engineers.

Strengthening Capabilities in Sustainable Energy Management

Each year, NEA organises a series of programmes to strengthen the capabilities of Singapore's energy managers and engineers. These programmes will equip them with the knowledge and skills to steer energy-intensive facilities towards more sustainable practices.

Energy efficiency programmes conducted in FY2017		
Programme Name	No. of Participants	Duration
The 70 th Professional Sharing Series on Obtaining Real Energy Savings	88	7 July 2017
The 70 th Professional Sharing Series on Towards Circular Economy & Resource Efficiency	70	5 October 2017
Advanced Proficiency Masterclass in Waste Heat Recovery for Steam Systems	26	22 to 24 January 2018

Supporting Companies in Their Energy Efficiency Efforts

The EENP Learning Network offers its partners resources to improve energy efficiency and learning events to learn best practices. NEA works closely with training providers such as the Sustainable Energy Association of Singapore and The Institution of Engineers, Singapore, to conduct these learning events. A total of 31 EENP learning events were conducted in FY2017.

The **National Energy Efficiency Conference (NEEC)** is a flagship event under the EENP Learning Network. NEA, Economic Development Board (EDB) and Energy Market Authority (EMA) are the joint organisers of this biennial event.

Themed 'Building an Energy Efficiency Ecosystem', NEEC 2017 was held from 5 to 6 October 2017. It brought together industry experts and professionals to share best practices and case studies of successful energy efficiency projects.



New to NEEC 2017 was a **Breakfast Roundtable for CEOs**. As the host, Mr Masagos Zulkifli, Minister for the Environment and Water Resources, was joined by 15 representatives from MEWR, NEA, EDB, EMA and SPRING Singapore (now Enterprise Singapore), as well as 23 senior executives from industrial companies. The hour-long Roundtable provided a platform for the attendees to engage in insightful dialogues on energy management and related topics.



Left: Guest of Honour, Minister Masagos delivering the opening address. Right: Minister Masagos engaged in a lively discussion with enthusiastic attendees at the Breakfast Roundtable for CEOs.

The presentation of 7th EENP Awards was a highlight of the NEEC 2017 opening ceremony. The awards recognise organisations, teams and individuals who have displayed outstanding achievements in energy efficiency. A total of 12 companies, two energy services providers, one certified energy manager, two public agencies, and two schools received the EENP Awards in 2017.



Improving Energy Efficiency in Households through Standards and Labelling Scheme ^[103-3]

The **Mandatory Energy Labelling Scheme (MELS)** empowers households to make more informed decisions when purchasing energy-intensive home appliances, such as air-conditioners, refrigerators and clothes dryers.

Only products that meet the **Minimum Energy Performance Standards (MEPS)** are allowed for sale in the market.

With MELS and MEPS, suppliers are encouraged to bring in more energy efficient products. Consumers will also benefit from the lower energy costs of operating energy efficient appliances.

Latest Developments for MELS and MEPS

**FROM DECEMBER 2017
MEPS for Refrigerators**
Raised by
5–13%

Least efficient one-tick refrigerators have been phased out

**FROM OCTOBER 2018
MEPS for Motors**
Three-phase induction motors sold in Singapore will need to meet the minimum energy efficiency level of International Energy Efficiency class 3 (IE3)

Since the introduction of MELS and MEPS



Air-conditioners

▲23%
average energy efficiency



Refrigerators

▲39%
average energy efficiency

Annual energy cost savings for households

>\$200 million
equivalent to the annual energy cost of ~200,000 four-room housing units

WASTE [103-2,103-3]

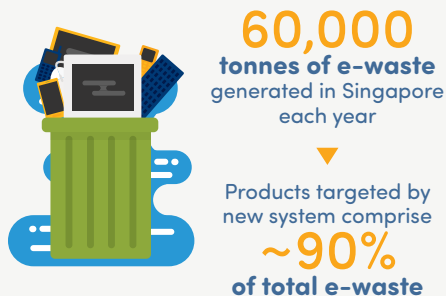
Working with the Industry to Manage E-waste

NEA works with industry stakeholders to implement recycling programmes for the public under the National Voluntary Partnership for E-waste Recycling.

One key programme is the **StarHub REcycling Nation's Electronic Waste (RENEW) Programme**, which has placed over 400 RENEW bins around Singapore. Other programmes include the **Singtel x SingPost E-waste Recycling Programme 'ReCYCLE'** and the **Panasonic's Heartland E-waste Recycling Programme**.

NEA actively engages companies that are interested in spearheading programmes to make electronic waste (e-waste) recycling more convenient for the public.

Moving forward, NEA will implement a mandatory e-waste management



system for Singapore by 2021. The system will be based on the Extended Producer Responsibility framework, where importers and manufacturers are responsible for the collection and treatment of e-waste generated from their products.

Developing Guidelines to Encourage Food Wastage Reduction and Re-distribution

Three guidebooks on food waste minimisation were launched in 2016 and 2017. Together, these guidebooks encourage businesses along the supply chain, from food manufacturers to food retail establishments and supermarkets, to take concrete steps towards reducing



The three Food Waste Minimisation Guidebooks launched respectively on 24 October 2016, 13 October 2017 and 1 November 2017.

food waste. Businesses keen to donate their unsold or excess food will also find useful food safety and re-distribution guidelines in the guidebooks.

Understanding the Sources of Household Food Waste

A five-month household waste audit commissioned by NEA was completed in March 2017. Interviews were conducted with 443 households, while waste from 279 households was studied over three days. Key findings include:



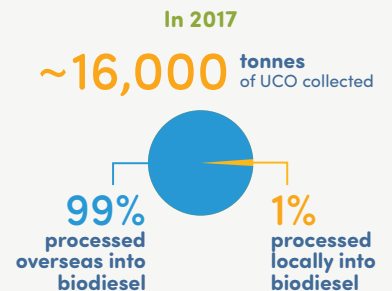
Avoidable Food Waste
e.g. leftovers, blemished fruits and vegetables, expired and stale food



Unavoidable Food Waste
e.g. bones and egg shells

Achieving Oversight of Used Cooking Oil Collection

NEA regulates the collection, storage and transportation of used cooking oil (UCO) under a licensing scheme introduced on 1 December 2016. All food establishments must engage licensed UCO collectors from 1 June 2017. As at December 2017, there are a total of 13 licensed UCO collectors.



Automating Waste Conveyance on a District Level

NEA is working with the Urban Redevelopment Authority (URA) and the Singapore Land Authority to implement a district Pneumatic Waste Conveyance System (PWCS) at Kampong Bugis precinct.

The district PWCS will transport waste automatically by air suction to a central collection station, reducing manpower needs. As the system is enclosed, the public will enjoy a cleaner environment with reduced pest nuisance and odours from exposed waste.

To spur greater adoption of PWCS, new strata-titled residential developments with 500 or more dwelling units are required to implement PWCS. This requirement will apply to new development applications submitted to URA from 1 April 2018.

Developing the Integrated Waste Management Facility for Long-Term Needs

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 late 2017, a multidisciplinary consultancy team led by Black & Veatch and AECOM was appointed to draw up IWMF's engineering plans and design specifications. Tenders will be called in the second half of 2018 for the design, construction and commissioning of IWMF.

IWMF will be developed in phases. Its first phase – the WTE Facility – is set to be completed by the middle of 2023. This will be followed by the completion of the Materials Recovery Facility, Food Waste Treatment Facility and Sludge Incineration Facility by 2024.

The construction of the two viaducts at the project site, to be completed by December 2018, is also progressing on schedule.

Assessing the Environmental Impact of Carrier Bags and Food Packaging

In 2017, NEA completed a life-cycle assessment on the environmental impact of carrier bags and food packaging material used in Singapore. The study found that consumers can reduce their impact on the environment by switching from disposables to reusable bags and food containers. These results will help NEA make informed policy decisions on the use of single-use carrier bags and disposable food packaging.

Utilising Roof Space to Harness Solar Power

NEA participates in the **SolarNova Programme** – a Whole-of-Government initiative to aggregate demand for accelerated solar adoption in Singapore. Roof space at suitable NEA-managed premises are utilised for the installation of solar panels. The electricity generated will be used to augment the energy needs of these premises.

Eight NEA-managed premises – the Mandai Crematorium and Columbarium and seven food centres, participated in the second phase of the programme. Installation is expected to be completed in 2019. Together, these eight premises could yield 1.248 MWp in solar capacity.

NEA will also be participating in the third and fourth phases, with the inclusion of the Choa Chu Kang Columbarium for the third phase, and the new Mandai Crematorium and Bukit Panjang North Hawker Centre for the fourth phase.

Timely and Reliable Weather Information and Hazard Preparedness

Situated near the equator, Singapore has a tropical climate that presents its own unique set of environmental challenges. Cross-border hazards such as transboundary haze also affect the livelihood of our people and businesses.

The Meteorological Service Singapore (MSS) contributes to public safety and smooth operations in many socio-economic activities, by providing timely and accurate weather data and forecasts. A division under NEA, MSS is our national authority on weather and climate. The key users of weather information include the general public as well as stakeholders in the aviation, military and maritime sectors.

To achieve high standards as a service provider, MSS seeks to continually enhance its capabilities by tapping on new technologies and conducting research on the tropical weather and climate of Singapore. MSS also strives

to be a leading meteorological service in the region, and actively shares its expertise with partners on regional and international platforms.

Understanding the Impact of Different Pollutant Sources on Singapore's Air Quality

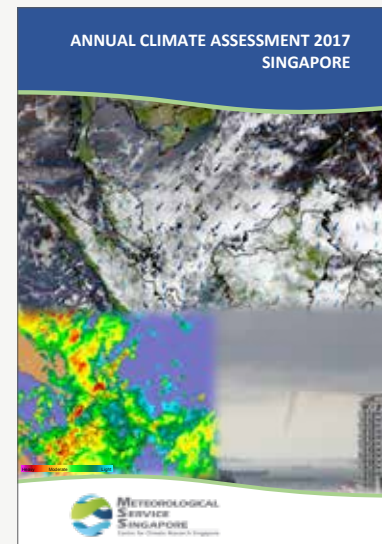
MSS has completed a source apportionment modelling study to understand how different pollutant sources impact ambient air quality in Singapore. The study was conducted in collaboration with the Meteorological Office, UK, using data obtained from NEA, the Maritime and Port Authority of Singapore and established open-source datasets. The results of this study will contribute towards the further development of NEA's air quality modelling and forecast capabilities.

Providing Information on Current State of Climate in Singapore

On 21 March 2018, the Centre for Climate Research Singapore, MSS' research arm, published the

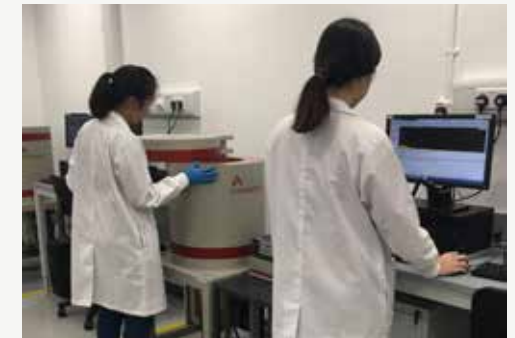
third Annual Climate Assessment Report. The release of the publication was timed to coincide with World Meteorological Day.

Launched in 2016, the publication has since evolved to include the use of infographics, as well as intuitive graphs and charts. This has been especially helpful for the media and public to gain a clear and concise perspective of Singapore's climate for the past year.



Setting Up a National Radiochemistry Laboratory to Monitor Radioactivity Levels in the Environment

The National Radiochemistry Laboratory (NRL) is a new facility set up by NEA to establish Singapore's background radioactivity levels.



NEA staff operating radiochemical analytical equipment at their new NRL premises.

The outfitting of the NRL was completed in August 2017. It is equipped with the key radio-analytical instruments that are capable of detecting and analysing radioactive materials released into the environment.

CHAPTER 2

Engaging Our Partners and the Community

Develop and Promote the Environmental Services Industry

A vibrant and future-ready environmental sector is pivotal to Singapore's plans to achieve environmental sustainability together with economic growth. Schemes are in place to help private industries build capabilities in areas such as clean energy, energy efficiency and green buildings, and keep pace with our long-term needs in the water-energy-waste nexus.

For the environmental sector, NEA is concurrently the regulator, the enabler and the service provider. Its three-pronged role is administered through policies, infrastructure and licensing, as well as engaging the industry to understand their needs and challenges. Industry players that have made significant contributions to Singapore's sustainability efforts are recognised through awards and accolades.

NEA also works closely with the industry through strategic partnerships to implement initiatives that upskill the environmental workforce, raise sector productivity, support local companies to become global players, and promote local companies internationally.

TRANSFORMING BUSINESSES AND JOBS IN THE ENVIRONMENTAL SERVICES INDUSTRY

Each day, Singapore is kept clean and liveable by the efforts of 1,700 companies and their 78,000-strong workforce in the cleaning and waste management sectors. Demand for such environmental services (ES) is rising. Given our manpower constraints, the industry needs to transform to remain competitive and to create better jobs for Singaporeans.

Much of the industry still relies heavily on manual labour and less-than-efficient work processes. To transform the ES industry, NEA worked with various public agencies, unions and industry stakeholders to develop the Environmental Services Industry Transformation Map (ES ITM).

The ES ITM was unveiled on 11 December 2017 by Mr Masagos Zulkifli, Minister for

the Environment and Water Resources. It outlines the initiatives and strategies that will help the ES industry strive towards greater vibrancy, sustainability and professionalism. The transformation efforts will also ensure that the industry remains competitive and attractive, with the aim of:

- i. Driving innovation and widespread technology adoption
- ii. Upskilling the workforce to take on better jobs
- iii. Improving productivity through better procurement practices
- iv. Capturing value overseas through internationalisation

By 2025, around 30,000 individuals in the ES industry would stand to benefit from value-added jobs made possible through ES ITM's upskilling and technology strategies.

Driving Innovation and Widespread Technology Adoption

NEA will help businesses develop new capabilities, enhance service delivery and address manpower challenges through innovative technology and best practices. Opportunities will also be created for technology collaboration and adaptation, where businesses can

work towards greater productivity in a sustainable and cost-effective manner.

The INCUBATE (Innovating and Curating Better Automation and Technologies for Environmental Services) initiative will see NEA partner the industry to collectively innovate and curate better technologies, solutions and innovations for the ES industry. NEA signed Letters of Intent with seven INCUBATE partners on 11 December 2017 to kick-start trials of innovative ES solutions at the partners' premises.

Progress is already underway for NEA and several INCUBATE partners. The projects include the use of robotics and autonomous equipment to aid cleaning and waste management operations, data analytics to enhance pest control, operational management, and outcome-based contracting for more efficient and cost-effective environmental services.

Funding schemes for technology development and deployment are available to both researchers and businesses. These include the \$10.8 million **Environmental Robotics Programme**, initiated by NEA with support from the **National Robotics Programme**.

The first Request for Proposal under the Environmental Robotics Programme was jointly issued by the Ministry of Transport and NEA in December 2017. It called for the proof-of-concept for the design and development of Autonomous Environmental Service Vehicles, which will be deployed for the cleaning of roads and pavements.

NEA is also administering the \$45 million Closing the Waste Loop research and development (R&D) initiative, with the support of the National Research Foundation and the Ministry of National Development. This initiative will boost Singapore's R&D capabilities in developing solutions to extract valuable resources from key waste and residue streams, including food, electrical and electronic products, and incineration ash.

Under the ES ITM, NEA will be working closely with other public agencies to transform the ES industry. In January 2018, SPRING Singapore (now Enterprise Singapore) and NEA jointly launched an innovation call for technologies that can improve overall productivity especially for SMEs in the ES industry. Qualifying parties were invited to submit their proposals to address problem statements related to cleaning and waste management operations.

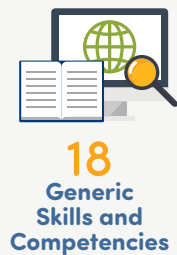
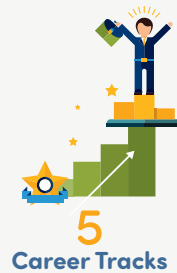
Upskilling the Workforce to Take On Better Jobs

NEA will be working together with the industry, public agencies and institutions to provide upskilling opportunities for the ES workforce. Better jobs will also be created, as routine and laborious tasks will be reduced through automation. Workers will be able to focus on more value-added areas of work, such as operating machinery or using apps and data analytics to improve service delivery.

Launched on 11 December 2017, the Skills Framework for Environmental Services is an integral component of ES ITM. It was developed by the joint efforts of NEA, SkillsFuture Singapore, Workforce Singapore (WSG), employers, industry associations, unions, as well as education and training providers.

The Skills Framework will serve as a handy reference for individuals who are keen to upskill or take up better skills-based jobs in the ES industry. Employers will find the document useful towards the capability development of their employees. Education and training providers may also design their

The ES Skills Framework provides key information about:



programmes in response to emerging skills and competencies.

NEA will drive the adoption of job redesign solutions by working hand-in-hand with WSG, industry partners and solution providers. ES businesses can tap on WSG's WorkPro Job Redesign Grant to make jobs easier, safer and smarter for older workers. Resources will also be provided to help the ES industry improve its image and attract new talent.

To prepare the ES workforce for better jobs, NEA will work with Institutes of Higher Learning and the industry to increase internship, apprenticeship and scholarship opportunities. More professional training programmes will be put in place to address the skills and competency needs of the ES industry.

Demand for cleaning and waste management services will continue to increase and outstrip manpower supply. The public's role is equally important, as keeping the environment clean and minimising waste will help reduce ES demand. To this end, NEA will continue to work with partners in schools, organisations and the community to promote a self-service culture and waste minimisation mindset.

Improving Productivity Through Better Procurement Practices

NEA recognises that service buyers play a crucial role in the ES industry's transformation journey. The ES ITM will therefore push for a wider adoption of outcome-based contracting. This is a procurement model where service buyers do not specify headcount

requirements and encourage service providers to improve cleaning services to meet expected cleanliness and service quality. This can be achieved through innovation and technology adoption, thereby raising productivity and reducing reliance on manpower.

Efforts will be dedicated towards helping service buyers build the capabilities to implement outcome-based contracting. To kick-start the effort, NEA worked with public agencies and industry stakeholders to develop the 'Guide on Specifications for Outcome-based Cleaning Contract'.

The guide serves as a handy reference for service buyers to draft outcome-based contracts. Service providers will also gain a clear understanding of the expectations and performance standards required. Additionally, NEA is working with training partners to conduct training for service buyers and providers to help them transition from headcount-based to outcome-based contracting.

Capturing Value Overseas Through Internationalisation

NEA will continue to enhance export capabilities and market access for the ES industry through its overseas networks, international projects, and international platforms and events. Another key initiative for internationalisation would be to build sufficient scale for the ES industry to export their integrated solutions for city planning and development projects overseas. NEA will work across industry sectors, trade associations and public agencies to facilitate such joint ventures and consortiums.

Catalysing Insights on the Future of the Environmental Services Industry

As a lead-up to CleanEnviro Summit Singapore (CESS) 2018, NEA organised the inaugural CESS Catalyst in October 2017. Themed 'Industry 4.0 – Circular Economy and Environment Perspectives', the by-invitation event saw 150 delegates from 17 countries come together to discuss key trends that drive the future of the environmental services industry.

Industry Transformation

Industry transformation will ensure that the industry remains competitive and attractive



Driving Innovation and Widespread Technology Adoption

- Creating opportunities for technology collaboration and adaptation
- Helping companies access ready technology to develop new capabilities and address manpower challenges



Upskilling Workforce to Take On Better Jobs

- Promoting a self-service culture and waste minimisation mindset to reduce service demand
- Improving work tasks through job redesign and use of technology
- Developing internship and scholarship programmes to attract talent to the industry



Improving Productivity

- Encouraging adoption of outcome-based contracts
- Driving procurement practices to focus on quality, technology use and productivity



Capturing Value Overseas

- Enhancing export capabilities and market access
- Working with partners to offer integrated solutions

At the event, Guest of Honour, Minister Masagos, delivered the opening address. Renowned speakers were invited to share their insights and facilitate discourse among the delegates, while technology providers took the opportunity to showcase innovative solutions for the environmental services industry. The issues and challenges raised formed the basis for further discussions at CESS 2018.

Celebrating 10 Impactful Years of Reducing Packaging Waste

The Singapore Packaging Agreement (SPA) celebrated its 10th Anniversary in 2017. The 3R Packaging Awards was also renamed 'SPA Awards' to enable businesses and the public to easily associate the awards with the SPA.

The SPA 10th Anniversary Awards Ceremony and Gala Dinner was held on 5 June 2017 – also the World Environment Day. Guest of Honour, Minister Masagos presented awards to 19 companies and three individuals for notable efforts in packaging waste reduction.

In his opening speech, Minister Masagos also announced the implementation of mandatory reporting requirements for sustainable packaging waste management by 2021¹¹. Under the mandatory reporting framework, businesses will need to submit yearly reports with information on the types and amounts of packaging placed on the consumer market, as well as their plans on packaging waste reduction.

Achievements since Launch of Singapore Packaging Agreement in 2007



Cumulative Reduction
39,000
tonnes
of packaging waste



Cumulative Savings
\$93
million
of material costs

¹¹ The implementation for mandatory reporting requirements for sustainable packaging waste management has been brought forward to 2020.



Recipients of the SPA Awards who made outstanding contributions to packaging waste reduction.

The 'Logo for Products with Reduced Packaging' was also launched as part of SPA's 10th Anniversary celebrations. The eco-label will help consumers identify products with reduced packaging so that they can make an informed purchasing decision. It also provides recognition to signatories of SPA that have gone the extra mile to minimise packaging waste.



An initiative of the SPA
www.nea.gov.sg/SPA

footprint arising from the long-distance transportation of goods and services.

In FY2017, about 2,600 suppliers and vendors supported NEA in its diverse operations. This figure excludes the Small Value Purchases made outside GeBIZ, the government's centralised procurement portal. Almost all were locally based firms; less than two per cent comprised suppliers from countries such as USA and the UK.

Pursuing Sustainability in Procurement Practices ^[102-9,103-1,103-2,103-3,204-1]

NEA supports local suppliers and vendors as much as possible, as part of its sustainable procurement practices. This contributes not only to Singapore's economy but also to a lower carbon

The suppliers and vendors include:

- incineration plant-related service providers
- facilities management service providers
- consultants
- public campaign service providers

Develop and Promote the
Environmental Services Industry

DRIVING TRANSFORMATION FOR A SUSTAINABLE FUTURE

- conservancy service providers
- cleaning and maintenance service providers
- information technology service providers

As part of its sustainable procurement practices, NEA ensures that suppliers and vendors not only deliver quality goods and services but also operate in a responsible and sustainable manner. This was achieved through formulating a set of criteria to encourage potential suppliers and vendors to integrate sustainability into their work processes.

Depending on the nature of the procurement, suppliers and vendors may need to declare their financial status, safety, health and the environmental measures that they will undertake in their quotations and tenders, and be accredited under schemes such as the Enhanced Clean Mark Accreditation Scheme.

In addition, NEA ensures the three principles – transparency, open and fair competition, and value for money – are met during its procurement process.

This is in compliance with the Ministry of Finance's (MOF) Instruction Manual (Procurement)¹².

For proper governance, NEA requires that the approving authority for the awarding of quotations or tenders not be from the buying department. This is to avoid any conflict of interest and to achieve clear segregation of roles.

For transparency, NEA requires almost all quotations and tenders to be posted on GeBIZ. Lastly, NEA has established a Price Quality Scoring Framework for consistent and objective evaluation of quotations and tenders by suppliers and vendors.

Strengthening Capabilities in Environmental Protection and Public Health ^[102-9]

NEA has been creating opportunities for the industry to improve through skills training and professional development. This is part of NEA's ongoing strategy to strengthen Singapore's capabilities in environmental protection and public health.

¹² In 2010, MOF updated the Public Sector Taking the Lead in Environmental Sustainability guidelines and introduced 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.

To achieve this, NEA collaborates with educational institutions and public agencies to establish certification standards and mechanisms, as well as conduct various licence-based and joint training programmes.

Providing Recognition to Exemplary Service Providers ^[103-2]

In May 2017, NEA introduced a dedicated Service Award to recognise staff of its Service Providers (SPs) for their excellent service delivery to the

Workshops and professional courses conducted in FY2017			
Programme Name	No. of Participants	Partnership	
Environmental Control Officers Course	230	Singapore Polytechnic	
Environmental Infection Control and Management in Non-Hospital Facilities	109	Singapore Polytechnic	
Joint ITE-NEA Certificate in Pest Control	173	Institute of Technical Education	
Joint ITE-NEA Certificate in Pest Management	299	Institute of Technical Education	
Swimming Pool Maintenance and Operations	26	Institute of Technical Education	
Management of Water and Environmental Services for Estate Managers	25	BCA Academy	PUB, Singapore's National Water Agency
Customised Course in Vector Management and Control for Companies	40	—	
Basic Ionising Radiation Safety (General)	201	—	
Basic Laser Radiation Safety	180	—	
Customised Course in Radiation Safety and Protection	132	—	

public. This initiative signifies the close collaboration between NEA and its SPs when delivering public services.

NEA received overwhelming support from the SPs with 28 nominations received. Award winners were presented the awards at the NEA Service Forum held on 13 November 2017.



Top and bottom: Mr Ronnie Tay, CEO, presenting the Service Award to Exemplary SPs at the NEA Service Forum.

Engaging NEA's Stakeholders: Business Community, Organisations, Schools, Partners and Public Agencies ^[102-42,102-43,102-44]

NEA realises the importance of identifying and engaging the right groups of stakeholders in order to implement and drive vital environmental measures. NEA had therefore carried out a comprehensive analysis of risks and opportunities related to driving sustainability within the organisation. In the process, the relevant stakeholders were also identified and selected.

NEA's ability to realise a liveable and sustainable Singapore rests on the commitment and support of its stakeholders in the business community, as well as organisations, schools, partners and other public agencies. The involvement of these stakeholders is crucial for NEA to drive environmental awareness and sustainability practices, which begins at home and carries through to workplaces, schools, communities and other spheres of influence. This holistic approach enhances the reach, permeability and impact of NEA's environmental management initiatives.

Through close collaboration and engagement, these stakeholders can become influential advocates of sustainability initiatives. NEA can pull together their collective resources and efforts to take on greater environmental challenges and achieve new sustainability milestones.

Listening to stakeholders allows NEA to formulate goals and enhance initiatives to help them better understand their impact and responsibilities towards the environment.

NEA encourages open communication and regularly initiates collaborations with its stakeholders to promote environmental awareness. The frequency of ongoing engagement with stakeholders varies with their specific needs as well as with the areas of engagement. The engagement platforms NEA uses to address its stakeholders' concerns are as follows:

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements
<ul style="list-style-type: none"> To gather feedback from public agencies and partners on NEA's programmes and services To identify areas where NEA can raise the level of adoption of its programmes by businesses and industry stakeholders To identify areas where NEA can elevate the service delivery experience for community and public stakeholders 	<p>Surveys, meetings, discussion, advisories and circulars</p>	<ul style="list-style-type: none"> 3P Partnership Survey to understand the level of participation in NEA's engagement programmes among its partner organisations, and gauge the helpfulness and effectiveness of such programmes Pro-Enterprise Ranking Survey conducted by the Ministry of Trade and Industry to rank public agencies with regulatory roles on how pro-enterprise they are Focus group discussion on e-waste management in Singapore pertaining to possible design options for an e-waste management system in Singapore Advisories to remind Cleaning Business licensees on compliance to the revised Progressive Wage Model schedules
		<ul style="list-style-type: none"> Circulars to inform Vector Control Operators on the grants and funding available to improve productivity, and as reminders for compliance to safe fogging operations Inter-Agency Dengue Task Force to coordinate and sustain mosquito control programmes in the areas under the care of other member agencies Inter-Agency Rat Control Task Force to help public land agencies coordinate rat control efforts, identify potential rat situations early and implement pre-emptive actions

... continued from previous page ^[102-43,102-44]

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements
<ul style="list-style-type: none"> To improve the adoption level of environmental initiatives within the business community 	<p>Voluntary programmes, initiatives, meetings and seminars</p>	<ul style="list-style-type: none"> Energy Efficiency National Partnership, which encourages companies to be more energy efficient by offering learning activities and energy efficiency-related resources, as well as incentives and recognition, throughout the year Youth for the Environment Day, an annual opportunity for youth to lead, organise and participate in environmental programmes Educational outreach to building management and premises owners on the importance of rat control efforts on a needs basis Under the Environmental Services (ES) Industry Transformation Map: <ul style="list-style-type: none"> i. Technology Connect Session to introduce ES companies to technology applications from parallel industry sectors, such as automation and robotics sectors ii. The INCUBATE (Innovating and Curating Better Automation and Technologies for Environmental Services) initiative, where NEA will partner the industry to develop innovative ES solutions and leverage innovative technology
<ul style="list-style-type: none"> To inform industry partners and seek feedback on new and existing legislation, regimes and programmes that NEA is either planning to implement or has implemented 	<p>Dialogue sessions, circulars, notices, media and social media publicity, NEA's corporate websites, advisories</p>	<ul style="list-style-type: none"> Singapore Packaging Agreement, which is a voluntary joint initiative by public agencies, the industry and non-governmental organisations to reduce packaging waste Tray Return programmes with relevant partners to inculcate social graciousness among the public and to contribute to a cleaner dining environment, including: <ul style="list-style-type: none"> i. Bi-monthly Tray Return meetings with relevant partners mainly from the F&B industry on strategies and initiatives to boost the adoption of Tray Return ii. Engagement with schools to inculcate graciousness among students Outreach to potential partners of the 'Vibrant Hawker Centres' programme, who are invited to join as a partner or adopter of a hawker centre
		<ul style="list-style-type: none"> Stakeholder engagement sessions on the Smoking Prohibition Extension to ensure smooth implementation Meetings with motor traders, manufacturers and fuel companies to obtain feedback on existing as well as upcoming policies related to vehicular emissions Leveraging of mainstream and social media channels to inform the public of new legislation, regimes and programmes implemented by NEA Biennial dialogue sessions with Built Environment Industry to provide updates and seek feedback on code of practice and guidelines related to NEA's environmental requirements Meetings with major supermarkets to understand the feasibility and challenges of setting up a voluntary agreement among major supermarkets to implement a plastic bag charge

... continued from previous page ^[102-43,102-44]

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements	
<ul style="list-style-type: none"> To recognise the environmental contributions of NEA's partners 	Award events	<ul style="list-style-type: none"> Energy Efficiency National Partnership Awards to recognise companies, energy managers and public sector agencies for their commitment and outstanding achievements in improving their energy efficiency 3R Awards and Seminar for Shopping Malls to recognise 3R efforts made by malls and their retail tenants Singapore Packaging Agreement (SPA) Awards to recognise companies for their efforts in reducing packaging waste under the SPA 	<ul style="list-style-type: none"> STARs (Special Tribute and Recognitions) of the Environment Night to appreciate and recognise the environmental contributions of grassroots organisations in the South West district and schools EcoFriend Awards 2017 to honour eco-champions for their outstanding contributions to the environment
<ul style="list-style-type: none"> To share knowledge and gather feedback 	Dialogue sessions, presentations, conferences, outreach sessions, meetings, briefing and networking sessions	<ul style="list-style-type: none"> Organising of the National Energy Efficiency Conference and related learning events to share and promote best practices in energy management Operation Mozzie-Free Operations Managers' Forum to brief operations managers of schools on dengue prevention measures Seminars on food hygiene and safety for retail food industries and associations and public agencies to enhance their food safety knowledge Sharing experiences and expertise on food safety in Singapore with overseas delegates CleanEnviro Summit Singapore (CESS) Catalyst to facilitate discourse among international delegates on the future of the environmental services industry, with issues and challenges raised forming the basis for further discussions at CESS 2018 	<ul style="list-style-type: none"> 3R outreach sessions for hotels to learn and share best practices MICE 3R Toolkit, containing 3R tips and case studies for the MICE (meetings, incentives, conventions, exhibitions) industry, which has been made available on the NEA website 3R Guidebook for Shopping Malls, which was updated with case studies of malls with best practices, also made available on the NEA website Half-day Packaging Sustainability Conference (as part of the SPA 10th Anniversary) to broaden knowledge on sustainable packaging and sustainable packaging waste management Annual joint seminar with the Singapore Institute of Architects and the Institution of Engineers Singapore to gather feedback on code of practice and guidelines related to NEA's environmental requirements
<ul style="list-style-type: none"> To provide training opportunities to NEA's partners in the industry and the community 	Masterclasses, workshops, lectures, training courses	<ul style="list-style-type: none"> Masterclasses, workshops and lectures on energy efficiency, waste management and sustainability conducted for industry professionals Training of retail sales personnel to equip them with the necessary knowledge to promote energy efficient appliances to consumers 	<ul style="list-style-type: none"> Joint Certification Programmes with academic institutions, e.g. the Institute of Technical Education, Singapore Polytechnic, and Building and Construction Authority Academy, and PUB, Singapore's National Water Agency, covering environmental public health topics, e.g. pest management, environmental control, and the management of water and environmental services

Partner Public Sector Agencies

Public agencies in Singapore often come together to coordinate operations, share expertise and resources, and minimise duplication of efforts. To harness this synergy, NEA forms strategic partnerships with fellow public agencies and plays an integral role in various Whole-of-Government programmes.

NEA has been coordinating several inter-agency committees and task forces, especially in areas that involve more than one agency. These include many of NEA's operations in vector control, public health and management of municipal services. Additionally, NEA is also leading the collective efforts of various public agencies to develop Singapore's environmental services industry.

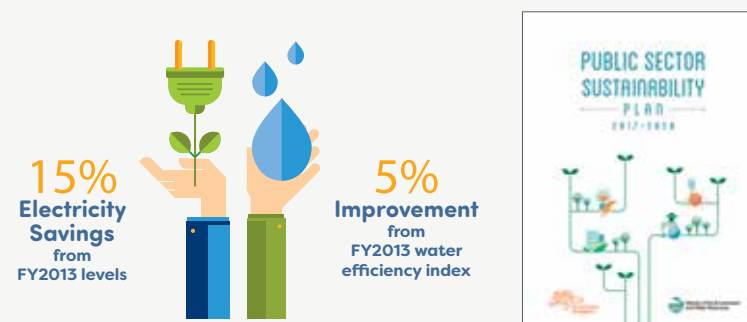
Besides supporting the work of other agencies where environment- and weather-related services are needed, NEA also leads by example in various sustainability initiatives. NEA has since demonstrated its commitment in sustainability reporting, met with other

public agencies to spread sustainability messages, and endeavoured to exceed the requirements of the Public Sector Taking the Lead in Environmental Sustainability (PSTLES) initiative.

Leading by Example in Environmental Sustainability

The PSTLES initiative was first introduced in 2006. It requires public agencies to put in place environmental sustainability measures that include energy efficiency, water efficiency and waste management. In 2014, the PSTLES initiative was enhanced, requiring agencies to set sustainability targets and develop resource management plan to meet the targets.

The Public Sector Sustainability Plan 2017–2020 was unveiled on 5 June 2017. The document outlines the public sector's plans to reduce its environmental footprint under the PSTLES initiative. By FY2020, the public sector aims to collectively achieve:



NEA encourages public agencies that are retrofitting major energy-consuming equipment to adopt the Guaranteed Energy Savings Performance (GESP) contracting model. With GESP, agencies will enjoy greater certainty of system performance over the contract period, and sustained energy savings.

NEA is developing an Integrated Energy Management System (iEMS) to help public sector building owners uncover more energy optimisation opportunities in their buildings. The iEMS pilot project commenced in 2017 and will be completed by 2019.

Fostering Opportunities for R&D Collaborations in Urban Sustainability

NEA co-organised the 4th Urban Sustainability R&D Congress, which was held on 29 and 30 June 2017, with the Ministry of National Development and 15 other partner agencies. The biennial congress brought together public agencies, industry players and the research community to foster R&D collaborations and dialogue on Singapore's urban sustainability challenges.

Discussions and exhibitions were focused on the theme of transforming Singapore into the 'Green City, Best Home'. NEA's Waste-to-Energy Research Facility and new hawker centres were among the outstanding initiatives showcased at the integrated Whole-of-Government exhibition booth.

Charting the path towards environmental sustainability with the Public Sector Sustainability Plan 2017–2020.

Engage and Nurture People and the Community

NEA's work has a significant impact on the environmental landscape of Singapore, affecting the lives and futures of many. It is therefore important to ensure that our people and community remain engaged and aware of their environmental roles and responsibilities.

NEA spearheads national movements, public outreach and education programmes through its partnership with the People, Public and Private sectors. Leveraging on these networks, NEA has co-developed district eco-plans with the five Community Development Councils (CDCs). The eco-plans chart each district's long term environmental goal and target.

To enhance its reach, NEA has nurtured student and teacher environmental advocates in public schools, as well as a network of ambassadors in the community. NEA officers have also been

assigned to various community districts, where they have a strong presence on the ground, to nurture generations of Singaporeans to care for and cherish the environment they live in.

Communities are also encouraged to initiate ideas and projects which they could call their own. Through these efforts, NEA is committed to motivating every individual to take up environmental ownership and care for the environment as a way of life. The collective efforts of our people and the community are key to Singapore's sustainability journey.

Creating Public Awareness on the Latest Environmental Perspectives

NEA has been publishing the biannual ENVISION Magazine since 2012 to keep the public informed on the latest environmental issues. The technical publication enables readers to discover environmental perspectives from Singapore and around the world, through technology briefings, interviews,

policy announcements, best practices and case studies.

The 13th issue of ENVISION was published in November 2017. Titled 'Game-Changers: Remaking the World and How Business Gets Done', it explores perspectives and insights on green finance and sustainable manufacturing.

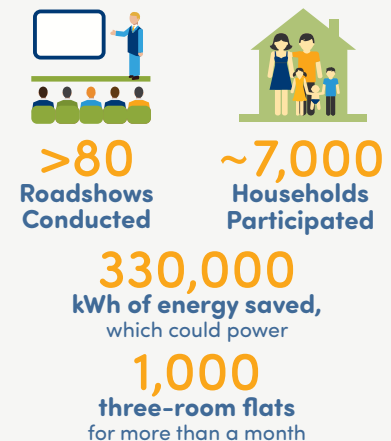


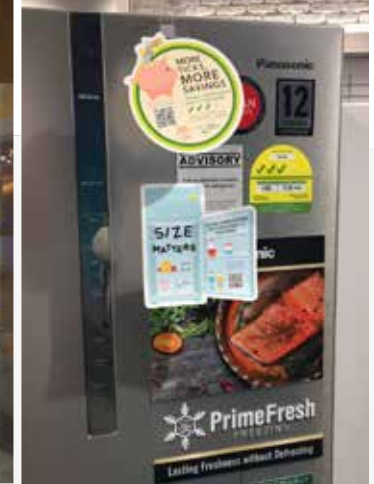
Raising Public Awareness on Household Energy Conservation

In 2017, NEA reached out to households on energy conservation through the following platforms:

1. The Energy-Saving Challenge

The campaign was held from June to September 2017 in partnership with SP Group. The aim was to encourage households to practise simple energy-saving habits and reduce their household electricity consumption. Under the Challenge, households who reduced their consumption by at least one per cent stood a chance to win attractive prizes worth a total of more than \$70,000.





Left: A participant signing up for the Challenge at a roadshow. Middle: NEA's consumer education video screened at an appliance retail store. Right: Wobblers displayed on energy-efficient appliances.

2. Consumer Education on Energy Efficient Appliances

To cultivate consumer consciousness on energy efficiency, NEA produces:

- Educational videos that reinforced energy saving tips
- Informative wobblers that were prominently displayed on energy-efficient appliances at the appliance retail stores
- An Eco-Home mock-up was set up at Clean & Green Singapore Carnival 2017, for visitors to pick up tips on electricity and water conservation, and ways to reduce and recycle waste.

Honouring the Champions of Environmental Sustainability ^[103-2]

Ten eco-champions were recognised for their exceptional contributions to the environment at the EcoFriend Awards

2017. The awardees were selected from a total of 329 nominees this year. The awards were presented by Mr Masagos Zulkifli, Minister for the Environment and Water Resources, during the awards ceremony on 20 September 2017.

Driving Community Action to Reduce Food Wastage ^[103-2]

The Food Waste Reduction campaign promotes awareness of food wastage in Singapore and empowers the public to take action to reduce food wastage. Consumers, schools and the community are engaged through publicity and outreach efforts all year round.

In 2017, the campaign reinforced the message for consumers to buy, order or cook just enough food. It was conceived in response to NEA's household waste audit, which found that more than half of household food waste could be

avoided through consumer choice. The line-up of publicity and outreach efforts this year included:

1. Food Wastage Reduction Ambassadors

NEA continued to recruit and train passionate individuals who would lead outreach programmes in the community, as well as share food waste reduction tips with their friends and family.

- >600 ambassadors recruited and trained since 2015
- >6,000 participants engaged through the ambassadors

2. Ground-up Initiative on Food Waste Reduction

NEA partnered National Geographic to organise a series of talks and workshops in August 2017. Mr Tristram Stuart, an award-winning author and global activist championing the

food waste reduction movement, was invited to share his insights and experiences on combating food waste with 172 representatives from the industry, schools, non-government organisations and the community. The week-long activities culminated in a public talk by Mr Stuart, where over 1,000 participants learnt the importance and means of tackling food waste.

3. Nationwide Publicity Blitz

NEA launched a nationwide publicity blitz for the food waste reduction campaign in November 2017. The campaign's messages were broadcast across various media platforms, including television, radio, newspapers, public transportation, digital and social media, as well as on-ground activations.

- ~3.61 million people saw the publicity materials at least once



Left: A fully furnished and interactive Eco Home exhibit. Right: Students from a participating school segregating their food waste at specially designated bins.

4. Love Your Food @ Schools

NEA has launched the 'Love Your Food @ Schools' project in schools, starting April 2017, to cultivate young minds on the importance of not being wasteful with food. A closed-loop food waste management system was introduced to 10 participating schools. Students, staff and canteen stallholders worked together to reduce food wastage, while segregating and recycling food waste to produce compost. The hands-on experience was reinforced through food waste reduction activities, such as talks, videos, exhibits and games.

5. Youth for the Environment Day

NEA rallies young Singaporeans through the annual Youth for the Environment Day (YED) to take on active roles in environmental programmes. YED is aligned to Earth Day, an international environmental event that falls on 22 April.

YED 2017 focused on food waste reduction, with the main event held on 7 April 2017 at Chongzheng Primary School. It saw the launch of 'Love Your Food @ Schools' by Guest of Honour, Minister Masagos. More than 380 students and guests from 35 schools participated in the event.

Inspiring Singaporeans to Achieve a Clean and Green Environment Together

The Clean & Green Singapore (CGS) campaign inspires Singaporeans to show their care for and protect the environment by embracing a sustainable lifestyle. It comprises

a series of events – organised by NEA and its partners – to engage stakeholders throughout the community and foster sustainable living as part of the Singapore DNA.

1. CGS Carnival

NEA, together with Central Singapore CDC, MEWR and 6 other public agencies, co-organised the annual CGS Carnival. Held from 4 to 6 November 2017, the Carnival was launched by Mr Tharman Shanmugaratnam, Deputy Prime Minister and Coordinating Minister for Economic and Social Policies.

The theme for 2017 remained 'Caring for Our Environment Together', which

Left: Minister Masagos, learning along with students and guests about the food waste digester at the 'Love Your Food Experiential Trail'. Right: Students and guests took part in the 'Love Your Food' activity to learn the importance of not wasting food, and shared over 700 social media posts of their cleared plates.



aimed to promote an eco-friendly lifestyle at home, at the workplace and in shared community spaces. Ten public agencies and 40 partners worked together to bring visitors through different exhibitions, game stations and workshops, where simple and practical tips on achieving an eco-friendly lifestyle were shared. The CGS Carnival, along with its sustainability messages, was promoted through an integrated publicity effort across out-of-home, print, digital and social media platforms.

- >20,000 people attended the three day CGS Carnival
- ~2.64 million people reached out through CGS publicity efforts

2. UP Market @ CGS Carnival

The upcycling-themed flea market brought together 18 community partners to share upcycling ideas and products, while promoting upcycling as part of a sustainable lifestyle. Visitors learnt how to turn their used items into useful products, such as making tote bags out of old clothing.

3. Eco Fair @ CGS Carnival

NEA worked with 21 exhibiting partners to showcase their environment-related initiatives and products, ranging from food waste reduction to e-waste recycling.

4. Eco School Day @ CGS Carnival

Held on 6 November 2017, the Eco School Day saw a strong turnout

of about 960 pre-schoolers and 1,300 primary and secondary school students, along with their teachers. The young participants picked up simple eco-friendly tips through various activities, interactive games, exhibitions and workshops. Also showcased at the event were seven winning projects of the Environment Challenge for Schools 2017.

5. District CGS Carnivals

NEA also partnered North East, North West, South East and South West CDCs to co-organise four district CGS Carnivals on 11 and 12 November 2017. More than 20,000 people were engaged at these district CGS Carnivals.

KEY HIGHLIGHT OF NORTH EAST DISTRICT CGS CARNIVAL

Launch of 'North East Green Adventure', a children's book featuring five superheroes, each representing an eco-habit for children to practise

KEY HIGHLIGHT OF NORTH WEST DISTRICT CGS CARNIVAL

Unveiling of 'North West Sustainability Plan 2030', as part of efforts to guide the district in embracing sustainable living

KEY HIGHLIGHT OF SOUTH EAST DISTRICT CGS CARNIVAL

Announcement that the 'Eco Kepalas @ South East Schools' programme will be expanded to include more partnership opportunities with organisations and the community

KEY HIGHLIGHT OF SOUTH WEST DISTRICT CGS CARNIVAL

Launch of 'Foodprints @ South West Food Waste Reduction Calendar', which will provide residents useful food waste reduction tips



Far left: The launch of the CGS Carnival 2017.
Left: Students presenting their winning project for the Environment Challenge for Schools 2017 to Deputy Prime Minister Tharman.

Galvanising the Community to Keep Singapore Clean

The Keep Singapore Clean Movement (KSCM) is an awareness drive that rallies the community to come together to improve public cleanliness. It is led by the Public Hygiene Council (PHC), NEA and the Singapore Kindness Movement (SKM).

The annual 'Operation WE Clean Up!' is now known as 'Keep Clean, Singapore!'. The rebranded ground-up initiative was launched on 30 April 2017. Close to 290 partners organised more than 420 clean-up activities island-wide.

In 2017, more than 14,000 students from 260 schools participated in the **Clean Singapore Learning Trail (Beaches) programme**. The students undertook extensive clean-up efforts along Singapore's beaches, while also encouraging the public to pick up after themselves and not litter.

The **CleanPod** is a resource-sharing platform piloted by PHC at East Coast Park in December 2017. It supports schools and organisations, including individuals, to organise their own litter-picking activities in a more efficient and sustainable manner.



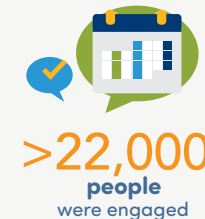
Left: Students participating in a mass clean-up session at the beach to show their care and ownership of Singapore's shores. Right: Volunteers, poster walkers and YouTube influencers (TreePotatoes) at the New Year Countdown on-ground activation.

The Buddy Clean Workshop is organised by NEA to educate students on the importance of keeping their school premises clean. To date, more than 16,000 students have been trained and equipped with the skills required to undertake the cleaning activities.

NEA also worked with PHC and the Litter-Free Ambassadors to mitigate littering at mass events. More than 600 volunteers were deployed in 2017 at mass events, including the National Day Parade and New Year Countdown, to urge the public to pick up after themselves.

The event organisers were also provided a guidebook on how they could use visual aids, audio reminders and other interventions to remind event-goers of the need to keep event venues clean.

Achievements in Mitigating Littering at Mass Events



On-the-ground outreach efforts were augmented by publicity efforts, which amplified key messages across traditional, out-of-home, digital and social media. YouTube influencers, Tree Potatoes, were engaged to advocate good binning habits via social media and on-the-ground activations at the New Year Countdown.

A cinema etiquette video series that encourages gracious acts among moviegoers, such as picking up after

themselves, has been jointly developed by PHC, SKM and NEA. The light-hearted video series was unveiled by Minister Masagos on 8 June 2017, and subsequently screened at the theatres of Singapore's four major cinema operators.

Widening Community Outreach on Dengue Prevention

The National Dengue Prevention Campaign mobilises the community to do their part in the fight against dengue. Also called the 'Do the Mozzie Wipeout'



Left: The launch of the 'Do the Mozzie Wipeout' campaign 2017. Right: Poster walkers helping to educate the public on how to 'mosquito-proof' their homes.

campaign, it reminds residents to stay vigilant and practise the '5-Step Mozzie Wipeout' regularly, especially during the annual peak dengue season.

The campaign was launched on 14 May 2017 at Our Tampines Hub by Minister Masagos and Mr Baey Yam Keng, the Advisers to Tampines Grassroots Organisations.

At the launch, Minister Masagos, Mr Baey, grassroots leaders and Dengue Prevention Volunteers (DPV) reached out to residents. The DPVs also conducted house visits to residents living nearby to encourage them to join the fight against dengue and Zika.

The campaign was also launched concurrently across all the districts. Grassroots leaders and DPVs conducted house visits and patrolled town centres to check for potential mosquito breeding habitats. Community events, such as roadshows with games and skit, were also organised to educate residents on common mosquito breeding habitats and dengue prevention tips.

More than 25,000 residents island-wide were engaged through the outreach efforts during the campaign launch and in the following two weeks of intensive outreach.

Following its May 2017 launch, the campaign also ran from October to

November 2017 and from January to March 2018 to reinforce the messages of dengue prevention. Residents and members of the public were also reminded to 'mosquito-proof' their homes before travelling during the holiday seasons.

To widen the spread of dengue prevention messages on a national level, publicity materials were launched across multiple platforms. This included traditional media, out-of-home media, digital and social media, community banners, and on-ground activations such as poster walkers. The dengue prevention messages reached 3.78 million people in 2017.

KEY HIGHLIGHT OF NATIONAL DENGUE PREVENTION CAMPAIGN @ SOUTH WEST DISTRICT

Launch of the 'Operation Mozzie-Free @ South West 2017' flagship programme, as well as 'Mosquito Quest' – a 3D virtual reality mobile app developed by corporate partner, Bayer, where users could learn how to find potential mosquito breeding spots at home

KEY HIGHLIGHT OF NATIONAL DENGUE PREVENTION CAMPAIGN @ SOUTH EAST DISTRICT

Conducting of dengue prevention outreach with grassroots advisers and leaders and DPVs to promote the '5-Step Mozzie Wipeout', while also removing discarded receptacles that could potentially become mosquito breeding habitats

KEY HIGHLIGHT OF NATIONAL DENGUE PREVENTION CAMPAIGN @ CENTRAL SINGAPORE DISTRICT

Coordinating grassroots advisers and leaders and DPVs to spread the message of keeping dengue at bay, and to urge residents to keep their homes free of stagnant water and practise the '5-Step Mozzie Wipeout'

KEY HIGHLIGHT OF NATIONAL DENGUE PREVENTION CAMPAIGN @ NORTH WEST DISTRICT

Conducting of educational outreach around Bangkit Square with grassroots advisers and leaders and DPVs, who distributed dengue educational materials and bamboo pole holder caps and urged residents to practise the '5-Step Mozzie Wipeout'

Engaging Former Users of the Sungei Road Hawking Zone

On 14 February 2017, it was announced that the site where the Sungei Road Hawking Zone (SRHZ) was located would be used for ground preparation works to facilitate future public residential development use, and that SRHZ would be closed after its last day of operation on 10 July 2017.

Prior to the closure, officers from public agencies, such as NEA and the Ministry of Social and Family Development (MSF), had proactively communicated and engaged SRHZ users to understand the concerns of each individual and offered relevant assistance options, such as lock-up stalls at hawker centres, as well as employment and financial assistance to those who may need them.

Collectively, the government agencies had engaged more than 200 users who operated at SRHZ. As of 31 January 2018, various forms of government assistance had been extended to almost 90 former users. More than 90 other former users had informed that they did not require any assistance, while another 37 users were allocated stalls at hawker centres.

To help these former SRHZ users adapt and build up their businesses at their new locations at the hawker centres, NEA facilitated their attendance of a course on merchandise display and encouraged them to explore new items for sale. The Central Singapore CDC also worked with partners and volunteers on a community programme to assist former SRHZ users with the initial set-up of their stalls and subsequent visual merchandising.

Promoting Discourse and Collaborations for a Clean and Sustainable Singapore

On 18 January 2018, NEA successfully organised its Board Strategy Advance. This annual corporate planning event brought together key stakeholders across the community, including government agencies, non-government organisations, industry associations and the academia.

Participants engaged in meaningful discussions on topics that ranged from 'Keep Singapore Clean' and 'Sustainable Singapore' to 'Re-Imagining Hawker Centres'. It was also a platform for participants to

share ideas and explore collaboration opportunities on environmental issues. The useful insights generated will help point the way forward for NEA to align and embark on key strategic issues.

Engaging NEA's Stakeholders: Public and the Community ^[102-42,102-43,102-44]

NEA realises the importance of identifying and engaging the right groups of stakeholders in order to implement and drive vital environmental measures. NEA had therefore carried out a comprehensive analysis of risks and opportunities related to driving sustainability within the organisation. In the process, the relevant stakeholders were also identified and selected.

NEA's ability to realise a liveable and sustainable Singapore is only possible with strong public and community support. The fostering of strong relationships with public and community stakeholders has helped NEA drive greater environmental awareness and adoption of sustainable living.

Public and community stakeholders constitute the largest group that consumes NEA's services. From

public health enforcement to hawker centre management and weather services, much of NEA's operations revolve around public and community stakeholders. Listening to their needs and addressing their concerns is therefore crucial to the success of NEA's initiatives.

NEA has put in place various platforms to enhance public outreach and engagement. The frequency of these engagements varies with the needs of specific communities. Engagement goals are then set based on the key topics and concerns raised during previous stakeholder engagement exercises, and will serve to guide NEA's continued efforts to raise environmental ownership among public and community stakeholders.

... continued from previous page ^[102-43,102-44]

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements	
<ul style="list-style-type: none"> To better understand public sentiment on the environment and gather feedback from the public on NEA's existing and new programmes and services 	Surveys, public communication channels, public consultations	<ul style="list-style-type: none"> Public communication channels, such as phone, emails, SMS, walk-in, letters, faxes, social media, online feedback form and myENV mobile app, serve as platforms for the public to submit their feedback Consultations were held to solicit feedback on mandating energy labelling and Minimum Energy Performance Standards (MEPS) for lamps and raising MEPS for air conditioners Public consultations on inland ash scattering facilities for cremated ashes in Singapore, with feedback sought on various aspects such as design criteria, user experience, operational procedures, booking arrangements, cultural and religious needs 	<ul style="list-style-type: none"> Customer Satisfaction Survey on Public Waste Collection (PWC) Scheme to measure the quality of refuse collection and recycling services provided by the PWCs, determine the level of customer satisfaction with the services provided, and identify ways to improve the service standards Environmental and Service Satisfaction Survey to determine level of customer satisfaction with environmental initiatives and services provided by NEA and its external partners
<ul style="list-style-type: none"> To raise environmental awareness among the community, educate them on the scope of NEA's work, and promote public interest in environmental matters 	Visits to NEA facilities	<ul style="list-style-type: none"> Visits to the Meteorological Service Singapore (MSS) Central Forecast Office by educational institutions and specialised users to learn about MSS' weather services, which will allow them to make better use of these services in their operations and planning 	<ul style="list-style-type: none"> Visits to NEA's incineration plants and Semakau Landfill by educational institutions, community groups and companies to foster a stronger sense of shared environmental ownership and understand how they too have a part to play in waste reduction
	Public events, exhibitions, activities, educational materials	<ul style="list-style-type: none"> Clean & Green Singapore, which is an annual public campaign that promotes environmental awareness as well as encourages the community to get involved in keeping the environment clean and green NEA's exhibition at the annual Singapore Food Expo to raise public education and awareness of food safety matters The E2Singapore website, which contains up-to-date information on energy efficiency related events, case studies, resources, programmes, as well as news articles relevant to the households, transport, buildings and the industry sectors The myENV phone application was incorporated with the Home Energy Auditor and Life Cycle Cost Calculator modules to equip homeowners with energy efficiency information so they can make more informed decisions 	<ul style="list-style-type: none"> Posters and banners displayed at the Housing & Development Board void decks and hawker centres to raise energy efficiency awareness The Resource Efficiency Guide for New Home Owners was distributed to new homeowners to raise their energy efficiency awareness The three Food Waste Minimisation Guidebooks for businesses along the food supply chain to take concrete steps towards reducing food waste Distribution of brochures on food hygiene guidelines to help guide the public on food hygiene Library Mobile Exhibition allows NEA to educate the public on energy saving in a fun way through games
<ul style="list-style-type: none"> To update the public on NEA's initiatives, programmes and legislation 	Media publicity, updates on NEA's corporate websites and social media platforms	<ul style="list-style-type: none"> NEA leverages mainstream and social media channels to inform the public about its policies and regulations, such as its anti-littering campaigns and the anti-idling engine regulations, and to raise community awareness of public health and environmental protection issues, such as the Zika outbreak and the 3Rs 	<ul style="list-style-type: none"> Related posts and videos on social media platforms to reach out to NEA's social media account followers

Collaborate and Advance International Interests

Singapore is vulnerable to the transboundary effects of environmental threats and infectious vector-borne diseases due to its global interconnectedness and geographical profile. These risks are further intensified by climate change, along with its socio-economic impact.

To foster collaboration and knowledge exchange at the international level, NEA engages its ASEAN counterparts in the regular circuit of bilateral and multi-lateral meetings, especially in transboundary environmental issues. This engagement also extends beyond ASEAN to the international stage, where NEA collaborates on projects with international organisations such as the United Nations Environment Programme and foreign agencies such as the Meteorological Office, UK.

Additionally, NEA leverages various international platforms to promote Singapore's expertise in environmental management beyond our shores. This enables Singapore to broaden its mindshare by contributing best practices and knowledge to the global discourse on the climate change and the environment.

Establishing the New WMO Regional Office in Singapore

Singapore is now home to the World Meteorological Organization (WMO) Regional Office for Asia and the South-West Pacific. Hosted by Meteorological Service Singapore (MSS) at its CCRS, the Regional Office will serve as WMO's regional nerve centre supporting 58 member countries in Asia and the South-West Pacific.

With WMO's presence in the region, Singapore is well-placed to strengthen regional cooperation in environmental challenges such as climate change and transboundary haze. This will also

synergise with MSS' role as host to the ASEAN Specialised Meteorological Centre (ASMC) in developing capabilities in the region in the field of weather and climate prediction, and in regional fire and haze monitoring and assessment.

The opening ceremony took place on 21 August 2017. It was officiated by Professor Petteri Taalas, Secretary-General of WMO, and Mr Masagos Zulkifli, Minister for the Environment and Water Resources.

Steering ASEAN Towards Best Practices on Climate Change Projections

As host to ASMC, MSS leads the region's development of best practices for climate change projections. Its latest efforts include organising the Best Practice Workshop for Climate Change Projections and their Application in ASEAN Countries.

The workshop was held in Singapore from 20 to 23 March 2018. It was the first

of its kind to review the diverse studies on regional climate change projections. Extensive discussions were dedicated to adapting global climate projections to local needs. Case studies and scientific methodologies were also shared at the workshop.

45 participants took part in the workshop. They include representatives from the National Meteorological and Hydrological Services of 10 ASEAN countries, experts invited from Europe and Australia, as well as regional end-users of climate change projections.

Spearheading SIGMET Coordination in Southeast Asia

Following a pilot trial in coordinating the issuance of Significant Meteorological Information (SIGMET) among the Meteorological Watch Offices (MWOs) of Indonesia, Malaysia and Singapore, the initiative went fully operational in August 2017. SIGMET refers to information on hazardous weather of significant risk to flight safety.

MSS continues to coordinate and lead the effort to issue consistent SIGMETs across the region. The cross-border coordination enhances safety and efficiency for aviation operations. Efforts are underway to extend this coordination to other regional MWOs.

Fostering Bilateral Cooperation on Nuclear Safety with US and Australia

In 2017, NEA signed two bilateral arrangements with national regulatory authorities in US and Australia to exchange technical information and advance cooperation in radiation protection and nuclear safety.



US Nuclear Regulatory Commission
Information Exchange Arrangement
Signed on 3 July 2017



Australian Radiation Protection and Nuclear Safety Agency
Memorandum of Arrangement
Signed on 25 September 2017

Enhancing Regional Preparedness in Nuclear and Radiological Emergencies

Under the ASEANTOM-IAEA Regional Technical Cooperation Project¹³, NEA hosted a regional workshop, 'Communication with the Public in a Nuclear or Radiological Emergency' from 5 to 9 June 2017. As a follow-up, NEA hosted a second regional workshop, 'Assessment and Decision Making Protocol and Public Communication Strategy in a Nuclear or Radiological Emergency for ASEAN Region' from 19 to 23 March 2018. The workshops helped the ASEAN member states develop harmonised public communication and decision making arrangements to respond to a nuclear or radiological emergency.

Broadening Mindshare with International Programmes

NEA conducted 11 technical assistance programmes in FY2017 to share Singapore's experience in environmental management with foreign delegates. Delivered through close collaboration with the Ministry of Foreign Affairs and international organisations, the programmes aim to broaden NEA's mindshare and cultivate international goodwill.

¹³ This project is jointly developed by NEA and Thailand's Office of Atoms for Peace with the support of members from ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM) and the International Atomic Energy Agency (IAEA).

Advancing Environmental Cooperation through Bilateral Platforms

In 2017, NEA continued its efforts to advance environmental cooperation with neighbouring countries. This was achieved through bilateral platforms, including the 11th Meeting of the Brunei-Singapore Working Group on the Environment held on 13 April 2017, and the 15th Meeting of the Malaysia-Singapore Joint Committee on the Environment Working Group held from 23 to 24 May 2017.

At each bilateral meeting, delegates from both countries continued the discussion on key environmental management issues of common interest, as well as opportunities

for mutual cooperation. Officials from NEA also visited Brunei for an exchange programme on solid waste management.

Special Mentions

9 to 13 October 2017
**Singapore-Norway Third
Country Training Programme
on Waste Management and
Reduction of Marine Litter**
23 international delegates

26 February to 2 March 2018
**Air Quality
Management and Solid Waste
Management Workshop**
6 officials from Brunei

Leading Regional Cooperation and Action on Climate Change

Singapore, represented by NEA, has assumed the Chairmanship of the ASEAN Working Group on Climate Change (AWGCC) for the period of 2017 to 2019. Established in 2009, AWGCC promotes cooperation among ASEAN member states to address climate change's adverse impact on socio-economic development.

At the 8th AWGCC meeting held on 14 June 2017, NEA advanced the AWGCC Action Plan and presented two projects. The projects aimed to improve the estimation of greenhouse gas emissions from land use change in peatlands, and to build up capacity for regional carbon pricing. Both projects were endorsed by ASEAN member states.

CHAPTER 3

Enabling a High Performance NEA



Strengthen Operations and Service Delivery

Public agencies around the world face a common challenge in their provision of essential public services. Customer expectations from businesses and the public are on the rise, which has led public agencies to search for new ways to improve their service delivery.

Over the years, NEA has introduced various initiatives to enhance service delivery. With a digitally-connected population, NEA is increasingly leveraging digital technology to transform how services are provided to the public and business communities. Many of NEA's services, such as licence applications and weather forecasts, can now be accessed through convenient platforms such as mobile apps, websites and self-service kiosks.

Within the organisation, the innovative use of technology has enabled NEA to achieve greater operational efficiency.

Automation solutions such as drones and remote monitoring have been deployed on the ground to alleviate manpower and resource constraints. Meanwhile, NEA's training programmes have also incorporated technology to provide participants an immersive and effective learning environment.

Forging a Future Ready NEA through Innovation

Many factors drive NEA to innovate. New challenges arising from environmental issues, public health threats and a densely built-up living environment emerge from time to time. Demand for environmental services and infrastructure are growing, along with rising public expectations and a greater need for transparency and accountability. NEA steps up to these challenges and responds with effective and innovative solutions.

NEA is also motivated to innovate from within. Its innovation-driven culture spurs staff at all levels to constantly pursue new ideas, best practices and creative solutions. Recent trends in technology have presented new opportunities for NEA to strengthen

operations and service delivery, and to engage more effectively with stakeholders. The impetus for NEA to explore ways to innovate and deliver better outcomes is part of its organisational DNA.

Driving Innovation Excellence in NEA

To cultivate and sustain an innovation-driven culture, NEA has implemented an innovation framework founded on the tenets of organisational development and behavioural sciences. The framework streamlines NEA's system, processes and people 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 recognition via various platforms.

NEA's Innovation Culture



NEA's Sources of Innovation and Innovation Tools



Celebrating Innovative Efforts through Internal Recognition

In FY2017, NEA staff completed 96 work improvement projects. This has allowed NEA to reap productivity gains of over \$4.7 million.

NEA acknowledges outstanding innovative efforts to spur and inspire staff to continue innovating. The **Innovation and Learning Fiesta** was therefore conceived to recognise individuals and project teams who have implemented innovative solutions to key challenges.

A highlight of the annual event is the conferring of The Best Idea and Best Project Awards, which recognise positive outcomes from innovative efforts. Meanwhile, the Best Ideator and ExCEL Champion Awards honour outstanding contributions from innovative individuals.

In FY2017, NEA introduced new incentives to recognise continued innovation efforts among departments and individuals. These awards include:

- **Top 3x3 Best Performing Entities**
This award recognises departments that showed active participation in achieving innovation excellence.
- **Top 3x3 Best Improved Entities**
This award recognises departments that showed tremendous improvement in their innovation efforts.
- **Best Venture Projects**
This award recognises cross-functional projects that display a high degree of innovation, ingenuity and collaboration, as well as the achieving of impactful outcomes.
- **Top \$avings Award**
This award recognises projects that have achieved substantial real cost savings over a one-year period.
- **Crowdsourcing Challenge Awards**
This award recognises departments and individuals who have participated in organisation-wide co-creation efforts.

These awards exemplify NEA's continued commitment to cultivating the innovative spirit within the organisation, as well as nurturing an innovation-driven culture. These awards will be given from FY2018 onwards.

Other schemes that recognise innovation within NEA are:

- **MyiDeas Scheme**
Points are awarded to ideators who contribute ideas. Awarded points are encashed monthly to ideators. To encourage implementation, half of the points awarded to ideators are granted to implementers of the ideas. Good ideas will also be judged by the Innovation and Productivity Committee for the Best MyiDeas Awards.
- **Improvement Projects' Scheme**
This scheme offers project teams incentives for submitting their projects to the Improvement Projects portal. In addition, good projects are eligible for the Best Project Award, which is judged by the Innovation and Productivity Committee.

Innovative Staff Contributions Received in FY2017



822
MyiDeas



69
Improvement Projects

Achieving External Recognition for Innovation Excellence

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

In FY2017, NEA garnered several innovation awards at the national and international levels. These awards are a positive affirmation of NEA's commitment to innovation and the proven strength of its innovation-driven culture.

International Awards

NEA received the following international awards in FY2017:

- **International Convention for Quality Control Circles 2017 (Gold):**
 - 'Automatic Larvae Counter' for mass rearing of male *Wolbachia*-carrying *Aedes aegypti* mosquitoes as a dengue control tool
 - 'Rodent Burrows Clustering and Surveillance' to identify priority areas for rat control efforts
 - 'Re-design of Precast Cover Frame for Re-interment

Burial Crypts' implemented at the Choa Chu Kang Cemetery

- **CIO Awards 2017 Highly Recommended at the CIO Conference**, in recognition of NEA's Integrated Field Operations System (iFOS) as one of the top IT projects carried out in Asia

National Awards

NEA also received the following national awards in FY2017:

- **Excellence in Public Service Award** conferred by the Public Service Division
- **Workplace Transformation Award** conferred by the Public Service Division for innovative use of Workplace by Facebook as a productivity and collaboration platform

- GovInsider Innovation Awards under 'Best Use of Data' category for the project 'Dengue Risk Map for Resource Allocation and Targeted Preventive Surveillance'
- Fourteen awards at the MEWR Excellence Day 2017 conferred by Ministry of the Environment and Water Resources (MEWR)
 - MEWR ExCEL Champions Awards (three awards)
 - MEWR Innovative Project Awards (three awards)
 - MEWR Excellence Day Best Practice Awards (eight awards)
- OpenGov Recognition of Excellence Award at the Third Singapore OpenGov Leadership Forum for the iFOS



International Convention for Quality Control Circles



Excellence in Public Service Award



GovInsider Innovation Awards

Fostering a Culture of Continuous Innovation and Learning

The biennial Innovation and Learning Fiesta is a tribute to NEA's culture of continuous innovation and learning. Held on 6 September 2017, the flagship event was attended by 1,721 participants. It also marked the conclusion of NEA's 15th Anniversary celebrations.

Learning opportunities were aplenty at the Fiesta. Guest speakers were invited to conduct a series of learning workshops, seminars and speeches for the participants. Exhibition booths were set up to showcase innovation projects developed within NEA, as well as innovative practices and solutions from other organisations.

The Fiesta is also a platform for NEA to recognise individuals and teams for their exemplary contributions to the spirit of innovation. About 80 individuals and teams were honoured with the NEA Innovation and Learning Awards at the Fiesta's award ceremony.

Key Highlights of Innovation and Learning Fiesta 2017

Positive Feedback



Learning Opportunities



Stepping Up Productivity and Quality of Hawker Centre Construction

NEA continued to make new strides in leveraging smart technology to raise productivity and quality of the construction of its hawker centres.

The use of precast prefabricated cooked food stalls (PPCFS) was successfully piloted by NEA at the Yishun Park Hawker Centre. Each PPCFS was assembled at a plant before delivery for on-site installation. This improved productivity and workmanship of the hawker centre's construction, and reduced dust and noise pollution at the construction site.

Building Information Modelling (BIM) was adopted by NEA to improve productivity during the construction of the Bukit Panjang Hawker Centre. BIM's computer simulations improved decision making during the building's design stage, thereby minimising rework during the construction stage.

NEA's successful implementation of PPCFS and BIM were showcased at the Singapore Construction Productivity Week 2017 from 24 to 26 October 2017.

Keeping the Public Informed of Hawker Centre Closures

NEA's myENV mobile app now has an alert feature to inform the public about the latest hawker centre closures. Newly introduced in October 2017, the feature allows users to be notified when their selected hawker centres are closed for renovation or spring cleaning, saving them from making unnecessary trips. Users can also use the app to find out which other nearby hawker centres are open.



An example of the hawker centre closure alert that users of the myENV app will receive based on their list of selected hawker centres.

Developing an Automated Solution to Detect Smoky Emission and Flaring

In September 2017, NEA completed the development of a video analytics-based solution that allows for real-time automated detection of smoky emission and flaring from industrial stacks. It was developed in collaboration with a solution provider under the national Safety and Security Industry Programme 2020.

A prototype of the solution was tested in the field to evaluate its performance. It was able to achieve an accuracy of more than 95 per cent for automated detection of smoky emission and flaring, with a false detection rate of less than eight per cent. NEA identified the improvements required to enhance the solution's operational value.

The solution will continue to undergo refinements and further field testing, so that its effectiveness can be maximised before being operationalised.

Leveraging Digital Technology in Environmental Learning

NEA is exploring ways to tap on digital technology to improve learning

outcomes. These smart learning solutions were developed in FY2017 to create an immersive and engaging learning experience for participants of NEA's programmes.

1. PEEL (Programme for Environmental Experiential Learning) Trail Mobile Apps

The trail apps provide interactive, bite-size information during site tours and visits to environmental facilities around Singapore. The fifth trail app on Climate Change was successfully deployed at NEA's international programmes in FY2017.

2. Amazing Environment Race Trail Mobile App

The app adopts a gamification approach similar to 'The Amazing Race'. Participants team up to locate clues planted along the Singapore River using image recognition and GPS technology. Through the immersive experience, participants of the NEA Induction programme were able to uncover and appreciate the history behind the decade-long Singapore River clean-up.

3. Foundation E-Learning Modules

NEA is progressively converting all 11 modules in the Foundation Programme into e-learning modules to facilitate self-paced learning and learning on the go. By FY2017, 80 per cent of the e-learning modules had been developed and will be made to available for all staff from July 2018.

4. Virtual Reality Pilot

A pilot study using Virtual Reality (VR) technology to simulate enforcement scenarios in a Foundation module was successfully conducted. NEA officers were able to train in a simulated but safe learning environment before their deployment. Additionally, the VR learning solution comes with built-in performance tracking software that will indicate whether the officers are ready for ground deployment.

Leveraging Technology to Go Paperless

Wherever feasible, NEA explores ways to reduce paperwork and physical documentation for its stakeholders. In FY2017, NEA leveraged the Building and Construction Authority's e-CORENET¹⁴ submission system to accept building plan submissions.

With the overhaul of the hardcopy submission process, Qualified Persons only need to submit building plans electronically using e-CORENET. NEA will assess, sign and issue documents and clearance letters electronically via the same digital platform.

NEA hopes that the migration to e-CORENET will help speed up the entire submission process, minimise the use of paper and avoid situations where documents are misplaced during the mailing process.

Transforming Operations with Innovative Drone Use

NEA recognises the potential of drones in driving greater operational productivity and capabilities. In 2017, NEA enhanced its drone protocol and developed an Unmanned Aircraft Systems Operation Manual.

The manual was endorsed by the Civil Aviation Authority of Singapore (CAAS), and led NEA to become one of the first few agencies to obtain CAAS' Public Service Block Activity Permit. The permit enables NEA to pilot drones in Singapore except in restricted areas, without having to obtain individual permits tied to the flight locations.

The use of the drones (where permitted) has allowed NEA officers to easily access hard-to-reach places such as roof gutters during routine inspections for mosquito breeding habitats.

NEA also deployed a tethered drone during an oil spill operational readiness exercise. The exercise was held on 20 March 2018, as part of NEA's ongoing effort to review operational processes and validate operational plans for landward oil spill clean-up operations. The deployment of the tethered drone improved situational awareness and operational efficiency during the shoreline clean-up operations.

For the innovative use of drones in its operations, NEA was recognised with a Best Practice Award at MEWR Excellence Day 2018.

Enhancing Enforcement Outcomes with Body-Worn Camera Technology

Once regarded as an innovative gadget, body-worn cameras are becoming an increasingly invaluable mainstay of enforcement agencies worldwide and in Singapore.

When conducting enforcement, NEA officers may sometimes encounter

offenders who are uncooperative or abusive. NEA has been progressively equipping its officers with body-worn cameras, to help deter abusive behaviour by offenders, protect officers against allegations of unprofessional conduct, as well as remind officers to abide by operational protocols at all times.

The deployment of the body-worn cameras has facilitated a smoother enforcement process and bolstered the confidence of NEA's frontline enforcement team in carrying out their work.

Integrating All Licences Under One Roof

LicenceOne is a one-stop government portal for the application and renewal of licences. It was previously known as FRONTIER and replaces the existing Online Business Licensing System.

NEA aims to integrate 31 licences under LicenceOne. This is in line with NEA's strategy to go paperless and reduce overcrowding at its Customer Service Centre.

Once full integration is achieved, applicants will be able to enjoy the ease

¹⁴ CORENET stands for Construction Real Estate Network – an electronic system that is accessible 24/7 via the internet.

of submitting their forms and payments online. The application form will be automatically populated with data that exists within the Whole-of-Government data platforms, allowing for an even more efficient application process.

In FY2017, NEA completed the integration of another six licences, bringing the cumulative total to 11. The remaining 20 licences will continue to be integrated progressively.

- Five licences to be integrated by end April 2018
- Fourteen licences to be integrated by June 2018
- One remaining licence to be integrated by August 2019

Improving User Experience with Revamped Haze Website

The haze website has been revamped and launched in March 2018 with a streamlined and easy-to-navigate interface. It was also designed with responsive, mobile-friendly and scalable features to enhance user experience. With the revamped website, users can now access information on air

quality and guidelines on haze-related issues more quickly and easily.

Expanding the Capabilities of NEA's Integrated Environment System

NEA's Integrated Environment System (IES) is a real-time environmental monitoring and operational system. It is designed to integrate data from different types of environmental and weather sensing systems, thereby allowing it to achieve a holistic analysis of possible environmental or public health risks.

In FY2017, the IES was expanded to include several new capabilities.

- The system architecture now has improved security features to guard against cyberattacks from the Internet of Things (sensors).
- IES is now integrated with NEA's corporate website, haze website and the hotline's Interactive Voice Response to ensure simultaneous and timely distribution of weather and Pollutant Standards Index information to the public.
- The analytics platform has been upgraded to serve a broader

user base outside of IES, and to allow for smarter self-service analytics and drag-and-drop dashboard capabilities.

- IES has been integrated with Smart Nation Platform Sensors Data eXchange for near real-time sharing of air quality and weather datasets.

Taking Bold Steps in Digital Transformation

The NEA Digitalisation Plan was developed in 2017 to support NEA's mission and strategy outcomes till 2030. It is also aligned to the Whole-of-Government Digitalisation Framework to realise Singapore's Smart Nation vision.

Three new ICT development projects have since commenced under the NEA Digitalisation Plan.

- NEA OneStopService Portal (ePortal)
- One Integrated Licensing System
- Waste and Resource Management System

Developing a Novel Methodology to Automate Business Process Reviews

In 2017, an NEA team comprising the Central Licensing Branch, Radiation Protection and Nuclear Science Department, IT Department and Transformation Department embarked on a project to streamline their service and licence application processes with the aid of IT systems. Working with Public Service Division (PSD)'s Innovation Labs, the Design Thinking Approach was shared with NEA to meet stakeholders' needs.

With this, NEA had reinvented their project methodology and infused Lean Six Sigma and the 'ADKAR' change management model (together with PSD's Design Thinking Methodology) into a single approach. This methodology worked well for the project team. The reinvented approach was replicated and applied throughout the whole of NEA. This provided NEA with a blueprint to carry out future business process reviews with their stakeholders.

Broadening Convenient Payment Options for NEA ePayments

The ePayment Gateway is a centralised payment gateway that consolidates NEA's payment records and makes it convenient for the public to make payment for licences, permits, fines, hawkers-related fees and services rendered by NEA. The public can choose to pay via NEA's e-Services or through payment provider partners such as AXS and SAM kiosks.

In September 2017, NEA upgraded its Unified Point-of-Sale terminals for all NEA Counters. The public will now be able to tap on the NETS QRCode to make payment via 'DBS PayLah!', 'UOB Mighty' and 'OCBC Pay Anyone'. NEA also appointed SingPost Pte Ltd to provide even more payment options at the island-wide Post Offices.

These convenient payment options were met with overwhelmingly positive responses from the public, who can now pay these fees anytime, anywhere.

Strengthening Operations and Service Quality through Roadshows

Four service and operational excellence roadshows were organised for a total of 892 NEA officers in FY2017. This helped to create learning opportunities on the functions of different departments under NEA's Service Quality Division, as well as to highlight the service and operational excellence initiatives that were put in place for them.

These initiatives included:

- i. An approach for the management of feedback, thereby allowing feedback to be addressed efficiently and effectively
- ii. An awareness briefing on the management of video recordings to familiarise NEA officers on how offenders could use video recordings taken during field engagements to discredit NEA's reputation on social media using 'fake news' and 'false allegations'

iii. A sharing on the various complaints lodged against NEA officers by members of the public, key takeaways from actual case studies, and how the Complaints Investigation Branch investigates and exonerates officers from false allegations

iv. A dialogue session with the Director of NEA's Service Quality Division, where officers were free to seek clarification or provide insights or feedback on service and operational excellence

Enhancing Operational Processes through Audits

Audits were conducted for six processes in FY2017:

- Tenancy Management
- Public Cleaning
- Sanitation Control
- Port Health Services
- Management of Environmental Data
- Refuse Disposal

Achieving High Compliance Rating in the IM8 Process Audit

In 2017, GovTech launched the IM8 Process Audit on behalf of Smart Nation and Digital Government Group. The Instruction Manual on IT Management (IM8) are a set of policies and rules that guides NEA in the delivery of high-quality, effective and reliable e-services for the public. The audit scope was comprehensive, covering a total of 578 clauses from the IM8 policies, standards and circulars.

NEA performed reasonably well in almost all areas of the audit, achieving 99.3 per cent compliance with only three partial compliance clauses. The high compliance rating was attributed to NEA's subscription to Whole-of-Government services, such as 'SG-Mail' and 'G-Cloud', as well as the efforts of well-informed NEA staff who took prompt action to comply with any new IM8 standards. NEA's management also played a pivotal role through their encouraging support on ICT initiatives and oversight of ICT controls.

Adopt 'Right-Size' Regulations and Simplify Processes

Regulations need to be administered 'right-size' to avoid defensive practices and ensure a win-win situation for all stakeholders, including the parties whose compliance is required.

NEA is the national regulatory authority on environment matters ranging from public health and hawkers centres to energy efficiency, waste management and pollution. Where new development occurs or from time to time, NEA will work in tandem with the stakeholders to review and fine-tune regulations. This allows regulations to remain 'right-size' and relevant in the face of evolving needs and challenges.

NEA is also constantly looking to simplify the application and compliance processes of its regulations where feasible. This not only helps NEA to optimise its resources as a regulator, but businesses and individuals will also find it a welcome boost to their own productivity.

Build Robust Capabilities

NEA's organisational capabilities drive its corporate and operational success. It is therefore crucial for NEA to build robust capabilities, given its breadth of work and the diversity of stakeholders that relies on its policies and services. This will enable NEA to operate effectively and accomplish its mission in a complex and dynamic environment.

Within the organisation, NEA also ensures that its processes and frameworks are robust and able to keep pace with its operational needs. From policy formulation and knowledge management to skills training and service delivery, NEA's robust capabilities allow the organisation to respond swiftly and effectively to deal with different situations as they arise.

Develop and Engage Staff ^[103-1,103-2]

Sustaining NEA as a high-performance organisation could only be possible with the right people. To attract and retain a competent workforce, NEA has put in place various initiatives to train and develop employees and leaders to their fullest potential. This also ensures that everyone in NEA is equipped with the skills, knowledge and qualities to excel in their roles and help NEA achieve its mission.

NEA also believes in engaging the mind and connecting with the heart of its people, so that they remain motivated and dedicated to the organisation's goals and priorities. To this end, NEA is committed to providing every individual fair employment, a safe working environment, a balanced work life, as well as ample opportunities in career development.

In NEA, every individual has a voice in the organisation's culture and decisions. The needs and feedback of NEA employees are sought through regular engagement activities and communication platforms. With its competent and committed people, NEA will be better able to meet the increasingly challenging and complex needs of environmental management in the years ahead.

A People-centric Approach ^[103-2]

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 its people.

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

1. Brand NEA to attract the right talent
2. Develop workforce capabilities

... continued from previous page

3. Build an engaged and resilient workforce
4. Grow leadership pipeline
5. Improve HR processes and systems

In 2013, NEA developed an Employee Value Proposition (EVP), as summarised below, and launched continuous outreach efforts such as contests to reinforce the EVP and connect with staff.

- Safeguard our environment
- Nurture our people
- Cherish our relationships

Employment ^[102-8,103-2,201-3,401-1]

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

Fair Employment

NEA's terms of employment are guided by Singapore's legislations, including the Employment Act, the Workplace Safety and Health Act, and the Retirement and Re-employment Act. In addition, NEA aligns its HR practices with the Tripartite Guidelines on Fair Employment Practices. As of 31 March 2018, there were 20 employees with physical disabilities in NEA.

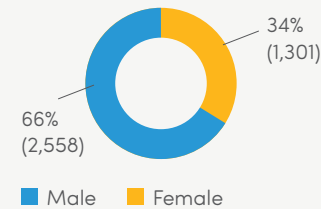
NEA staff attending a pottery workshop as part of their annual Department Advance.



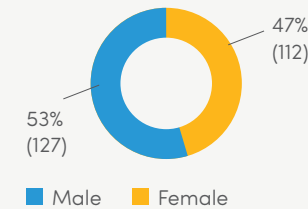
Staff Demographics *(as of 31 March 2018)*

As at 31 March 2018, NEA had a diverse workforce of 3,859 working in various locations island-wide. They were led by a 21-strong senior management team.

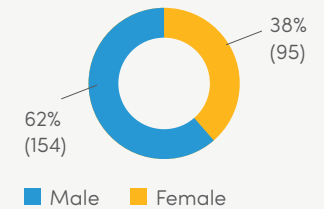
Number of officers in NEA
(Total: 3,859)



Number of officers recruited in FY2017



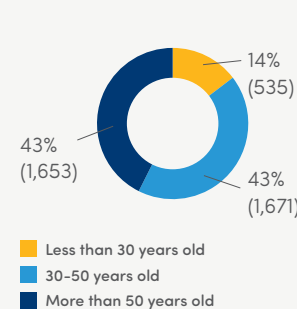
Number of officers who have left NEA in FY2017



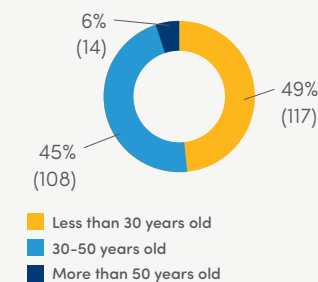
Breakdown by Age

In terms of age, 14 per cent of NEA officers were below 30 years old, while the percentage of NEA officers between 30 to 50 years old, and that above 50 years old were the same at 43 per cent respectively. In FY2017, 49 per cent of officers recruited were below 30 years old, while 45 per cent were between 30 to 50 years old; and 6 per cent were over 50 years old. About 15 per cent of officers who had left NEA were below 30 years old, while 36 per cent of those who left were aged 30 to 50, and 49 per cent were above 50 years old.

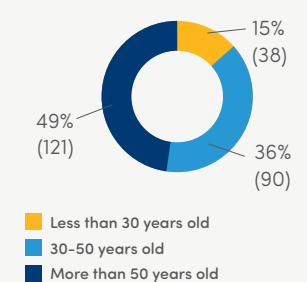
Number of officers in NEA



Number of officers recruited in FY2017



Number of officers who have left NEA in FY2017



... continued from previous page ^[102-8,103-3,401-1]

- *Breakdown by Gender*

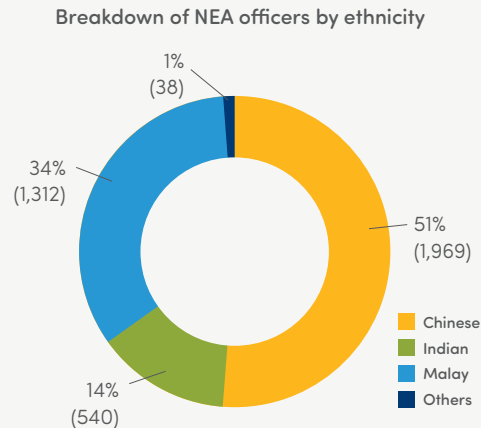
In terms of gender, 66 per cent of NEA officers were male and 34 per cent were female. In FY2017, 53 per cent of the new officers recruited were male while 47 per cent were female. This trend arises due to the nature of NEA's operational work, which tends to have more male applicants. Nevertheless, both genders were given equal consideration in the recruitment process. Of the 249 staff who had left NEA in FY2017, 38 per cent were female and 62 per cent were male.

Breakdown of NEA officers by gender
Strength: 3,859 (as of 31 March 2018)

Number of Monthly-rated Employees	3,308	Male	2,162
		Female	1,146
Number of Daily-rated Employees	551	Male	396
		Female	155

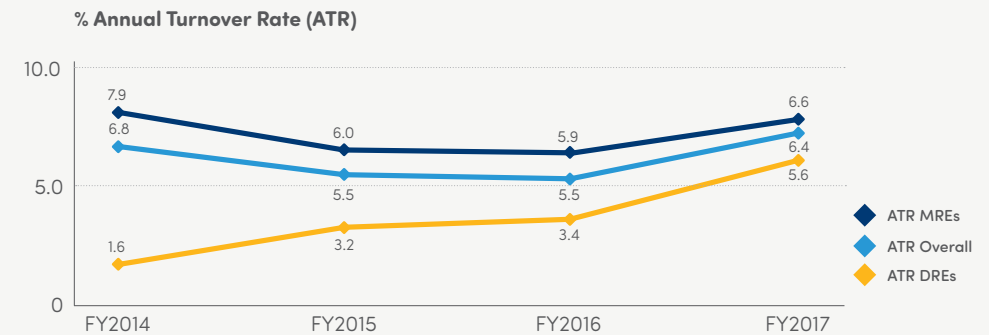
- *Breakdown by Ethnicity*

The ethnic composition of NEA officers was 51 per cent Chinese, 34 per cent Malay, 14 per cent Indian and 1 per cent Others.



- *Breakdown of Turnover Rate*

In FY2017, the annual turnover¹⁵ rates based on all employees, monthly-rated employees (MREs) and daily-rated employees (DREs) are shown in the graph below.



Since NEA's 30-month onboarding programme was introduced in 2015, there has been a sharp decrease in the resignation rates for officers in the 'NX13 & Above' grade. This is especially so for young graduate officers (below 30 years of age), where there has been a downward trend based on a two-year moving average.

Additionally, the resignation rate has seen a sharp decline among officers with lengths of service of less than two years. This demonstrates that the onboarding programme to engage officers who are new or younger has yielded encouraging results.

¹⁵ Employees who leave the organisation voluntarily or involuntarily (e.g. dismissal, retirement, or death in service)

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

Retirement and Re-employment Policy

Following the enactment of the Re-employment Legislation in 2012, NEA has re-employed all its eligible retirees. Employees who fail to meet NEA's fitness criteria or performance conduct for re-employment are assisted in the following ways:

- i. Connected with organisations, such as the Employment and Employability Institute, that are able to provide for employment opportunities outside NEA
- ii. Given an Employment Assistance Payment to help them tide over financially

A large proportion of NEA officers are older workers, of which 43 per cent is aged 50 and above. NEA values its mature workers and provides them equal opportunities. NEA also does not discriminate against older workers when hiring.

Employee Benefits

All NEA staff are covered under the Group Personal Accident Insurance and Work Injury Compensation. The coverage ceases when the employee leaves NEA.

NEA initiatives that support work-life harmony		
Focus Areas	Initiatives	
Self <i>To achieve better personal well-being by bringing helpful mind and body activities to the workplace</i>	Annual health screening	Quarterly fruit distribution
	Sports and recreational activities, such as Exercise Hour	Provision of gym, pantry and cafeteria for all staff
	Personal wellness workshops and programmes	Staff care support programme
	Healthy catering choices at corporate events	Interact Point Workshops for NEA singles
Family and Friends <i>To develop and strengthen relationships with one's family and friends</i>	Festive celebrations	NEA interest groups
	NEAt Kids' Club for children and grandchildren of NEA staff	NEA Family Day, NEA Dinner and Dance
	Medical benefits for dependents	An in-house childcare centre
	Gifts for NEA staff who are newly-wed or have a newborn	Leave benefits (e.g. adoption leave, childcare leave, parent care/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'	
Community <i>To develop a whole person through giving back to the community and making a positive difference to society</i>	Community Chest SHARE, a workplace giving programme	Fundraising activities such as the Vertical Challenge
	Community outreach and corporate voluntarism programmes	Volunteer leave
Work <i>To encourage and engage our officers with a positive work culture and environment</i>	Flexible working arrangements, such as part-time employment, staggered working hours and telecommuting	To support 'Blue Sky Friday', NEA senior management avoids holding meetings on Friday evenings, so that staff can leave work on time to spend time with their family or pursue their own personal interests
	Flexi-benefits Scheme	

Under the Group Personal Accident Insurance Plan, NEA staff are provided a \$100,000 24-hour worldwide coverage for death, injury and partial disablement due to accidental means, including non-work related accidents.

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 Work Injury Compensation Act (WICA). For diseases not listed in WICA, the Ministry of Manpower 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, and bear the full cost of the premium.

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

The coverage will continue even if the employee were to move to another government organisation. The employee can also choose to continue his coverage after retirement up to 70 years old provided that he:

- i. leaves the public service under age limit/early/optional retirement
- ii. retires under medical grounds
- iii. leaves public service under the Special Resignation Scheme or Special Gratuity Scheme

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 its 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 Work-life 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.

Types of benefits provided to full-time, part-time and temporary employees			
Type of Benefits	Full-time Employees	Part-time Employees	Temporary Staff
Outpatient Medical Benefits	Yes	Yes	Yes
Flexible Benefits	Yes	Pro-rated	No
Paternity and Maternity Leave	Yes	Yes	Yes



Top: Staff from NEA Headquarters and Regional Offices engage in sports activities to foster closer bonds.
Bottom: NEA staff on duty at Tuas South Incineration Plant.

... continued from previous page ^[401-3]

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. In FY2017, 82 eligible male employees and 38 eligible female employees utilised their paternity and

maternity leave respectively. All the employees subsequently returned to work after their parental leave had ended.

As of end FY2017, the retention rate¹⁶ of employees who took parental leave in FY2016 is 94 per cent for female

employees and 96 per cent for male employees. The high retention rate can be attributed to the appropriate HR policies that NEA has put in place to support the career paths of employees with families, as well as 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 FY2017 and those who returned to work in FY2017 after their parental leave ended, as well as the rate at which employees were still employed 12 months after their return to work from parental leave.

Total number of male and female employees who utilised their parental leave in FY2017	
Type of Parental Leave	No. of Employees
Maternity leave for female employees	38
Paternity leave for male employees	82
Grand Total	120

Total number of male and female employees who returned to work in FY2017 after their parental leave ended	
Type of Parental Leave	No. of Employees
Maternity leave for female employees	38
Paternity leave for male employees	82
Grand Total	120

Total number of male and female employees who returned to work after their parental leave ended in FY2016 and were still employed 12 months later	
Type of Parental Leave	No. of Employees
Maternity leave for female employees	65
Paternity leave for male employees	134
Grand Total	199

Return-to-work and retention rates of male and female employees who took parental leave		
Indicators	Male Employees	Female Employees
Return to work rate	100%	100%
Retention rate	96%	94%

¹⁶ The retention rate is calculated as the total number of employees retained 12 months after returning to work following a period of parental leave in FY2016, in line with the GRI Disclosure 401-3.

- *Work-life Activities*

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

- NEA's Human Resource Division
- The NEA Sports and Recreational Committee, which manages the gym and organises activities for NEA staff, such as fitness classes, sports activities, Family Day, and Dinner and Dance
- Panel for Employee Engagement and Recognition, which focuses on engaging NEA's employees by encouraging staff voluntarism and philanthropy, and promoting racial harmony

- *Union Membership* ^[102-41]

NEA employees are free to join unions recognised by NEA. Currently, 94 per cent of NEA's employees are eligible to join unions.

There are two unions active within NEA – the Amalgamated Union of Public Employees, and the Amalgamated Union of Public Daily Rated Workers.

Information about union representation is made available to NEA staff on NEA's intranet. All

new staff are also informed, on their first day of work as well as during induction courses, that they may join the unions.

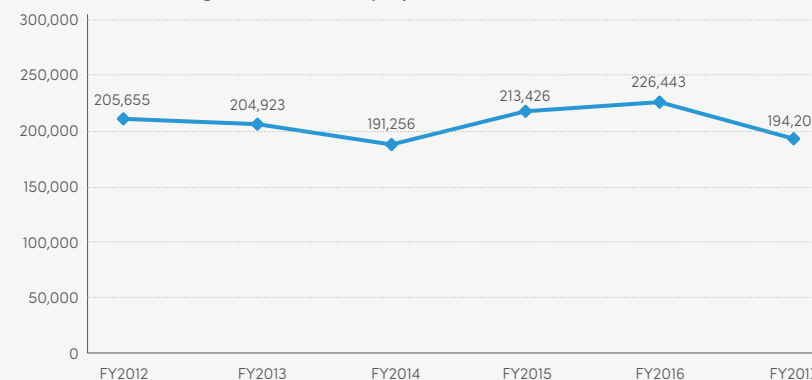
Training and Education ^[103-1,103-2]

NEA recognises the role of training and development in driving organisational productivity and growth. Its continued efforts in training and development ensure that employees will be equipped with the right qualities and knowledge to stay ahead.

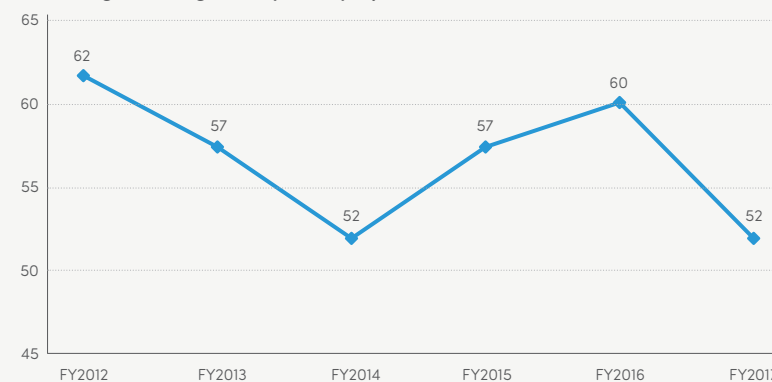
To support its training and development initiatives, NEA has put in place a robust learning infrastructure. Continual staff engagement processes have also been implemented to ensure that employees are future-ready in their career planning and development. NEA's learning partners also work alongside its management team to help employees proactively plan and prepare for the future.

In FY2017, NEA employees have accrued a total of 194,204 training hours, with an average of 52 training hours per employee. The following charts track the total and average training hours for NEA employees from FY2012 to FY2017.

Total training hours for all employees



Average training hours per employee



The tables below provide the breakdown of average training hours between gender, between monthly- and daily-rated employees, and across job grades.

Average training hours by gender	
Gender	Average Training Hours
Male	58.4
Female	52.4

Average training hours by employee category	
Employee Category	Average Training Hours
Monthly-rated employees	60.4
Daily-rated employees	6.6

Average training hours by job grade		
Job Grade	Training Targets	% Staff Who Achieved Targets
NX 13 and above	≥ 70 hours	48.0%
NX 13 (I) to NX 16	≥ 40 hours	53.0%
OSO III to OSO V and daily-rated employees	≥ 20 hours	38.9%

About 96.4 per cent of NEA officers with more than six months of service were trained. Of those trained, 44.5 per cent were aged 50 and above, reflecting our continued commitment in providing lifelong learning opportunities for our senior employees.

Employee Development

[103-2,103-3,404-1]

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 officers – including daily-rated employees – are encouraged to discuss their career aspirations with their supervisors during the performance management review. The officers then set career goals and development plans that are aligned with NEA's objectives.

In FY2017, close to 100 per cent of all employees completed their annual performance management review. NEA will support the career goals and plans set during the performance management review through available programmes under the learning infrastructure for employee development.

Percentage of employees who completed the performance management review in FY2017 based on gender

Gender	Completion Rate
Male	99.0%
Female	98.0%

Percentage of employees who completed the performance management review in FY2017 based on job grade

Job Grade	Completion Rate
OSO III to OSO IV (or equivalent)	100.0%
NX 15 & NX 16 (or equivalent)	100.0%
NX 13(I) & NX 14 (or equivalent)	99.0%
NX 13 & Above (or equivalent)	97.0%

To further guide employee development, NEA has set up an online career portal and organised the 'Understanding Myself, Managing My Career' development workshops for officers in the NEA Executive, Management Support and Environmental Support schemes. These add on to a comprehensive range of developmental initiatives (compiled in the table below) that have been put in place to develop NEA's officers.

A comprehensive range of developmental initiatives for NEA's officers ^[103-2,404-2]		
Initiatives	Objectives	Outcomes
Enhancement of Posting Framework (Initiated in 2010)	Provides more structured posting plans for officers with three postings within the first 10 years and two postings in the next 10 years	In 2017, about 10 per cent of NEA officers who were identified as high performers with good potential, and have spent three or more years on the job, were posted to different portfolios
internal Market Place (iMP)	Provides officers 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 FY2017, 23 positions (9.5 per cent of all openings within NEA) were filled internally by eligible NEA staff
Developmental Assignments	Provides officers a chance to be a part of inter-agency projects as well as cross-functional projects	Officers have been assigned key roles in projects where they lead team members from various departments in NEA or from other public agencies, thereby providing them exposure to whole-of-NEA and Whole-of-Government thinking
Educational Upgrading	Supports officers in their pursuit of higher education, and allows them to apply for sponsorship even after their course had commenced (following enhancements to NEA's Sponsorship and Scholarship Scheme in 2013)	In FY2017, 42 officers pursued higher qualifications through NEA's scholarship and sponsorship schemes
Technical Specialised Programmes	Further augments officers' key domain expertise knowledge by linking sponsored courses to NEA's key domain expertise areas	Officers are enrolled yearly for technical specialised programmes, some of which include meteorology training programmes, the Specialist Diploma in One Health, and the International Atomic Energy Agency Fellowship Programme
Job Competency Matrix Framework (Initiated in 2017)	Provides NEA officers with a structured and progressive competency-based skills development roadmap to guide their knowledge and skills acquisition for their job roles, as well as a firm foundation to support the development of deep expertise within NEA	Eleven learning tracks for Environmental Protection and Public Health to be implemented progressively from end FY2018

Each year, NEA organises a series of training initiatives to develop its officers to their fullest potential. Programmes that build technical capabilities and competencies, such as training workshops and specialist courses, are regularly conducted to help officers stay ahead in a dynamic operating environment. Some of these programmes have been jointly developed with industry experts and training providers. The table on the right lists the employment development programmes conducted by NEA in FY2017.

'Understanding Myself, Managing My Career' is a Career Development Workshop that was carried out to facilitate career development for continued employability. Open to all employees, the Workshop builds participants' self-awareness on their strength and interests through the Harrisons Assessment Talent System profiling tool. Participants were also provided information, resources and advice on career development opportunities in NEA. In FY2016 and FY2017, a total of 24 sessions of the Workshop were organised for 300 NEA officers.

Employee development programmes conducted by NEA in FY2017 ^[103-2,404-2]		
Programme Name	Objective/Partnership	No. of Participants
FORTE (Framework for Operational Ready Training for Excellence) Programme	Imparting basic enforcement skills and knowledge	102 officers
Evidence and Investigation of Environmental Offences (Level 1)	Imparting basic enforcement skills and knowledge	80 officers
Evidence and Investigation of Environmental Offences (Level 2)	Imparting basic enforcement skills and knowledge	58 officers
Operational Engagement Course for Cemetery, Crematorium and Columbarium	Building up technical and field capabilities (jointly conducted with Institute of Mental Health)	49 officers
Noise Monitoring Training for NEA Officers	Building up technical and field capabilities (jointly conducted with Institute of Mental Health)	91 officers
Air Pollution Control Equipment Course	Building up technical and field capabilities	31 officers
ITE-NEA Joint Certification on Pest Management	Building up technical and field capabilities (jointly conducted with Institute of Technical Education)	31 officers
Understanding the Procurement Framework	Cultivating functional competencies	48 officers
Specification Writing	Cultivating functional competencies	48 officers
Writing Replies to the Public	Cultivating functional competencies	39 officers
Emotional Intelligence for Resilience	Cultivating functional competencies	15 officers
Data Analytics – Basic Principles and Applications	Cultivating functional competencies	40 officers
Communication Effectiveness and Coaching Through MBTI	Enhancing workplace communication and coaching effectiveness	64 supervisors
Communication Effectiveness Through MBTI	Enhancing workplace communication and personal development	53 officers
Essential Basics for Tablet	Imparting practical IT skills	33 daily-rated employees
Understanding Myself, Managing My Career	Building self-awareness to better perform in current job role	130 officers
Enforcement Field Tactical Training	Providing hands-on training on enforcement-related subjects and scenarios	173 officers

Leadership Development [103-2,404-2]

NEA recognises the key role that its leaders play in the journey towards greater sustainability and organisational excellence. Leaders are defined as employees who have subordinates, and this applies across all job grades. With a robust framework in place to develop leaders, promising employees are identified early and groomed to realise their potential. Two key leadership programmes have been designed to develop employees who have demonstrated the potential for higher roles and responsibilities.

- **Talent Development Programme**
The Talent Development Programme was launched in 2013. It was then revised in 2017 so that NEA can continue to build a sustainable pipeline of effective and dynamic leaders for the organisation. Under the programme, younger officers who show leadership potential are groomed and guided on their personal and career development. As of 31 March 2018, more than 130 NEA officers have participated in this programme.

- **Public Service Leadership Programme**
NEA also enrolls eligible high-calibre officers in the Public Service Leadership Programme. The programme grooms capable and talented individuals for leadership positions within the Singapore public service in specialised areas spanning five sectors of government, including the Infrastructure and Environment sectors.

Participants in the programme undergo a structured career development and progression path that provides them with exposure and many developmental opportunities. These include milestone and developmental training, postings to ministries and statutory boards in different sectors, intra- or inter-Ministry developmental assignments and postgraduate sponsorships.

Complementing the key leadership programmes are milestones programmes that seek to build a strong foundation for NEA's leadership development:

- **NEA Executive Training (NEXT) Course**
NEXT is a five-day programme designed for officers who have been in service between two to five years to help them understand the rationale and thinking behind NEA's policies and initiatives.
- **Leaders in Environmental Action Planning (LEAP) Course**
LEAP is an 11-day pinnacle programme for NEA's middle managers. The programme enables

NEA to groom a pipeline of future leaders to support NEA's strategic initiatives.

- **New Manager Programme**
Launched in 2015, the New Manager Programme is customised for leaders who are either newly recruited or just promoted. The programme apprises new managers of key corporate policies and provides coaching on people management.

NEA's middle managers attending the 11-day LEAP programme.



To enable its leaders to be well-equipped with managerial knowledge and skills, a suite of management development programmes has been identified. On average, NEA sponsors about 20 employees for these programmes each year. These programmes include Senior Management Programme, Governance and Leadership Programme, Management Development Course, and the Civil Service College Strategic LEAD and Manager LEAD Programmes.

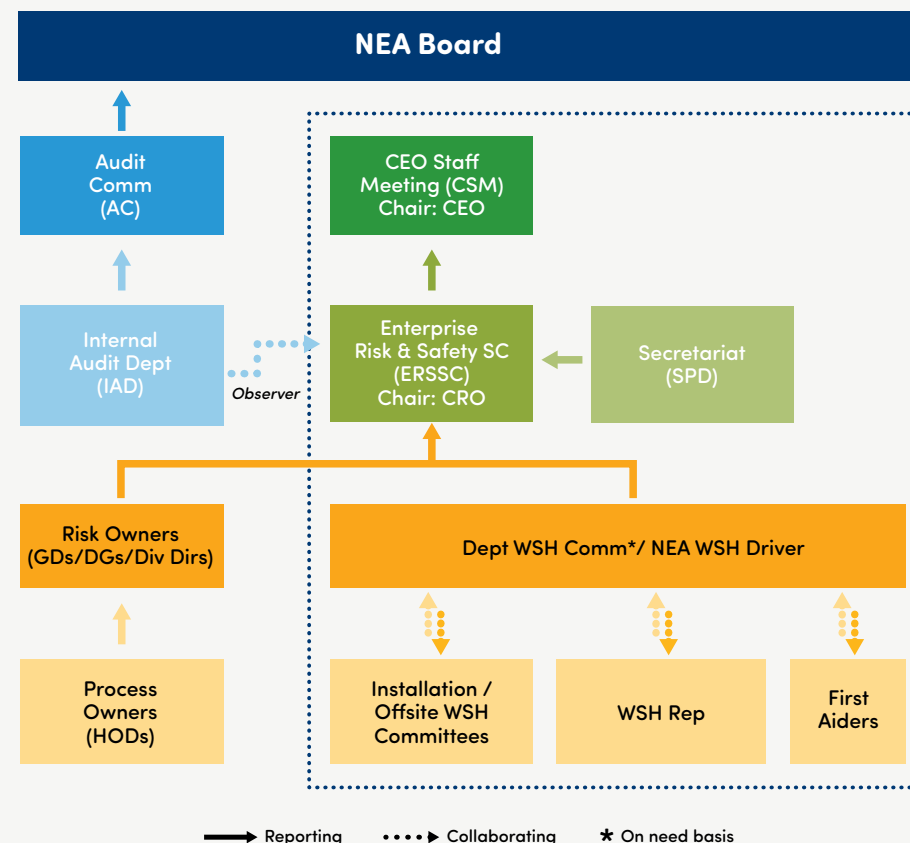
Leadership programmes conducted by NEA in FY2017 ^[404-2]

Programme Name	Objective/Partnership	No. of Participants
NEXT	Guiding promising executives into their next leadership roles	71 executives
LEAP	Grooming middle managers for higher office	17 middle managers
New Manager Programme	Preparing newly recruited or promoted managers for their new leadership roles	37 managers
SuperMan (Supervisors and Managers) Forum	Grooming middle management to become better 'people developers'	123 supervisors and managers
People Leadership Programme	Creating effective leaders in middle and senior management	34 officers
Spokesmanship Programme	Creating effective communicators in middle and senior management	14 officers
New Synthesis Workshop	Helping senior management become future-ready leaders	24 senior managers
Creating Greater Accountability: Self Track Training	Fostering a culture of organisational and personal accountability in middle management	130 officers
Emotional Intelligence for Resilience	Creating empathetic leaders in middle and senior management	47 officers
Leading Emotional Intelligence	Creating empathetic leaders in middle and senior management	45 officers
Four Disciplines of Execution	Helping middle and senior management achieve strategic focus, critical goals and performance management	58 officers

Workplace Safety and Health Governance ^[103-2]

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. The ERSSC is chaired by NEA's Deputy CEO in his capacity as NEA's Chief Risk Officer.

Enterprise Risk Management Governance Structure



WSH Stakeholder and Strategy Maps 2018–2020 ^[103–2]

In 2017, the WSH Stakeholder Map was created following an exercise to define and understand the roles and responsibilities of key WSH stakeholders. It complemented the newly developed WSH Strategy Map. It outlines NEA's WSH vision, along with the two key strategic outcomes and three strategies that would enable the realisation of this vision.

Both maps were endorsed by ERSSC in September 2017. They will serve to guide NEA's continuing efforts from 2018 to 2020, to ensure a safe and healthy workplace for all employees.

NEA's WSH Stakeholder Map



Partnering Departments

- Corporate Excellence Department (CED)**
 - Oversees various WSH programmes
 - Reports WSH statistics
 - Maintains WSH Management System
 - Conducts intervention and outreach
- Human Resource Business Partners (HRBP)**
 - Work with CED on WSH capabilities
 - Engage Union on workman injury compensation matters
- Legal Department (LD)**
 - Handles workman injury compensation insurance matters
- NEA Operations Centre (NOC) / Joint Operations & Planning Division (JOPD)**
 - Issues Incident Report to relevant parties

Internal

- Employees**
 - Understand relevant WSH risks
 - Be well equipped to manage WSH risks
 - Follow Safety and Health procedures
- Senior Management**
 - Sets the tone for Safety and Health culture
 - Decides WSH outcomes
 - Establishes clear performance indicators
- WSH Champions**
 - Advocate a Safety and Health culture
 - Address day-to-day WSH concerns
 - Drive WSH improvements

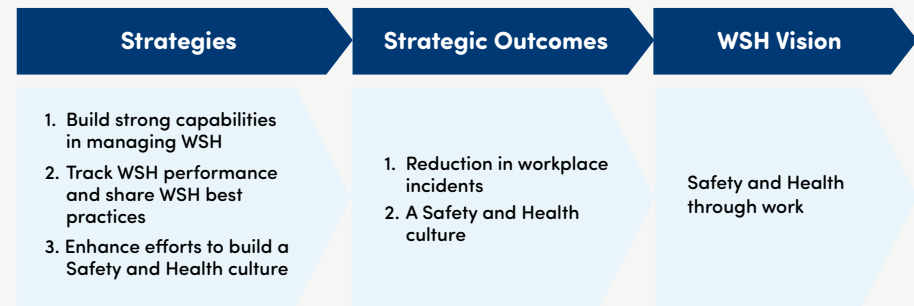
External

- Other Public Agencies**
 - Share with NEA their best practices and learning points from incidents they encountered
 - Inform their staff of similar WSH risks from NEA's incidents
- Suppliers**
 - Comply with the Ministry of Manpower (MOM)'s WSH regulations
 - Follow Safety and Health procedures
- Union**
 - Promotes WSH awareness, WSH training initiatives, and a Safety and Health culture
- WSH Council/MOM**
 - Champions and promotes WSH through:
 - setting standards
 - strengthening capabilities
 - building a Safety and Health culture

Legend

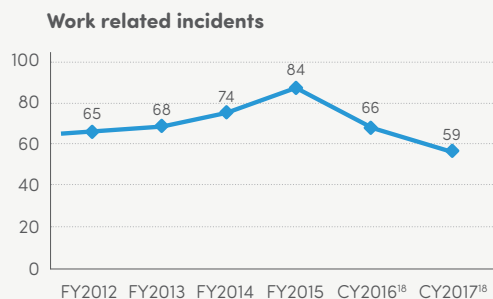
- Partnering Departments
- Internal
- External

NEA's WSH Strategy Map



Monitoring WSH Performance ^[103-2,103-3,403-2]

Under NEA's WSH governance structure, 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.



NEA has seen a rise in work-related incidents¹⁹ from FY2012 to FY2015. This increase was likely due to a higher rate of reporting, rather than an actual increase in the number of WSH incidents, as a result of requirements under the WSH Act to report all salient work-related incidents.

The setting up of the NEA Operations Centre in May 2012 also made available a more responsive platform to report work-related incidents; this too, led to

a higher rate of reporting. Since then, NEA has taken a more proactive role in addressing the rising trend.

Last year, NEA saw the lowest ever recorded work-related incidents — 59 in 2017 compared to 66 in 2016. This also meant an encouraging 10 per cent year-on-year drop, owing to a number of WSH initiatives introduced in 2016. Since 2012, NEA has not had a work-related fatality²⁰. In 2017, there were no cases of occupational diseases reported.

Of the 59 reported work-related incidents, 42 per cent were reportable to the Ministry of Manpower under the WSH Act (section on Incident Reporting Regulations). The most common incidents involved staff operating in the field suffering injuries caused by slips and trips, falling objects and traffic accidents.

Staff Profile of WSH Incidents

^[103-2,103-3,403-2]

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 2017, of the 31 Slips, Trips and Falls (STF) incidents, nine of them (29 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 2017 alone, 31 out of 59 (53 per cent) WSH incidents

NEA's WSH Incidents at a Glance

21% of total staff population are aged 61 years and above (highest risk of WSH incidents)

29% out of 31 STF-related incidents in 2017 were encountered by employees in this age group

53% of WSH incidents were STF-related

were STF, the bulk of which came from Dengue Control officers.

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. Man-hours were estimated.

Employees ²¹		
Gender	Accident Severity Rate per million man-hours	Accident Frequency Rate per million man-hours
Male	24	7.5
Female	19	6

Types of Injuries	No. of Cases	Breakdown by Gender	
Slips, trips and falls	31	Male	18
		Female	13
Traffic accidents	8	Male	8
		Female	0
Medical conditions	5	Male	3
		Female	2
Bitten by animals	5	Male	5
		Female	0
Aggressive/physical assaults	4	Male	3
		Female	1
Stung by insects	4	Male	3
		Female	1
Injured by moving, fixed or stationary objects	2	Male	2
		Female	0

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

¹⁸ Refers to work-related incidents involving NEA's monthly-rated employees and daily-rated employees.

¹⁹ A workplace accident refers to any accident that occurs in the course of work.

²⁰ Work-related fatality refers to any death that occurs in the course of work.

²¹ There were 2 cases of injuries (a head laceration and a wrist injury) involving male non-employees at two NEA premises. The accident frequency rate for non-employees at these two premises was 5.53 per million man-hours. Man-hours were estimated.

Nurturing a Caring Culture in NEA through Staff Voluntarism ^[201-1]

NEA believes in developing an engaged and socially responsible workforce that gives back to the community. Staff voluntarism is therefore promoted through activities held in collaboration with NEA's partners and the community. With staff voluntarism ingrained as part of its culture, NEA hopes to inspire a stronger sense of identity and engagement within the organisation while also contributing to its social sustainability goals.

Strategies and Initiatives

NEA provides volunteering opportunities for its staff. An interdepartmental committee organises up to three volunteering activities annually at the organisational level, while also incorporating the activities into departmental events. This not only enhances volunteering opportunities for staff but also promotes intradepartmental bonding.

Several strategies are also put in place to encourage staff voluntarism 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.

Staff Voluntarism Efforts

NEA monitors the participation rates of its volunteering activities, as well as the amount of funds raised each year.



The percentage of staff volunteers and the total funds raised in FY2017 are as compiled below:

NEA's voluntarism achievements for FY2017

Percentage of Volunteers	About 20%
Total Cash and In-kind Contributions	\$138,455

Here are some of NEA's notable volunteering and fundraising efforts in FY2017:

- Lending a Helping Voice for President's Challenge**
 A talent competition was held in NEA to scout for singing talents. The three finalists from the competition garnered pledges totalling \$1,000 from colleagues, which were then donated to the charities under the President's Challenge.
- Rising Up to the Vertical Challenge**
 NEA also supported President's Challenge through the MEWR Family fundraising event, Vertical Challenge, held in October 2017. Staff had to compete to climb 25 storeys of the Environment Building in the fastest time. A total of 209 NEA staff, including senior management, participated in the challenge and raised more than \$30,000 for charity.

• Giving Back to Society during Festive Celebrations

20 NEA staff volunteers set aside time to befriend and spread the joy of Christmas with children from the Singapore Children's Society. The young beneficiaries were taught how to upcycle tote bags from recycled materials through a craft making workshop. They were also invited to join NEA's Christmas celebration on 22 December 2017. Additionally, NEA staff donated over \$750 to purchase school supplies for the young beneficiaries.

• Guiding Departments in their Volunteering Activities

A resource toolkit was rolled out in October 2017 to guide individual departments in organising their own volunteering activities. Five NEA departments have since tapped on the toolkit to connect with voluntary welfare groups and organise their respective volunteering activities.

• Organising a Food Donation Drive

NEA staff organised a food donation drive on 9 February 2018 to promote the spirit of giving during the Lunar New Year period. A total of 513 food

items, including rice, beverages and canned food, were collected, sorted and packed through the dedicated efforts of 40 NEA staff. These were donated through The Food Bank Singapore to the less fortunate in society.

NEA will continue to assess the effectiveness of its staff voluntarism initiatives as efforts will be ramped up in the years ahead.

Developing an Effective Mentoring Scheme

The pilot mentoring scheme was rolled out in 2016 and completed in 2017, with 20 heads of departments and 20

eligible officers participating as mentors and mentees respectively. The scheme allowed younger, less experienced officers to learn from the more experienced officers on how to manage their personal and career development. Feedback from the pilot run would be collated for further review.

Enhancing Technical Knowledge Retention for NEA Officers

NEA's technical knowledge is documented, retained and shared within the organisation as part of the Technical Knowledge Retention (TKR) Programme. NEA officers can tap on the technical knowledge to shorten their learning curve and enhance operational efficiency.

Since its inception in 2015, the TKR Programme has amassed a growing trove of technical knowledge assets.

TKR Achievements at end FY2017



83
documents
NEA Knowledge
Documents



20
interviews
Expert Knowledge
Retention



660
knowledge assets
accumulated and
shared through
EMPOWER Technical
Knowledge Sharing Portal

Left: NEA staff befriending young beneficiaries at a craft-making workshop. Right: NEA staff sorting and packing donated food items.



Training Enforcement Officers in Field Operations

A total of 432 NEA officers have benefited from the Enforcement Field Tactical Training course, which had been running since 2016. The course exposes NEA officers to various enforcement-related subjects, including pre-deployment preparations and deployment strategies, as well as simulations in scenario response practices.

Attracting and Retaining Talents through NEA Scholarships

NEA continues to nurture promising talents through the award of scholarships. Awardees were selected from outstanding students with a passion for the environment, as well as NEA officers with exceptional performance.

The scholarships will support current and would-be NEA officers in their pursuit of higher education, while building up knowledge capital to support NEA's strategic objectives.

Engaging Daily-Rated Employees on their Job Redesign

NEA has implemented a job redesign for 185 Vector Control daily-rated employees (DREs), whose role now includes rodent control. The DREs also received adjustments to their wages that is commensurate with their new roles and responsibilities. Roadshows were conducted at all Regional Offices to reach out to the DREs to ensure that they understood the expectations and benefits of the job redesign.

Engaging Our People to Chart NEA's Future Together

A successful run of the NEA Workplan Seminar was conducted on 25 May 2017 at the University Cultural Centre, NUS. This seminar brought together more than 700 NEA officers to facilitate the cascading of work plans for the coming year.

Themed 'Recognising Our Achievements, Charting Our Future', the seminar featured interactive skits, presentations and a dialogue with senior management. Through these activities, NEA officers were able to appreciate the achievements made as an organisation, learn about current challenges, and be apprised of important upcoming initiatives.

NEA enforcement officers undergoing pre-deployment preparations.



NEA Scholarships Awarded in FY2017



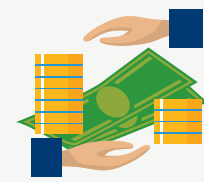
4

NEA officers
awarded NEA
Postgraduate
Scholarship



9

Students awarded
National Environment
and Water Scholarship



16

NEA officers
awarded NEA
Sponsorship
Scheme

Setting Strategies for NEA's Long Term Success

Held on 18 August 2017, the Strategic Planning Workshop comprised three main segments to facilitate an organisation-wide discussion on NEA's goals, capacity and capabilities.

The workshop began with a presentation that set the context for the key forces of change shaping our environment in the next 20 years. The presentation also envisaged how Singapore would be like in 2035, in terms of our economy, technology, environment and society. Participants were then asked to pitch their envisioned 'Big Hairy Audacious Goals' for NEA.

In the second segment, guest speakers from PricewaterhouseCoopers Singapore joined in the workshop to help NEA explore ways to create capacity and operate more optimally. Lastly, examples were shared to stimulate the brainstorming of key capabilities that NEA needs to develop for long-term success in fulfilling its mission.

Strengthening the Culture of Teamwork

With teamwork as its core value, NEA encourages individuals and

departments to support one another as they work hand-in-hand towards strategic objectives. To foster a stronger team bond and camaraderie, various activities are held throughout the year with the aim of promoting social cohesion, team building and closing of the leadership gap.

Activities to Promote Teamwork in FY2017



Celebrating a Lively and Fun-filled NEA's 15th Anniversary

On 30 June 2017, NEA celebrated its 15th Anniversary with the NEA Cohesion Games (C-Games) as the main event at the Pasir Ris Sports Centre. The NEA C-Games was held to foster closer bonds among all levels of staff in NEA.



A participant of the Strategic Planning Workshop sharing her team's 'Big Hairy Audacious Goals' for NEA.

Over 1,200 staff participated in the various C-Games activities and the main event. The activities included sports competitions, fitness and wellness classes, Floorball Introductory Clinic, The Great NEA Workout, Management Captain's Ball and Management Cheerleading Competitions.

As the main event drew to a close, the winners of the sporting events were recognised with medals while the winners of the Best Management Cheerleading competition received microphone-shaped balloons.

The C-Games garnered plenty of positive feedback, with participating staff requesting for more of such activities.

Nurturing a Culture of Open Communication and Camaraderie

NEA staff stay connected with each other through two internal

communication platforms – Workplace by Facebook (WPFB) and the Life@NEA intranet. Both platforms were set up to foster a culture of open communication, knowledge sharing and synergy across departments and management levels.

Active Participation in WPFB Official Groups for FY2017



In July 2017, NEA clinched the Workplace Transformation Award for its innovative use of WPFB to boost productivity and staff engagement.

The Workplace Transformation Award is an award conferred by the Public Service Division that recognises public agencies for using WBFB in a creative and innovative manner to engage their employees.

NEA achieved a claim rate of 71 per cent for staff claiming their WBFB accounts, and was among the top 10 public agencies (with more than 1,000 staff strength) with such a claim rate. Four official groups had been set up to facilitate collaboration on projects – Announcements, Events and Campaigns, Coffee Shop Talk and News. Staff participated actively in the groups as they shared ideas, discussed

common interests, promoted events, crowdsourced projects and developed stronger camaraderie.

Since its revamp, Life@NEA intranet has become an increasingly popular platform for knowledge sharing among staff. Many NEA staff also use the intranet's new features to hold informal discussions, collaborate on projects and send peer appreciation messages.

In FY2017, senior management shared more articles and posts via the online platforms, thereby establishing greater presence and staff engagement.

Human Resource Awards Attained in FY2017

NEA received the following Human Resource (HR) awards:

i. Singapore HEALTH Awards 2017 – Excellence Award

This award was conferred by the Health Promotion Board for NEA's sustained practices in promoting workplace health and employee well-being.

ii. Top 100 Singapore's Most Attractive Employers

This award recognises NEA's efforts in attracting and retaining talents, as well as the brand recognition it has built over the years as an employer of choice for tertiary students. 2017 marked the first time in which NEA made it to Universum's Most Attractive Employers ranking list.

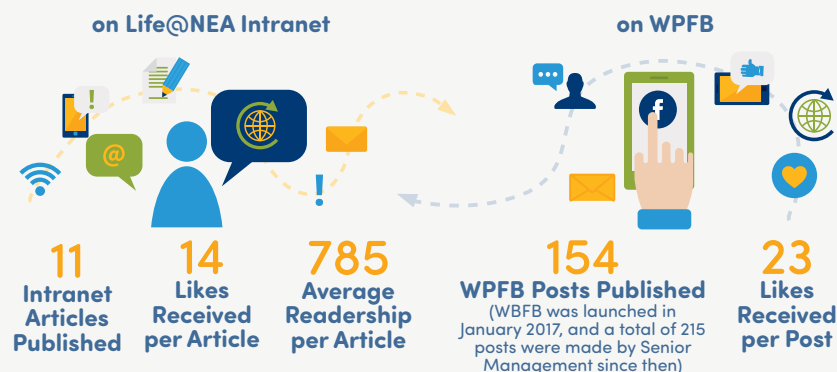
Milestones

- NEA also bagged the **Highest Entrant Award 2017** for being the highest ranked among newly included organisations on this list.
- NEA was ranked 10th in **Engineering and Natural Sciences** by local university students.

Active Engagement on Life@NEA Intranet



Senior Management Presence in FY2017



HR Achievements in 2017



5

Key Leadership Programmes
459 Participants



7

Functional Competency Programmes
269 Participants



4

SkillsFuture Briefing Sessions/Workshops
373 Participants



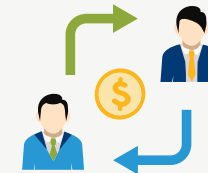
SuperMan Forum

123 Participants
Held on 27 March 2017 to help supervisors and managers strengthen their people management skills
Theme: People Developer
Guest Speaker: Mr Kenneth Er, CEO of NParks



360

Degree Feedback Exercise
73 Participants
Conducted in July 2017 for Heads of Department to build awareness of their individual leadership effectiveness



Job Redesign and Salary Adjustments

185 Employees
Conducted roadshows at all Regional Offices to brief Vector Control daily-rated employees on their adjusted job scope and benefits



6

Lunch and Learn Sessions
349 Participants
Organised once every two months for staff to share insights and experiences gained from their overseas trips



8

Health and Personal Development Talks
474 Participants
Conducted in dual-language format to motivate and inspire daily-rated employees



4

Sessions of Citizen First Responder Programme
72 Participants
Held in November 2017 to equip NEA officers with life-saving and first aid skills



19

Sessions of Learning Needs Analysis Consultation
Conducted with the respective NEA departments and divisions



Long Service Awards and Special Appreciation Award

138 Recipients
Presented at the annual awards ceremony held on 29 March 2018



248

NEA Officer Promotions
Based on their outstanding and dedicated contributions



38

Internships
Offered to eligible students of tertiary institutions



5

Career Fairs Participation
To reach out and attract new talents from local universities and polytechnics

Engaging NEA's Stakeholders: Employees ^[102-42,102-43,102-44,103-3]

NEA realises the importance of identifying and engaging the right groups of stakeholders in order to implement and drive vital environmental measures. NEA had therefore carried out a comprehensive analysis of risks and opportunities related to driving sustainability within the organisation. In the process, the relevant stakeholders were also identified and selected.

NEA's ability to realise a liveable and sustainable Singapore is enabled through a dedicated and engaged workforce. This includes operations officers on the ground, employees at various NEA premises and installations, as well as management that oversees various aspects of NEA's governance, performance and daily operations.

For that reason, NEA works towards building a strong relationship with employees through listening and open communication. Various communication platforms have been put in place over the years to solicit and address key topics and concerns from employees at all levels. The engagement goals below have been set based on the key topics and concerns raised, and will serve to guide NEA's continued efforts in enhancing employee engagement.

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements
<ul style="list-style-type: none"> • To better understand the challenges faced by staff at work • To update and solicit feedback from staff on key policy changes and processes • To provide timely advice on employees' HR queries • To strengthen ownership and accountability and improve NEA's budget utilisation • To update staff on findings identified by Auditor-General's Office • To strengthen communications capabilities and capacity within NEA 	<p>Surveys, dialogue sessions, roadshows, emails, e-newsletter, staff meetings, sharing sessions, Workplace by Facebook</p>	<ul style="list-style-type: none"> • The biennial Organisational Climate Survey • Corporate e-newsletters, including: <ol style="list-style-type: none"> i. 'ConNEActions' for HR communications ii. 'Procurement Insights' for procurement communications iii. 'IAD Insights' for audit communications • Budget kick-off briefing • Financial performance review sessions • Two-way communication avenues for management and staff, such as: <ol style="list-style-type: none"> i. CEO Townhall ii. CEO Monthly Visits to departments and off-site offices iii. Workplan seminars iv. HR roadshows • Sharing of Auditor-General's annual findings via sharing sessions and email so that action can be taken to prevent similar lapses
		<ul style="list-style-type: none"> • Biannual Internal Communications Tea Sessions with Internal Communications Champions from across departments • Pause and Reflect discussions from September to December 2017 for all staff to set aside time to reflect on how their own work processes could be improved • Operations Network for Excellence, a networking platform for operations officers with supervisory roles, who can learn from each other, share best practices and understand common pitfalls to avoid • Workplace by Facebook, NEA's internal communication and productivity platform for staff and management to openly share ideas, discuss common interests, promote events, crowdsource projects and develop strong camaraderie • Revamped Life@NEA intranet to facilitate informal discussions, knowledge management and collaboration on cross-functional projects among staff

... continued from previous page ^[102-43,102-44]

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements
<ul style="list-style-type: none"> To develop and provide training opportunities where staff can elevate their knowledge, competencies and capabilities 	<p>Knowledge retention programmes, technical knowledge sharing portal, training programmes, sharing sessions</p>	<ul style="list-style-type: none"> Induction programme where new employees are trained in basic skills such as risk management and international relations protocol matters Technical skills training programmes to build operational capabilities, such as FORTE Programme, Foundation Modules and Technical Knowledge Retention Programme Leadership programmes to prepare newly recruited or promoted staff for their new leadership or management roles, such as New Managers Programme Milestone programmes to equip NEA staff with the knowledge and skills to function better at different stages of their career: <ul style="list-style-type: none"> LEAP NEXT Soft skills training programmes related to written communication and emotional intelligence Community Health Awareness training session to familiarise NEA officers with identifying and engaging individuals with mental health conditions during the course of their work Lunch and Learn bimonthly sessions for staff to share technical knowledge and experiences gained from their overseas trips
		<ul style="list-style-type: none"> Learning Fiesta SuperMan Forum to strengthen middle management's people-management skills so that they can engage their teams more effectively Biannual workshops for NEA's Hygiene Officers Leadership Group workshops, dialogue session and pulse surveys organised by the Singapore Environment Institute to enhance engagement and communications with departmental staff Annual online proficiency quizzes to help officers retain operational knowledge and acquire new operational knowledge Outreach, courses, briefings, and the sharing of best practices and case studies with Department Procurement Officers Service Quality Roadshows held four times in FY2017 to engage NEA officers through presentations and dialogue on the various service and operational excellence initiatives Enforcement Field Tactical Training course conducted for operations departments

... continued from previous page ^[102-43,102-44]

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements	
<ul style="list-style-type: none"> Team engagement platforms focusing on innovation and service, adoption of eco-habits, Workplace Safety and Health, community outreach programmes and staff welfare activities 	<p>Awards, events, roadshows, formulation of teams and committees</p>	<ul style="list-style-type: none"> Key initiatives to cultivate innovation and build stronger ownership at the departmental level, including: <ol style="list-style-type: none"> Innovation and Learning Fiesta Service Excellence Award Innovation and Productivity roadshows The Innovation Scoreboard New awards to recognise continued innovation efforts among departments and individuals: <ol style="list-style-type: none"> Best Improved Departments Award Best Performing Departments Award Crowdsourcing Challenge Award Top Savings Award Venture Challenge Award Significant WSH-related developments and employee engagement for the year: <ol style="list-style-type: none"> Endorsement of the newly developed WSH Strategy Map by ERSSC in September 2017 Drafted and presented WSH Capability Building Roadmap in January 2018 15 WSH roadshows with around 500 team leaders to foster a WSH culture Internal WSH Awards presented in October 2017 based on a WSH Scoreboard Reviewed the first aider scheme and coordinated first aider training 	<ul style="list-style-type: none"> Innovation e-newsletter 'The InNEAvator' Work-life activities that help employees enhance their work-life balance and harmony in four focus areas: self, family and friends, community, work Annual health screening exercise held from 7 September to 6 October 2017 at 15 NEA premises, with 592 staff taking up the complimentary influenza vaccination during the health screening Lunchtime talks for staff on health and wellness topics such as 'Injury Free Exercise', 'Diabetes' and 'Caring for Your Fingernails' NEA Intra-Challenge as part of the organisation's participation in the National Steps Challenge Season 3, with 14 roadshows organised between January 2018 to 30 April 2018, to help 782 staff register for the challenge Fostering of social communities based on common sports and hobby interests, such as baking, futsal and photography Project Team DNA, with appreciation ceremony organised

... continued from previous page ^[102-43,102-44]

Engagement Goals	Stakeholder Engagement Methods	Examples of Engagements	
<ul style="list-style-type: none"> To enhance staff bonding and sense of belonging 	Activities	<ul style="list-style-type: none"> Festive celebrations NEA Family Day Annual Dinner and Dance NEAt Kids' Club activities, such as movie screenings and interactive workshops, organised for children and grandchildren of NEA staff 	<ul style="list-style-type: none"> Interact Point activities, such as archery and leathercraft workshops, organised for singles Organisational level volunteering activities Departmental level volunteer activities Sports and recreational activities
<ul style="list-style-type: none"> To raise staff's environmental consciousness 	Participation in environmental celebrations and events	<ul style="list-style-type: none"> World Water Day celebration World Environment Day celebration Social Recycling initiative 	<ul style="list-style-type: none"> Earth Hour participation Litter picking activities

Strengthen Corporate Practices and Governance ^[103-1,103-2,103-3]

To build trust, a public-facing organisation of a size and complexity like NEA needs to be founded on a proper system of controls, checks and balances. Over the years, NEA has put in place best practices and strong corporate governance to ensure continued transparency and accountability to stakeholders.

NEA's leadership are guided by the Corporate Governance Framework to achieve stringent oversight of the organisation's corporate practices. Various committees within NEA have also been established to ensure high standards of corporate governance, particularly in the areas of financial accounting and risk management, as the organisation strives towards achieving its goals and desired outcomes.

NEA's parent ministry, the Ministry of the Environment and Water Resources (MEWR), and 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 at all levels of the organisation.

Ensuring Financial Sustainability

NEA is funded mainly by government grants. It is vital that NEA staff make 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:
 - recovering costs directly from the users of that service
 - accounting for the full cost incurred in providing a good or service
 - ensuring that NEA does not compete with the private sector in the provision of goods and services
 - keeping costs affordable (and, hence, fees low) by striving to improve business processes

- **Continual review of its 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 the fiscal resources are limited, the budget has to be allocated optimally among departments.

To ensure that budgets requested by major departments are used well, NEA conducts quarterly performance reviews with the departments. NEA sets a budget utilisation rate (BUR) of 95 per cent as the target, and BUR figures achieved are reported to senior management on a quarterly basis.

- **Audit**
Each year, the NEA accounts are

audited by external auditors, approved by the Board of Directors and published with its annual report. The appointment of auditors is approved by the Minister for the Environment and Water Resources in consultation with the AGO.

In addition, the AGO performs both scheduled and ad hoc audits to ensure that NEA continues to adhere to good governance practices.

Refining NEA's Risk Management Capabilities

Since its inception in 2007, NEA's Enterprise Risk Management (ERM) programme has provided a systematic framework to help the organisation identify, assess, treat and monitor its key risks holistically.

NEA is making refinements to the ERM systems and tools following a review in 2016, where its programme was benchmarked against international ERM standards. Annual Control Self-Assessment Exercises targeting select procurement and operational processes were also conducted to heighten awareness within the organisation.

Walking the Talk^[103-2]

Environmental stewardship is part of NEA's purpose, culture and philosophy. With a key role to play in ensuring Singapore remains clean, liveable and sustainable, NEA is committed to safeguard Singapore's environment and resources for future generations. This is achieved through policies, initiatives, outreach and enforcement efforts.

Being an environmental steward takes more than just policy or philosophy. It is a responsibility that requires NEA to also lead by example. When NEA walks the talk by ensuring that its operations are in line with the environmental policies and measures it promotes for Singapore, NEA gains public trust. That is why, for NEA, championing sustainability starts from within.

It started with NEA taking the lead as the first public agency in Singapore to publish a sustainability report for 2011. Since then, NEA has progressed through milestone after milestone in its sustainability journey. With new milestones to hit in the nation's sustainability push, such as Public

Sector Taking the Lead in Environmental Sustainability (PSTLES), NEA will continue to adapt its sustainability plans, practices and strategies for the best outcome. NEA hopes that its efforts will inspire the private and public sectors to go the extra mile in their sustainability journeys.

Implementing Resource Conservation Practices Within NEA

As a responsible organisation, NEA is dedicated to conserve precious resources for the benefit of the environment and the generations to come. NEA makes its best efforts to reduce the consumption of resources in its daily operations by implementing eco-friendly workplace practices, technological innovations and infrastructural changes. NEA also has a resource management system to closely track the usage patterns of electricity, water and paper on its premises.

Engagement with staff has always been one of NEA's priorities. It is listed as one of the desired outcomes under NEA's Sustainability Framework. The 8 Effective Habits – 10% Challenge aims



Ensuring Singapore remains clean, liveable and sustainable is part of NEA's commitment to safeguard Singapore's environment and resources for future generations.

to nurture staff to become passionate environmental ambassadors. NEA's success in engaging its staff is reflected in the results of its 2015 Organisational Climate Survey; according to the survey, 93 per cent of the respondents believed strongly in the need to preserve and protect the environment and 93 per cent confirmed that they had adopted environmentally friendly practices.

Achieving Targets under the 8 Effective Habits – 10% Challenge

In October 2011, NEA committed to a five-year internal environmental

awareness movement called the 8 Effective Habits – 10% Challenge. NEA came up with eight environmental habits to raise awareness and inculcate eco-habits in staff.

As part of the campaign, NEA set the target of a 10 per cent reduction from business-as-usual levels in NEA's electricity and water consumption per Business Activity Indicator (BAI), as well as the amount of paper purchased per staff, by FY2016.

The FY2016 targets set have since all been met. NEA encourages all staff to sustain and enhance the best practices put in place during the campaign, so that NEA can continue to walk the talk moving forward.

NEA 8 Effective Habits



Working towards FY2020 Sustainability Targets^[103-2]

NEA will steer its efforts to become a more resource-efficient organisation under the PSTLES 2.0 initiative. NEA aims to achieve electricity savings of at least 15 per cent and an improvement in water efficiency index by 5 per cent (with reference to FY2013 baseline consumption) by FY2020.

For office premises that are undergoing major renovations, NEA is aiming to achieve at least a Green Mark Gold rating for Office Interior. In addition, NEA has made it a requirement for its events and functions to be held at Green Mark-certified venues.

Reducing Energy Consumption within NEA^[103-2]

Conserving energy starts from understanding how the energy is used and how much is consumed. Energy

consumption at NEA's offices and installations is currently tracked through two related indicators:

- Energy intensity, which is measured as the electricity used per unit activity
- Total electricity used

These consumption figures are reported at the quarterly Sustainability Committee meetings, where ways to further reduce energy consumption are discussed.

The Tuas Incineration Plant, for example, has implemented the following energy efficiency improvements in FY2017:

- Replaced 130 units of high bay sodium lights with energy-efficient LED lights
- Refurbished its air-cooled condenser fans to improve energy efficiency
- Installed variable speed drive units for the industrial water control system to vary pump speed, thereby reducing the system's energy consumption

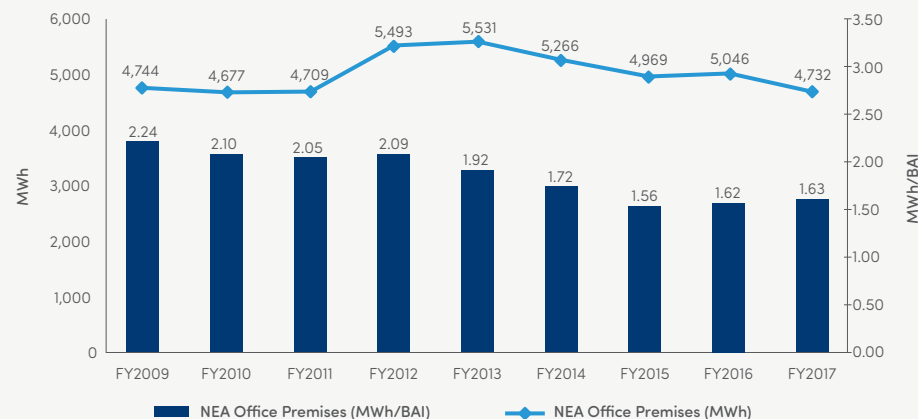
Achievements in Energy

Conservation ^[103-2,103-3,302-1,302-3,302-4]

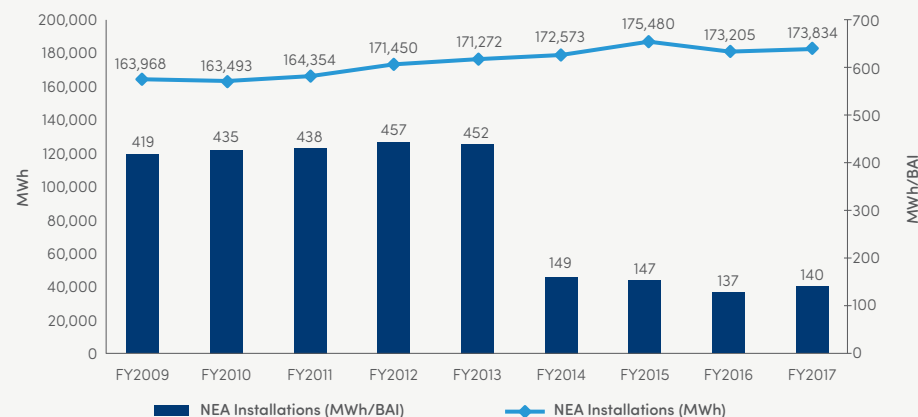
NEA's ongoing efforts at inculcating energy conservation habits among staff and implementing energy efficiency improvement measures have led to a reduction in electricity consumption at NEA offices in FY2017, as compared to FY2016. However, due to a decrease in the number of occupants, the FY2017 energy intensity (measured in MWh per BAI²²) for NEA's offices is slightly higher than FY2016.

In FY2017, NEA's industrial premises accounted for approximately 97 per cent of NEA's total electricity usage. Its absolute electricity consumption has been on a steady increase from FY2009, but showed a gradual decrease in FY2016 and FY2017. This fluctuation is largely attributed to public demand for NEA's services, with some energy savings contributed from the energy efficiency improvement measures implemented by NEA.

Electricity consumed at NEA Offices



Electricity consumed at NEA Installations



²² From FY2009 to FY2013, NEA's BAI referred to the number of monthly-rated employees. From FY2014 onwards, BAI has been redefined as the number of occupants (including the number of visitors, contractors and sub-contractors who had visited NEA's premises) to more accurately reflect the number of resource users.

Alternative Energy Sources at NEA Premises ^[103-2,103-3,302-1,305-5]

Not all electricity used at NEA premises are taken from the grid. NEA has two other electricity sources: solar and electricity generated from waste.

In a drive to tap on renewable energy, solar panels were installed at the Centre for Climate Research Singapore and Semakau Landfill. Installation of solar panels at eight of NEA-managed premises are also underway as part of the SolarNova programme.

Electricity generated from waste further adds to NEA's pool of energy sources. This energy is used to power the operations in the plants as well as Tuas Marine Transfer Station. Any excess

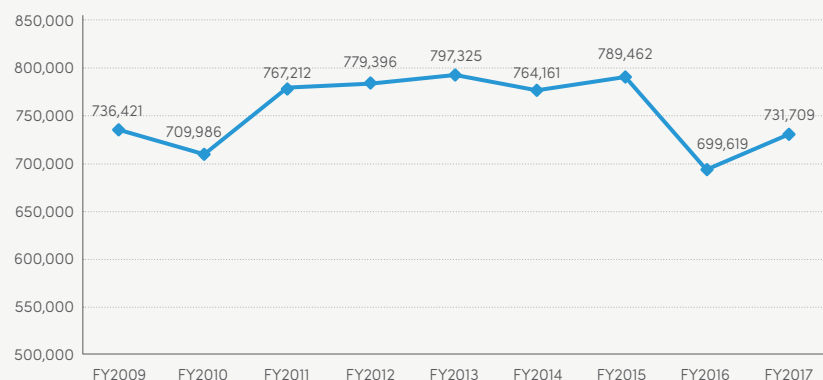
energy from the waste-to-energy (WTE) incineration process is sold to the grid. The amount sold to the grid in FY2017 was 560,905 MWh.

In FY2017, the electricity generated from solar and WTE incineration process was 731,709 MWh. The electricity generated is equivalent to the average annual electricity consumed by 154,000 Singapore households²³.

Reducing Corporate Carbon Footprint within NEA ^[103-2,103-3,302-1,305-5]

NEA strives to reduce its corporate carbon footprint in the journey towards greater sustainability. With carbon emission constituting 97 per cent²⁴ of Singapore's total greenhouse gas emissions, every step and every effort in the right direction counts.

Total electricity generated by renewable energy (MWh)



Waste incineration is the main contributor to NEA's corporate carbon footprint (Scope 1 carbon emission). Since the 1970s, Singapore has adopted WTE incineration in order to reduce waste volume and conserve landfill space. Today, all incinerable waste is incinerated while non-incinerable waste is landfilled. As the nation's incineration needs grow, NEA will continue to focus on reducing waste generation and consequently, emissions.

To achieve waste reduction, NEA actively promotes the 3Rs through a variety of outreach programmes and aims to

achieve a national recycling rate of 70 per cent by 2030. This goal is set out in Sustainable Singapore Blueprint 2015. NEA's 3R efforts within the organisation are outlined in 'Reducing Waste Generation within NEA' on page 107.

NEA has put in place various measures to monitor and reduce energy consumption in its offices and installations. These measures, together with NEA's solar adoption, has led to a reduction in Scope 2 carbon emissions. In addition, when staff travel between places of work, they are encouraged to use public transport or to car pool (Scope 3 emissions).

Types of fuel and amounts used at each NEA installation, equipment and vehicle

Installations, Equipment and Vehicles	Type of Fuel Used	Amount Used Per Year
Choa Chu Kang Crematorium, Columbarium and Cemetery	LPG	16,165 m ³
Mandai Crematorium and Columbarium	Town Gas	2,198,954 m ³
Landfill Equipment and Vehicles at the Semakau Landfill	Diesel	1,175,254 ltr
Tugs and Barges to Transport Incinerated Ash and Non-incinerable Waste to the Semakau Landfill	Diesel	505,231 ltr
Other NEA-owned Vehicles	Petrol	2,447 ltr
	Diesel	79,758 ltr

²³ Based on 2016's average monthly electricity consumption for four-room households of 396 kWh/month: https://www.ema.gov.sg/cmsmedia/Publications_and_Statistics/Publications/SES17/publication_Singapore_energy_statistics_2017.pdf

²⁴ Extracted from: <http://www.mewr.gov.sg/topic/carbon-emissions>

Calculation Methodologies

[103-2,302-1,305-1,305-2,305-3]

NEA's corporate carbon footprint is calculated in accordance with the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard set by the World Business Council for Sustainable Development and World Resources Institute.

The methodology used by NEA to calculate its carbon dioxide emissions is also in line with the 1996 Intergovernmental Panel on Climate Change guidelines. These guidelines are used in Singapore's international reporting to the United Nations Framework Convention on Climate Change.

A comparison of NEA's corporate emissions intensity from FY2015 to FY2017 ^[305-4]			
	FY2015	FY2016	FY2017
Indirect Carbon Emissions (Scope 2 and 3) ²⁵	78,554	77,457	4,146 ²⁶
BAI ²⁷	4,370	4,410	4,134
Carbon Emissions Intensity ²⁸	17.98	17.56	1.00

²⁵ Only carbon emissions from Scope 2 and 3 are included as NEA has a greater control over business processes reported under these 2 scopes. For Scope 1, it is highly dependent on the demand for NEA services, such as the number of after-death services required and waste incineration.

²⁶ For FY2017, the electricity consumed at Tuas South Incineration Plant, Tuas Incineration Plant and Tuas Marine Transfer Station was excluded from the carbon emission calculation, as the electricity used at these premises was self-generated. For Semakau Landfill, the electricity consumed was generated by diesel generators on the landfill. The diesel consumed had been accounted for under Scope 1 – NEA-owned vehicles.

²⁷ BAI from FY2014 onwards is defined as the number of occupants (including the number of visitors, contractors and sub-contractors who had visited NEA's premises).

²⁸ Carbon emissions intensity is derived as indirect carbon emissions (Scopes 2 and 3) per unit BAI.

... continued from previous page ^[103-2,305-1,305-2,305-3]

A comparison of NEA's corporate carbon footprint from FY2015 to FY2017						
NEA's Corporate Carbon Footprint	FY2015 ²⁹ Tonnes of Carbon Dioxide (Percentage of total aggregate)	Rank	FY2016 ²⁹ Tonnes of Carbon Dioxide (Percentage of total aggregate)	Rank	FY2017 Tonnes of Carbon Dioxide (Percentage of total aggregate)	Rank
Direct Carbon Emissions (Scope 1) ³⁰						
Waste incineration	907,110 (91.01%)	1	907,180 (91.08%)	1	898,510 (96.41%)	1
NEA-owned vehicles ³¹	285 (0.03%)	7	272 (0.03%)	6	4,717 (0.51%)	3
LPG and town gas ³²	10,719 (1.08%)	3	11,146 (1.12%)	3	24,601 (2.64%) ³³	2
Sub-total CO ₂ emissions (Scope 1)	918,114		918,598		927,828	
Indirect Carbon Emissions (Scope 2) ³⁴						
Electricity (NEA's office premises) ³⁵	2,170 (0.22%)	4	2,176 (0.22%)	4	2,008 (0.21%)	4
Electricity (NEA's installations) ³⁶	75,684 (7.59%)	2	74,703 (7.5%)	2	1,568 (0.17%)	5
Sub-total CO ₂ emissions (Scope 2)	77,854		76,879		3,576	
Indirect Carbon Emissions (Scope 3)						
Local ³⁷ staff business travel	336 (0.03%)	6	350 (0.04%)	5	342 (0.04%)	6
Overseas ³⁸ business travel (flights only)	364 (0.04%)	5	228 (0.02%)	7	228 (0.02%)	7
Sub-total CO ₂ emissions (Scope 3)	700		578		570	
Total CO ₂ Emissions	996,668		996,055		931,974	

²⁹ NEA's corporate carbon footprint data for FY2015 and FY2016 is presented to provide a comparison of NEA's corporate carbon footprint.

³⁰ For Direct Carbon Emissions (Scope 1), NEA accounts for carbon emissions for operations and premises which it has control over.

³¹ Carbon emission for NEA-owned vehicles is calculated based on amount of fuel (diesel and petrol) used. For FY2017, diesel consumed by vehicles, equipment and marine vessels used at Tuas Marine Transfer Station and Semakau Landfill has been included in the calculation of carbon emission.

³² Carbon emission is calculated for LPG and town gas used at the Choa Chu Kang and Mandai crematoriums respectively. This emission hinges on factors beyond NEA's control, such as the number of after-death services required and the number of visitors.

³³ There was an increase in the amount of LPG used at the Choa Chu Kang Crematorium FY2017 due to Choa Chu Kang Cemetery Exhumation Phase 5 and increase in private exhumation.

³⁴ For indirect carbon emissions from electricity consumption (Scope 2), NEA purchases electricity from the national grid. Grid-average emission factor data is used to calculate greenhouse gas emissions. NEA accounts for carbon emissions for operations and premises which it has control over.

³⁵ FY2017 carbon emission is calculated based on 2016 electricity grid emission factors: 0.4244kgCO₂ /kWh (https://www.ema.gov.sg/cmsmedia/Publications_and_Statistics/Publications/SES17/Publication_singapore_energy_statistics_2017.pdf).

³⁶ For FY2017, the electricity consumed at Tuas South Incineration Plant, Tuas Incineration Plant and Tuas Marine Transfer Station was excluded from the carbon emission 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 had been accounted for under Scope 1 – NEA-owned vehicles.

³⁷ Carbon emission is calculated based on local business travel by staff vehicles (assuming that the cars and motorcycles are fuelled by petrol with average motor vehicle fuel efficiency of 10.45L/100km, a number obtained from: http://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/FactsandFigures/Statistics_in_Brief_2009.pdf). This does not include the travel journeys of NEA staff to and from their homes.

³⁸ Carbon emission factors and flight distance travelled are calculated from: <http://www.icao.int/environmental-protection/CarbonOffset/Pages/default.aspx> and <http://www.gcmap.com/>

Promoting Water Conservation within NEA ^[103-2,103-3,303-1,303-3]

NEA also walks the talk when it comes to helping Singapore conserve its scarce water supplies. NEA has achieved the Water Efficient Building certification issued by PUB, Singapore's National Water Agency, for all its 18 premises.

Aside from installing water-saving fittings, NEA has also implemented the following water conservation measures:

- rainwater harvesting
- general cleaning using NEWater

- campaigns to encourage staff to conserve water
- regular monitoring and reporting of water usage, so that any anomalous consumption can be investigated and rectified quickly
- plans to minimise water usage at all premises during dry spells
- guidelines for irrigation regime

Water is also reused as much as possible across NEA's installations. For instance, at the Tuas Incineration Plant, 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.

Achievements in Water Conservation ^[103-3,303-1,303-3]

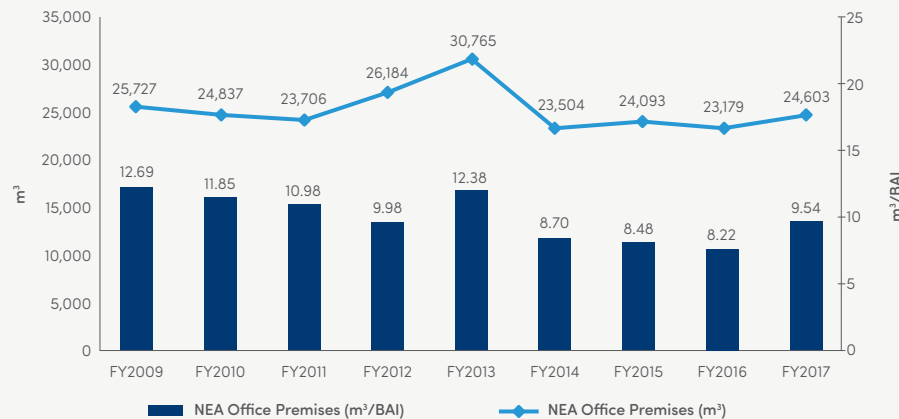
The water consumption at NEA offices has been fairly consistent over the years since the peak at FY2013.

In FY2017, NEA's installations consumed about 72 per cent of the organisation's total PUB water usage. However, there is a steady increase in water consumption at NEA's installations over the years, despite the implementation of water conservation practices. Water

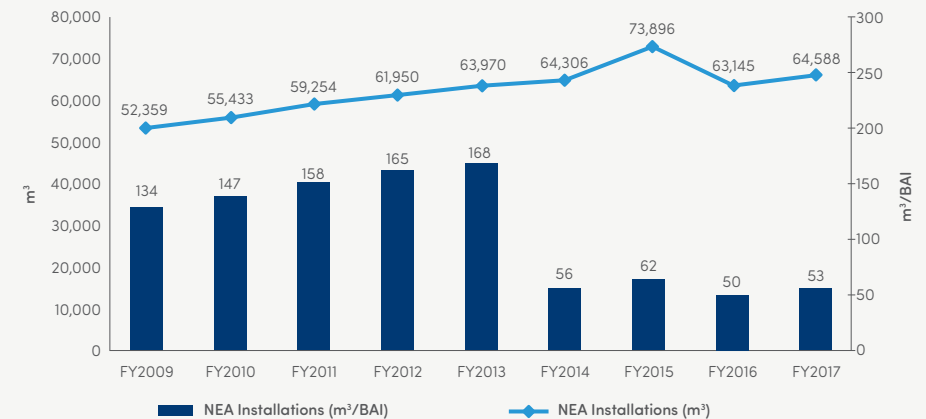
consumption at NEA installations is largely dependent on public demand for NEA's services. For example, an increase in after-death services at its crematoriums and columbariums would mean a higher number of visitors, thereby leading to a greater use of sanitation facilities and an increase in water consumption.

NEA's two incineration plants consumed 390,063m³ of NEWater in FY2017 for their operations, which include general cleaning, the cooling of hot ash, the suppressing of dust and the production of demineralised water for boiler usage.

PUB water consumed at NEA Offices



PUB water consumed at NEA Installations



Achievements in Rainwater Harvesting ^[103-2,103-3,303-1,306-2,306-4]

As part of NEA's water conservation efforts, NEA set up rain-harvesting systems at several NEA premises, including the Tuas Incineration Plant, Tuas South Incineration Plant, Tuas Marine Transfer Station, Semakau Landfill and Centre for Climate Research Singapore. However, only Tuas South Incineration Plant and Tuas Marine Transfer Station are equipped with meters to track the amount of rainwater used.

The rainwater collected is used to irrigate NEA grounds, and to clean and

run its operations, such as the cooling of hot ash at incineration plants, and suppressing of dust at incineration plants and Tuas Marine Transfer Station. The total volume of rainwater used in FY2017 was 42,334m³, which is equivalent to the average amount of water consumed by about 810 Singapore residents in their homes annually³⁹.

Reducing Waste Generation within NEA ^[103-2,103-3,303-1,306-2,306-4]

Due to land constraints, Singapore has limited space for waste disposal. To help extend the lifespan of Singapore's only

remaining landfill, NEA is leading 3R initiatives at its premises to reduce waste generation and increase recycling.

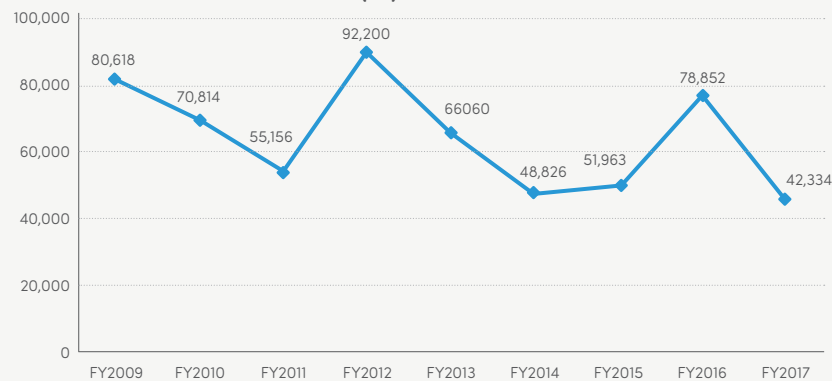
Achievements in Recycling Efforts ^[103-2,103-3,303-1,306-2,306-4]

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 off-site premises. Recycling bins for toner cartridges and electronic waste were also set up at NEA headquarters. In FY2017, NEA collected a total of 15,929kg⁴⁰ of recyclables

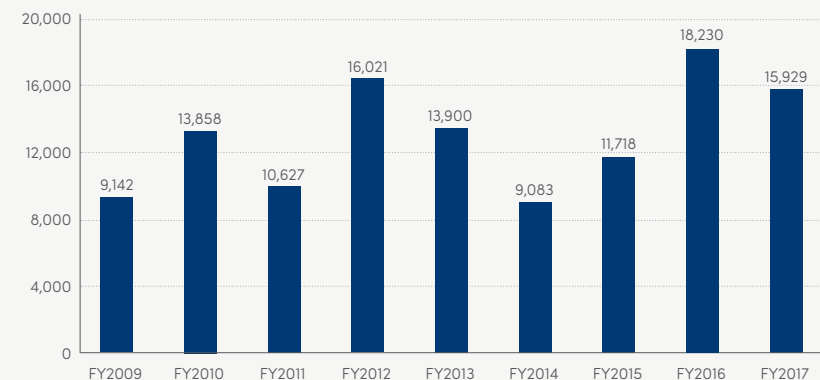
consisting of paper (98.6 per cent), plastic (0.6 per cent) and metals (0.8 per cent).

In FY2017, 16.96m³ 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 a licenced biohazardous waste collector – Cramoil Singapore Pte Ltd in FY2017. The biohazardous waste is then transported to a dedicated incinerator for incineration.

Total Rainwater Used at the Tuas South Incineration Plant and Tuas Marine Transfer Station (m³)



Total recyclables (kg)



³⁹ Based on Singapore's annual household water consumption per capita of 143 l/d in 2017 (<https://www.pub.gov.sg/watersupply/singaporewaterstory>).

⁴⁰ 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, and this information is therefore omitted from tabulation.

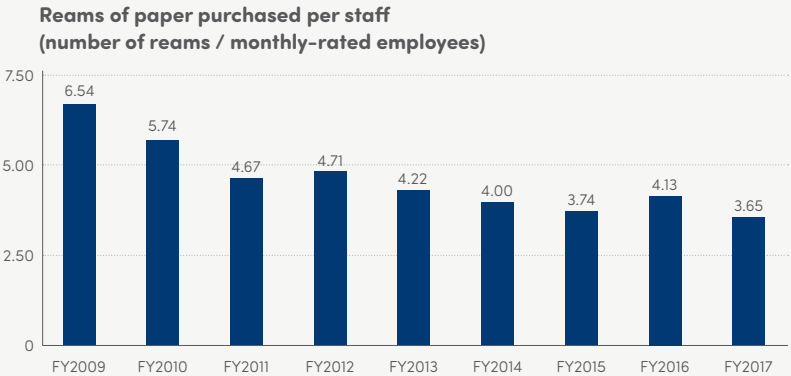
Achievements in Reducing
Paper Consumption [103-2,103-3,306-2,306-4]

To optimise paper usage and reduce wastage, NEA encourages its staff to embrace digital methods of sharing or viewing documents and to print only when necessary. This message is reinforced through the 8 Effective Habits – 10% Challenge, where printers are set to print on both sides of the paper and staff are reminded by visual cues in email signatures and stickers.

Since August 2014, NEA has also progressively replaced its existing printers with new printers that come

with the print-count feature. With this, NEA can now closely monitor paper usage among staff. This feature has allowed NEA to identify paper-intensive processes and look into digitalising some of these processes.

As a result of these measures, paper consumption at NEA’s premises has fallen by 44.2 per cent from FY2009 to FY2017. FY2017 also saw the lowest paper consumption – at 3.6 reams of paper purchased per staff – since FY2009.



About This Report ^[102-10,102-45,102-50,102-51,102-52]

In this Annual & Sustainability Report 2017/2018, NEA continued to provide its stakeholders with a clear account of its corporate, financial and sustainability performance in FY2017 (1 April 2017 to 31 March 2018). There were no significant organisational changes during the reporting period.

This is NEA's second Annual & Sustainability Report. The previous report was published in September 2017. It was then a new milestone in NEA's sustainability journey, which had begun with its first sustainability report published in 2011. Combining both NEA's annual achievements and sustainability efforts, the report will continue to be published on an annual basis.

This year, emphasis was placed on reporting NEA's strategies and business model. NEA shared about the insights and inputs that drive its business activities, as well as how this translated into value creation for internal and external stakeholders. This emphasis

also extended to NEA's new strategic role in driving the transformation of the environmental services industry. Together, these strategies provide the impetus for NEA's vision of a clean, liveable and sustainable Singapore.

Additionally, NEA hopes 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 Annual & Sustainability Report 2017/2018 has been prepared in accordance with:

- i. The Global Reporting Initiative (GRI) Standards – Core option with submission to the GRI to confirm the correct location of the materiality-related disclosures
- ii. The Integrated Reporting Framework set by the International Integrated Reporting Council, to ensure efficient reporting and effective communication across stakeholders

REPORTING SCOPE

This Annual & Sustainability Report 2017/2018 documents organisational activities, achievements and financial performance across NEA's 20 key premises, unless otherwise stated. These 20 premises consist of 14 office premises and six industrial premises.

NEA's 14 Office Premises

These are grouped into seven stand-alone and seven tenanted office premises.

- **Stand-alone Office Premises**
 - Centre for Climate Research Singapore at Kim Chuan Road
 - Department of Public Cleanliness and Environmental Health Institute at Neythal Road
 - Five NEA Regional Offices (ROs):
 - i. North East RO at Sin Ming Drive
 - ii. North West RO at Attap Valley Road

- iii. Central RO at Jalan Bukit Merah
- iv. South East RO at Tannery Lane
- v. South West RO at Albert Winsemius Lane

- **Tenanted Office Premises**
 - Environmental Health Institute at Biopolis
 - Hawker Centres Division at the HDB Hub
 - Meteorological Service Singapore at Changi Airport
 - National Radiochemistry Laboratory at CREATE
 - NEA Headquarters at Environment Building
 - Secondary Standards Dosimetry Laboratory at Health Sciences Authority
 - Singapore Environment Institute at Kay Siang Road

Notes ^[102-49]:

1. There are no significant changes from previous reporting periods in terms of material topics and topic boundaries.
2. The consumption data for hawker centres currently managed by NEA is not included in this report.

Integrated Reporting Approach

NEA's Six Industrial Premises ^[102-45]

- Choa Chu Kang Crematorium, Columbarium and Cemetery
- Mandai Crematorium and Columbarium
- Semakau Landfill
- Tuas Marine Transfer Station
- Tuas South Incineration Plant
- Tuas Incineration Plant

ENQUIRIES ^[102-53]

As part of NEA's environmental conservation efforts, hardcopy reports are not printed. Digital copies of the past and current Annual & Sustainability Reports can be found on NEA's corporate website: www.nea.gov.sg

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

Ms Azreen Noor
azreen_noor@nea.gov.sg

Ms Eleanor Goh
eleanor_goh@nea.gov.sg

As we combine our Annual and Sustainability Reports together, we are working towards producing an Integrated Report based on 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 reporting. For our future reports, we will work towards improving the connectivity of information and future orientation of the report.

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 14 - 16
B. Governance	Corporate Governance, pg 6 - 13
C. Business model	NEA's Strategy and Business Model, pg 17 - 19
D. Risks and opportunities	Risks and Opportunities, pg 20 - 23 NEA's Corporate Sustainability Material Issues, pg 24 - 26
E. Strategy and resource allocation	Chairman's Foreword, pg 2 - 3 CEO's Message, pg 4 - 5 NEA's Strategy and Business Model, pg 17 - 19
F. Performance	Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore, pg 27 - 45 Engaging Our Partners and the Community, pg 46 - 66 Enabling a High Performance NEA, pg 67 - 99 Walking the Talk, pg 100 - 108
G. Outlook	Chairman's Foreword, pg 2 - 3 CEO's Message, pg 4 - 5
H. Basis of preparation and presentation	NEA's Corporate Sustainability Material Issues, pg 24 - 26 About This Report, pg 109 - 110

GRI Standards Content Index

[102-55,102-56]



External assurance was not conducted for this report

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
GRI 101: Foundation 2016		
General Disclosures		
Organisation Profile		
GRI 102 : General Disclosures 2016	102-1 Name of the organisation	Pg 14: About the National Environmental Agency
	102-2 Activities, brands, products, and services	Pg 14-16: About the National Environmental Agency
	102-3 Location of headquarters	Pg 14: About the National Environmental Agency
	102-4 Location of operations	Pg 14: About the National Environmental Agency
	102-5 Ownership and legal form	Pg 14: About the National Environmental Agency
	102-6 Markets served	Pg 14: About the National Environmental Agency
	102-7 Scale of the organisation	Pg 14-16: About the National Environmental Agency
	102-8 Information on employees and other workers	Pg 76-77: Enabling a High Performance NEA > Develop and Engage Staff Breakdown for temporary employees is not provided as their tenure is less than 11 months.
	102-9 Supply chain	Pg 50: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry
	102-10 Significant changes to the organisation and its supply chain	Pg 109: About This Report
	102-11 Precautionary Principle or approach	Pg 20-21: About the National Environment Agency > Risks and Opportunities
	102-12 External initiatives	Pg 14: About the National Environmental Agency NEA also aligns its HR practices with the Tripartite Guidelines on Fair Employment Practices.
	102-13 Membership of associations	Pg 14: About the National Environmental Agency
Strategy		
GRI 102 : General Disclosures 2016	102-14 Statement from senior decision-maker	Pg 2-3: Chairman's Foreword Pg 4-5: CEO's Message
	102-15 Key impacts, risks, and opportunities	Pg 20-23: About the National Environment Agency > Risks and Opportunities Pg 24-26: About the National Environment Agency > NEA's Corporate Sustainability Material Issues

... continued from previous page ^[102-55]

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
General Disclosures		
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 6-13: Corporate Governance
Stakeholder Engagement		
GRI 102 : General Disclosures 2016	102-40 List of stakeholder groups	Pg 24-26: About the National Environment Agency > NEA's Corporate Sustainability Material Issues
	102-41 Collective bargaining agreements	Pg 81: Enabling a High Performance NEA > Develop and Engage Staff Around 91 per cent of the monthly rated employees and 100 per cent of daily rated employees are covered by collective bargaining agreements.
	102-42 Identifying and selecting stakeholders	Pg 52: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry Pg 62: Engaging Our Partners and the Community > Engage and Nurture People and the Community Pg 95: Enabling a High Performance NEA > Develop and Engage Staff
	102-43 Approach to stakeholder engagement	Pg 52-54: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry Pg 62-63: Engaging Our Partners and the Community > Engage and Nurture People and the Community Pg 95-98: Enabling a High Performance NEA > Develop and Engage Staff No engagement was undertaken specifically as part of the report preparation process.
	102-44 Key topics and concerns raised	Pg 52-54: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry Pg 62-63: Engaging Our Partners and the Community > Engage and Nurture People and the Community Pg 95-98: Enabling a High Performance NEA > Develop and Engage Staff
	102-45 Entities included in the consolidated financial statements	Pg 109-110: About This Report
	102-46 Defining report content and topic Boundaries	Pg 24-26: About the National Environment Agency > NEA's Corporate Sustainability Material Issues

... continued from previous page ^[102-55]

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
General Disclosures		
Reporting Practice		
GRI 102 : General Disclosures 2016	102-47 List of material topics	Pg 24-26: About the National Environment Agency > NEA's Corporate Sustainability Material Issues
	102-48 Restatements of information	There were no restatements.
	102-49 Changes in reporting	Pg 109: About This Report
	102-50 Reporting period	Pg 109: About This Report
	102-51 Date of most recent report	Pg 109: About This Report
	102-52 Reporting cycle	Pg 109: About This Report
	102-53 Contact point for questions regarding the report	Pg 110: 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 111-120: GRI Content Index
	102-56 External assurance	Pg 111: GRI Content Index
Topic Specific Disclosures		
Economic Performance		
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 99: Enabling a High Performance NEA > Strengthen Corporate Practices and Governance
	103-2 The management approach and its components	Pg 99: Enabling a High Performance NEA > Strengthen Corporate Practices and Governance
	103-3 Evaluation of the management approach	Pg 99: Enabling a High Performance NEA > Strengthen Corporate Practices and Governance
GRI 201 : Economic Performance 2016	201-1 Direct economic value generated and distributed	Refer to Annual Financial Statement Pg 89: Enabling a High Performance NEA > Develop and Engage Staff
	201-2 Financial implications and other risks and opportunities due to climate change	Pg 20: About the National Environment Agency > Risks and Opportunities
	201-3 Defined benefit plan obligations and other retirement plans	Refer to Annual Financial Statement, Defined Contribution Plan Pg 76-78: Enabling a High Performance NEA > Develop and Engage Staff
	201-4 Financial assistance received from government	Refer to Annual Financial Statement

... continued from previous page ^[102-55]

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
Topic Specific Disclosures		
Procurement Practices		
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 26: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 50: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry
	103-2 The management approach and its components	Pg 50: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry
	103-3 Evaluation of the management approach	Pg 50: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry
GRI 204 : Procurement Practices 2016	204-1 Proportion of spending on local suppliers	Pg 50: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry
Energy		
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 24: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 40: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore
	103-2 The management approach and its components	Pg 40-42: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore Pg 101-104: Walking the Talk
	103-3 Evaluation of the management approach	Pg 42: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore Pg 102: Walking the Talk
GRI 302 : Energy 2016	302-1 Energy consumption within the organisation	Pg 102-104: Walking the Talk
	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 102: Walking the Talk
	302-4 Reduction of energy consumption	Pg 102: Walking the Talk
	302-5 Reductions in energy requirements of products and services	Not applicable to NEA

... continued from previous page ^[102-55]

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
Topic Specific Disclosures		
Water		
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 24: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 40: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore
	103-2 The management approach and its components	Pg 30-31: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore Pg 51: Engaging Our Partners and the Community > Develop and Promote the Environmental Services Industry Pg 57: Engaging Our Partners and the Community > Engage and Nurture People and the Community Pg 100-101, 105-107: Walking the Talk
	103-3 Evaluation of the management approach	Pg 106-107: Walking the Talk
	103-4 Evaluation of the management approach	Pg 106-107: Walking the Talk
GRI 303 : Water 2016	303-1 Water withdrawal by source	Pg 106-107: 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 106: Walking the Talk
Emissions		
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 24: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 40: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore
	103-2 The management approach and its components	Pg 37-38: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Safe, Healthy and Conducive Living Environment Pg 40-42: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore Pg 103-104: Walking the Talk
	103-3 Evaluation of the management approach	Pg 103: Walking the Talk
	103-4 Evaluation of the management approach	Pg 103: Walking the Talk
GRI 305 : Emissions 2016	305-1 Direct (Scope 1) GHG emissions	Pg 104-105: Walking the Talk
	305-2 Energy indirect (Scope 2) GHG emissions	Pg 104-105: Walking the Talk
	305-3 Other indirect (Scope 3) GHG emissions	Pg 104-105: Walking the Talk

... continued from previous page ^[102-55]

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
Topic Specific Disclosures		
Emissions		
GRI 305 : Emissions 2016	305-4 GHG emissions intensity	Pg 104: Walking the Talk
	305-5 Reduction of GHG emissions	Pg 103: Walking the Talk
	305-6 Emissions of ozone-depleted substances (ODS)	Not material as NEA is not a significant emitter of ODS.
	305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Pg 39: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > 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 24: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 37: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Safe, Healthy and Conducive Living Environment Pg 40: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore
	103-2 The management approach and its components	Pg 39: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Safe, Healthy and Conducive Living Environment Pg 43-44: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Resource Efficient and Sustainable Singapore Pg 107-108: Walking the Talk
	103-3 Evaluation of the management approach	Pg 43-44: Resource Efficient and Sustainable Singapore Pg 108: Walking the Talk
GRI 306 : Effluents and Waste 2016	306-1 Water discharge by quality and destination	Pg 39: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Safe, Healthy and Conducive Living Environment
	306-2 Waste by type and disposal method	Pg 107-108: Walking the Talk
	306-3 Significant spills	NEA has not had any significant spills.
	306-4 Transport of hazardous waste	Pg 107: 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.

... continued from previous page ^[102-55]

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
Topic Specific Disclosures		
Environmental Compliance		
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 24: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 37: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Safe, Healthy and Conducive Living Environment
	103-2 The management approach and its components	Pg 38-39: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Safe, Healthy and Conducive Living Environment
	103-3 Evaluation of the management approach	Pg 39: Ensuring a Clean Environment, Towards a Liveable and Sustainable Singapore > Safe, Healthy and Conducive Living Environment
	Total number and volume of significant spills	Not material as NEA has not had any significant spills.
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 25: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 75: Enabling a High Performance NEA > Develop and Engage Staff
	103-2 The management approach and its components	Pg 75-81: Enabling a High Performance NEA > Develop and Engage Staff
	103-3 Evaluation of the management approach	Pg 77, 95: Enabling a High Performance NEA > Develop and Engage Staff
GRI 401 : Employment 2016	401-1 New employee hires and employee turnover	Pg 76-77: Enabling a High Performance NEA > Develop and Engage Staff
	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	Pg 78: Enabling a High Performance NEA > Develop and Engage Staff
	401-3 Parental leave	Pg 79-80: Enabling a High Performance NEA > Develop and Engage Staff

... continued from previous page ^[102-55]

GRI Standard Number	Disclosure Number	Page No. / Section Titles / Remarks
Topic Specific Disclosures		
Occupational Health and Safety		
GRI 103 : Management Approach 2016	103-1 Explanation of the material topic and its Boundary	Pg 25: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 75: Enabling a High Performance NEA > Develop and Engage Staff
	103-2 The management approach and its components	Pg 86-88: Enabling a High Performance NEA > Develop and Engage Staff
	103-3 Evaluation of the management approach	Pg 88: Enabling a High Performance NEA > Develop and Engage Staff
GRI 403 : Occupational Health and Safety 2016	403-1 Workers representation in formal joint management-worker health and safety committees	There is a NEA Workplace Safety and Health Driver from the Corporate Excellence Department and Workplace Safety and Health Representatives from each department and off-site premises. 100 per cent of NEA employees 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 88: Enabling a High Performance NEA > Develop and Engage Staff
	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 25: About the National Environment Agency > NEA's Corporate Sustainability Material Issues Pg 75, 81: Enabling a High Performance NEA > Develop and Engage Staff
	103-2 The management approach and its components	Pg 81-86: Enabling a High Performance NEA > Develop and Engage Staff
	103-3 Evaluation of the management approach	Pg 82: Enabling a High Performance NEA > Develop and Engage Staff
GRI 404 : Training and Education 2016	404-1 Average hours of training per year per employee	Pg 82: Enabling a High Performance NEA > Develop and Engage Staff
	404-2 Programs for upgrading employee skills and transition assistance programs	Pg 78, 83-86: Enabling a High Performance NEA > Develop and Engage Staff
	404-3 Percentage of employees receiving regular performance and career development reviews	Pg 82: Enabling a High Performance NEA > Develop and Engage Staff



National Environment Agency
40 Scotts Road, #13-00
Environment Building
Singapore 228231

www.nea.gov.sg



FINANCIAL STATEMENTS 2017/2018



Driving Transformation for a Sustainable Future





National Environment Agency

(Established under the National Environment Agency Act)

Annual Financial Statements

For the financial year ended 31 March 2018

National Environment Agency
(Established under the National Environment Agency Act)

Annual Financial Statements
For the financial year ended 31 March 2018

National Environment Agency

Contents

	Page
Independent Auditor's Report	1 - 4
Statement of Comprehensive Income	5
Balance Sheet	6
Statement of Changes in Equity	7
Cash Flow Statement	8
Notes to the Financial Statements	9 - 43

National Environment Agency

Independent Auditor's Report to the Member of National Environment Agency

Report on the Audit of the Financial Statements

Opinion

We have audited the accompanying financial statements of National Environment Agency (the "Agency"), which comprise the balance sheet as at 31 March 2018, the statement of comprehensive income, statement of changes in equity and cash flow statement for the year then ended, and notes to financial statements, including a summary of significant accounting policies, as set out on pages 5 to 43.

In our opinion, the accompanying financial statements are properly drawn up in accordance with the provisions of the National Environment Agency Act, Chapter 195 (the "Act") and Statutory Board Financial Reporting Standards ("SB-FRSs") so as to present fairly, in all material respects, the state of affairs of the Agency as at 31 March 2018 and the results, changes in equity and cash flows of the Agency for the year ended on that date.

Basis for Opinion

We conducted our audit in accordance with Singapore Standards on Auditing (SSAs). Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of the Agency in accordance with the Accounting and Corporate Regulatory Authority (ACRA) *Code of Professional Conduct and Ethics for Public Accountants and Accounting Entities* (ACRA Code) together with the ethical requirements that are relevant to our audit of the financial statements in Singapore, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the ACRA Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with the provisions of the Act and Statutory Board Financial Reporting Standards, and for such internal controls as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

A statutory board is constituted based on its Act and its dissolution requires Parliament's approval. In preparing the financial statements, management is responsible for assessing the Agency's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless there is intention to wind up the Agency or for the Agency to cease operations.

Those charged with governance are responsible for overseeing the Agency's financial reporting process.

National Environment Agency

Independent Auditor's Report to the Member of National Environment Agency

Auditor's Responsibility for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with SSAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Agency's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Agency's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Agency to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

National Environment Agency

Independent Auditor's Report to the Member of National Environment Agency

Report on Other Legal and Regulatory Requirements

Opinion

In our opinion:

- (a) the receipts, expenditure, investment of moneys and the acquisition and disposal of assets by the Agency during the year are, in all material respects, in accordance with the provisions of the Act; and
- (b) proper accounting and other records have been kept, including records of all assets of the Agency whether purchased, donated or otherwise.

Basis for Opinion

We conducted our audit in accordance with SSAs. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Compliance Audit* section of our report. We are independent of the Agency in accordance with the ACRA Code together with the ethical requirements that are relevant to our audit of the financial statements in Singapore, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the ACRA Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion on management's compliance.

Responsibilities of Management for Compliance with Legal and Regulatory Requirements

Management is responsible for ensuring that the receipts, expenditure, investment of moneys and the acquisition and disposal of assets, are in accordance with the provisions of the Act. This responsibility includes implementing accounting and internal controls as management determines are necessary to enable compliance with the provisions of the Act.

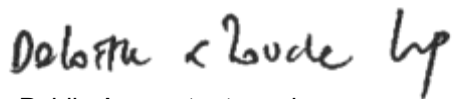
Auditor's Responsibilities for the Compliance Audit

Our responsibility is to express an opinion on management's compliance based on our audit of the financial statements. We planned and performed the compliance audit to obtain reasonable assurance about whether the receipts, expenditure, investment of moneys and the acquisition and disposal of assets, are in accordance with the provisions of the Act.

National Environment Agency

Independent Auditor's Report to the Member of National Environment Agency

Our compliance audit includes obtaining an understanding of the internal control relevant to the receipts, expenditure, investment of moneys and the acquisition and disposal of assets; and assessing the risks of material misstatement of the financial statements from non-compliance, if any, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Because of the inherent limitations in any accounting and internal control system, non-compliances may nevertheless occur and not be detected.



Public Accountants and
Chartered Accountants
Singapore

9 July 2018

National Environment Agency

**Statement of Comprehensive Income
For the financial year ended 31 March 2018**

	Note	2017/2018	2016/2017
		\$	\$
Income			
Management fees	4	63,554,596	61,160,835
Service fees		19,490,992	19,055,190
Regulatory charges		14,777,328	14,765,833
Interest income from banks		4,305,625	4,142,897
Other operating income		9,921,929	11,655,516
		112,050,470	110,780,271
Less:			
Expenditure			
Staff costs	5	329,016,389	308,778,121
Maintenance, services and supplies	6	462,648,792	465,254,265
Upgrading and improvement		9,722,457	5,678,815
Public education expense		12,976,857	14,613,502
Depreciation of property, plant and equipment		16,782,892	21,408,363
Rental of office and equipment		23,241,383	21,390,560
Finance expense	7	358,074	498,739
Other operating expenditure	8	46,693,025	37,979,056
		901,439,869	875,601,421
Operating deficit before Government grants		(789,389,399)	(764,821,150)
Add: Government grants	9	806,432,530	814,665,060
Surplus before contribution to the Consolidated Fund		17,043,131	49,843,910
Contribution to the Consolidated Fund	10	(2,897,332)	(8,473,465)
Net surplus for the financial year		14,145,799	41,370,445
Other comprehensive income that will not be reclassified to income or expenditure in subsequent periods			
Net re-measurement loss on defined benefit plans	19	-	(1,169,771)
Total comprehensive income for the financial year		14,145,799	40,200,674

Mr Liak Teng Lit
Chairman
9 July 2018

Mr Ronnie Tay
Chief Executive Officer

The accompanying notes form an integral part of these financial statements.

National Environment Agency

**Balance Sheet
As at 31 March 2018**

	Note	At 31 March 2018 \$	At 31 March 2017 \$
ASSETS			
Current assets			
Cash and cash equivalents	11	870,119,435	395,848,880
Trade and other receivables	12	40,694,649	38,256,360
Held-for-trading investments	13	119,149,291	-
Consumables		37,174,045	33,529,893
		<u>1,067,137,420</u>	<u>467,635,133</u>
Non-current assets			
Property, plant and equipment	15	71,156,396	65,986,110
Held-to-maturity financial assets	14	10,000,000	-
Total assets		<u>1,148,293,816</u>	<u>533,621,243</u>
LIABILITIES			
Current liabilities			
Trade and other payables	16	206,951,458	187,372,553
Payable to the Ministry of the Environment and Water Resources	17	36,739,722	43,296,785
Loan from Government	18	3,342,778	3,646,667
Provision for pensions and death gratuities	19	1,388,388	3,280,258
Provision for contribution to the Consolidated Fund	10	2,897,332	8,473,465
		<u>251,319,678</u>	<u>246,069,728</u>
Non-current liabilities			
Loan from Government	18	3,950,555	7,293,332
Provision for pensions and death gratuities	19	6,908,119	7,804,086
Deferred capital grants	20	18,235	24,478
		<u>10,876,909</u>	<u>15,121,896</u>
Total liabilities		<u>262,196,587</u>	<u>261,191,624</u>
NET ASSETS		<u>886,097,229</u>	<u>272,429,619</u>
EQUITY			
Share capital	21	685,735,911	85,165,100
Accumulated surplus		200,361,318	187,264,519
		<u>886,097,229</u>	<u>272,429,619</u>

Mr Liak Teng Lit
Chairman
9 July 2018

Mr Ronnie Tay
Chief Executive Officer

The accompanying notes form an integral part of these financial statements.

National Environment Agency

**Statement of Changes in Equity
For the financial year ended 31 March 2018**

	Note	Share Capital \$	Accumulated Surplus \$	Total \$
Balance 1 April 2017		85,165,100	187,264,519	272,429,619
Total comprehensive income for the financial year		-	14,145,799	14,145,799
Net surplus for the financial year				
Dividend	22	-	(1,049,000)	(1,049,000)
Equity injection	21	600,570,811	-	600,570,811
Balance as at 31 March 2018		685,735,911	200,361,318	886,097,229
 Balance 1 April 2016		 41,301,000	 147,063,845	 188,364,845
Total comprehensive income for the financial year				
Net surplus for the financial year		-	41,370,445	41,370,445
Other comprehensive income				
Net re-measurement loss on defined benefit plans		-	(1,169,771)	(1,169,771)
Equity injection	21	43,864,100	-	43,864,100
Balance as at 31 March 2017		85,165,100	187,264,519	272,429,619

The accompanying notes form an integral part of these financial statements.

National Environment Agency

Cash Flow Statement

For the financial year ended 31 March 2018

	Note	2017/2018 \$	2016/2017 \$
Cash flows from operating activities			
Net surplus for the financial year		14,145,799	41,370,445
Adjustments for:			
Contribution to the Consolidated Fund	10	2,897,332	8,473,465
Government grants	9	(806,432,530)	(814,665,060)
Depreciation of property, plant and equipment	15	16,782,892	21,408,363
Loss on disposal of property, plant and equipment		23,862	346,026
Interest expense	7	358,074	498,739
Interest income		(4,305,625)	(4,142,897)
Plant and equipment expensed off	8	846,152	667,298
Allowance for impairment loss on trade and other receivables	12	149,674	220,669
Provision for pensions and death gratuities	19	614,541	689,460
Fair value loss on held-for-trading investments		850,709	-
Operating cash flow before working capital changes		(774,069,120)	(745,133,492)
Change in operating assets and liabilities:			
- Consumables		(3,644,152)	637,826
- Trade and other receivables		(3,375,921)	(4,070,550)
- Trade and other payables		18,789,115	(20,383,485)
- Other payable to the Ministry of the Environment and Water Resources ("MEWR")		(447,846)	(230)
- Payable to MEWR		4,826,542	3,294,591
Cash used in operations		(757,921,382)	(765,655,340)
Interest received		5,093,583	3,946,741
Payments for pension cost		(3,402,378)	(1,351,774)
Payment to consolidated fund		(8,473,465)	(8,783,158)
Net cash used in operating activities		(764,703,642)	(771,843,531)
Cash flows from investing activities			
Purchases of property, plant and equipment		(21,987,489)	(18,145,428)
Purchase of held-to-maturity financial assets		(10,000,000)	-
Purchase of held-for-trading investments		(120,000,000)	-
Proceeds from disposal of property, plant and equipment		14,516	11,216
Net cash used in investing activities		(151,972,973)	(18,134,212)
Cash flows from financing activities			
Grants received from Government		795,430,099	814,638,498
Repayment of loan from Government		(3,646,666)	(3,646,667)
Interest paid on loan from Government		(358,074)	(498,739)
Equity injection		600,570,811	43,864,100
Dividend paid		(1,049,000)	-
Net cash from financing activities		1,390,947,170	854,357,192
Net increase in cash and cash equivalents		474,270,555	64,379,449
Cash and cash equivalents at beginning of financial year		395,848,880	331,469,431
Cash and cash equivalents at end of financial year	11	870,119,435	395,848,880

The accompanying notes form an integral part of these financial statements.

National Environment Agency

Notes to the Financial Statements

For the financial year ended 31 March 2018

1. General

National Environment Agency (the "Agency"), a Statutory Board under the Ministry of the Environment and Water Resources ("MEWR"), was incorporated under the National Environment Agency Act (the "Act") on 1 July 2002.

The address of its principal place of operation is 40 Scotts Road, Environment Building #13-00, Singapore 228231.

The principal activities of the Agency include:

- (i) conduct investigations, enforcement and surveillance of environmental health concerns and vectors of infectious agents;
- (ii) conduct research into and develop strategies for prevention and control of environmental health concerns;
- (iii) conduct meteorological observations and seismic monitoring;
- (iv) provide weather, climate and related services, and conduct research in meteorology;
- (v) undertake licensing, coordinate the implementation and management of upgrading programmes for markets and hawker centres, review of hawker policies, plan, construct, develop and manage markets and hawker centres in its own right and as agent of the Government or any body corporate established by written law;
- (vi) monitor environmental quality, review building plans for pollution control and environmental health requirements, and control environmental pollution;
- (vii) control the import, export, transportation, storage, sale, possession and use of hazardous substances;
- (viii) control the import, export, transportation, storage, collection, treatment and disposal of toxic industrial waste;
- (ix) promote resource conservation and energy efficiency;
- (x) regulate the collection and disposal of solid waste;
- (xi) plan, develop, manage and regulate waste-to-resource and waste-to-energy facilities;
- (xii) control the import, export, transportation, storage, sale, possession, use, manufacture and disposal of radioactive materials and irradiating apparatuses;
- (xiii) enhance the competency of the environment industry workforce and promote environmental thought leadership through knowledge distillation, sharing and training;
- (xiv) build up a vibrant research and development ecosystem in the environment industry and help develop environmental technology competencies and capabilities in Singapore;
- (xv) develop and drive the transformation of the environmental services industry to be vibrant, sustainable and professional to serve Singapore, as well as growing cities' needs;
- (xvi) inculcate pro-environment mindset in the community and raise community ownership of environmental and public health issues in Singapore;
- (xvii) oversee planning for after-death facilities, and build, operate and maintain Government-owned cemeteries, crematorium and columbarium facilities; and
- (xviii) provision of cleaning services in designated public areas.

2. Summary of significant accounting policies

(a) Basis of preparation

The financial statements of the Agency have been prepared in accordance with the provisions of the Act and Statutory Board Financial Reporting Standards ("SB-FRS"). The financial statements have been prepared on the historical cost basis except as disclosed in the accounting policies below.

The preparation of financial statements in conformity with SB-FRS requires management to exercise its judgement in the process of applying the Agency's accounting policies. It also requires the use of certain critical accounting estimates and assumptions. The areas where estimates and assumptions are significant and critical are disclosed in Note 3.

(b) SB-FRS and Interpretations of SB-FRS effective in the financial year

The accounting policies adopted are consistent with those of the previous financial year except for the adoption of the new/revised SB-FRSs and Interpretations to SB-FRS that are effective on 1 April 2017 and relevant to the Agency. The adoption of these standards and interpretations did not have any material impact on the Agency's financial statements.

(c) SB-FRS and Interpretations of SB-FRS issued but not yet effective

The Agency has not adopted the following standards and interpretations which are relevant that have been issued but not yet effective:

Reference	Description	Effective for annual periods beginning on or after
SB-FRS 109	Financial Instruments	1 January 2018
SB-FRS 115	Revenue from Contracts with Customers	1 January 2018
SB-FRS 1001	Accounting and Disclosure for Non-Exchange Revenue	1 January 2018
SB-FRS 116	Leases	1 January 2019

The standards and interpretations above are expected to have no material impact on the financial statements in the period of initial application except for the following:

- As at 31 March 2018, the Agency has non-cancellable operating lease commitments of \$14,094,050. A preliminary assessment indicates that these arrangements will result in a recognition of a right-of-use asset and a corresponding liability in respect of all these leases unless they qualify for low value or short-term leases upon the application of SB-FRS 116. This new requirement is expected to have an impact on the amounts recognised in the Agency's financial statements and management is currently assessing its potential impact. It is not practicable to provide a reasonable estimate of the financial effect until the Agency completes the review.
- The application of SB-FRS 115 may have an impact on the income recorded and management is currently assessing its potential impact. It is not practicable to provide a reasonable estimate of the financial effect until the Agency completes the review.

2. Summary of significant accounting policies (continued)

(c) *SB-FRS and Interpretations of SB-FRS issued but not yet effective (continued)*

- Based on an analysis of the Agency's financial assets and financial liabilities as at 31 March 2018 on the basis of the facts and circumstances that exist at that date, the management of the Agency has assessed the impact of SB-FRS 109 on the Agency's financial statements as follows:

Classification and measurement

The classification and measurement of financial assets is determined on the basis of the contractual cash flow characteristics and the objective of the business model associated with holding the asset.

Key changes include:

- Held-to-maturity financial asset will be classified under the new Amortised Cost category and the measurement method remains unchanged.
- Held-for-trading investment will be classified under the new Fair Value Through Profit or Loss category and the measurement method remains unchanged.
- Loans and receivables will be classified under the new Amortised Cost category and the measurement method remains unchanged.
- Upon transition, the Agency does not expect any significant impact on the re-measurement, arising from these changes.
- Classification of financial liabilities will remain unchanged for the Agency.

Impairment

The SB-FRS 109 impairment requirements are based on an expected credit loss model (ECL) that replaces the incurred loss model under the current accounting standard. The Agency will be required to recognise either a 12-month or lifetime ECL, depending on whether there has been a significant increase in credit risk since initial recognition. SB-FRS 109 will change the Agency's current methodology for determining the provision for financial assets.

It is not practicable to provide a reasonable estimate of the financial effect until the Agency completes the review.

2. Summary of significant accounting policies (continued)

(d) *Income recognition*

Income comprises the fair value of the consideration received or receivable for the rendering of services. Income is presented net of goods and services tax, rebates and discounts in the ordinary course of the Agency's activities. Income is recognised as follows:

- (i) Management fees are earned from activities as set out in Note 4 and recognised when due from stallholders.
- (ii) Service fees are recognised when services are rendered to the customers. Service fees include meteorological services and course fees.
- (iii) Regulatory charges (including income from licences and permits) are recognised at the point of collection.
- (iv) Interest income is recognised on a time proportion basis using the effective interest method.

(e) *Property, plant and equipment*

(i) *Measurement*

All items of property, plant and equipment are initially recognised at cost and subsequently carried at cost less accumulated depreciation and any accumulated impairment losses (Note 2(f)).

The cost of an item of property, plant and equipment initially recognised includes its purchase price and any cost that is directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management.

The cost of an item of property, plant and equipment is recognised as an asset, if and only if, it is probable that future economic benefits associated with the item will flow to the Agency and the cost of the item can be measured reliably.

2. Summary of significant accounting policies (continued)

(e) *Property, plant and equipment (continued)*

(ii) *Depreciation*

Depreciation on property, plant and equipment is calculated using the straight-line method to allocate their depreciable amounts over their estimated useful lives as follows:

Leasehold land	30 years (based on lease period)
Building and building improvements	3 - 28 years
Furniture and fittings, office equipment	5 years
Computer hardware and software	3 years
Motor vehicles	10 years
Plant and machinery	10 years
Tugs and barges	25 years

No depreciation is provided on construction-in-progress as these assets are not yet available for use.

For property, plant and equipment which were transferred to the Agency from MEWR on the Agency's establishment on 1 July 2002, the assets are depreciated over the remaining useful lives at 1 July 2002.

For property, plant and equipment which were transferred to the Agency from the Health Sciences Authority, as part of the transfer of the Centre for Radiation Protection on 1 July 2007, the assets are depreciated over the remaining useful lives at 1 July 2007.

The residual values, estimated useful lives and depreciation method of property, plant and equipment are reviewed, and adjusted prospectively as appropriate, at each balance sheet date. The effects of any revision are recognised in income or expenditure when the changes arise.

(iii) *Subsequent expenditure*

Subsequent expenditure relating to property, plant and equipment that has already been recognised is added to the carrying amount of the asset only when it is probable that future economic benefits associated with the item will flow to the Agency and the cost of the item can be measured reliably. All other repair and maintenance expenses are recognised in income or expenditure when incurred.

(iv) *Disposal*

An item of property, plant and equipment is derecognised upon disposal or when no future economic benefits are expected from its use or disposal. On disposal of an item of property, plant and equipment, the difference between the disposal proceeds and its carrying amount is recognised in income or expenditure in the year the asset is disposed.

2. Summary of significant accounting policies (continued)

(f) *Impairment of non-financial assets*

Property, plant and equipment are tested for impairment whenever there is any objective evidence or indication that these assets may be impaired. If any such indication exists, or when an annual impairment assessment for an asset is required, the Agency makes an estimate of the asset's recoverable amount.

For the purpose of impairment testing of these assets, recoverable amount (i.e. the higher of the fair value less costs of disposal and the value-in-use) is determined on an individual asset basis unless the asset does not generate cash flows that are largely independent of those from other assets. If this is the case, recoverable amount is determined for the cash generating units ("CGU") to which the asset belongs.

If the recoverable amount of the asset (or CGU) is estimated to be less than its carrying amount, the carrying amount of the asset (or CGU) is reduced to its recoverable amount. The difference between the carrying amount and recoverable amount is recognised as an impairment loss in income or expenditure.

In assessing value in use, the estimated future cash flows expected to be generated by the asset are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. In determining fair value less costs of disposal, recent market transactions are taken into account, if available. If no such transactions can be identified, an appropriate valuation model is used.

An assessment is made at each reporting date as to whether there is any indication that previously recognised losses and impairment for an asset may no longer exist or may have decreased. An impairment loss for an asset is reversed if, and only if, there has been a change in the estimates used to determine the assets' recoverable amount since the last impairment loss was recognised. The carrying amount of an asset is increased to its revised recoverable amount, provided that this amount does not exceed the carrying amount that would have been determined (net of accumulated depreciation) had no impairment loss been recognised for the asset in prior years. A reversal of impairment loss for an asset is recognised in income or expenditure.

(g) *Consumables*

Consumables are carried at the lower of cost and net realisable value and are determined on a weighted average basis. Where necessary, allowance is provided for damaged, obsolete and slow-moving items to adjust the carrying value of consumables to the lower of cost and net realisable value. Net realisable value is determined using an estimate of replacement costs which is a close approximation of net realisable value.

2. Summary of significant accounting policies (continued)

(h) *Financial instruments*

(i) *Financial assets*

Initial recognition and measurement

Financial assets are recognised when, and only when, the Agency becomes a party to the contractual provisions of the financial instrument. The Agency determines the classification of its financial assets at initial recognition.

When financial assets are recognised initially, they are measured at fair value plus directly attributable transaction costs, except for those financial assets classified as at fair value through profit or loss which are initially measured at fair value.

Subsequent measurements

(a) Financial assets at fair value through profit or loss ("FVTPL")

Financial assets are classified as at FVTPL where the financial asset is either held-for-trading or it is designated as at FVTPL.

A financial asset is classified as held-for-trading if:

- It has been acquired principally for the purpose of selling in the near future; or
- On initial recognition, it is part of an identified portfolio of financial instruments that the group manages together and has a recent actual pattern of short-term profit-taking; or
- It is a derivative that is not designated and effective as a hedging instrument.

A financial asset other than a financial asset held-for-trading may be designated as at FVTPL upon initial recognition if:

- Such designation eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise; or
- The financial asset forms part of a group of financial assets or financial liabilities or both, which is managed and its performance is evaluated on a fair value basis, in accordance with the group's documented risk management or investment strategy, and information about the grouping is provided internally on that basis; or
- It forms part of a contract containing one or more embedded derivatives, and FRS 39 Financial Instruments: Recognition and Measurement permits the entire combined contract (asset or liability) to be designated as at FVTPL.

2. Summary of significant accounting policies (continued)

(h) Financial instruments (continued)

(i) Financial assets (continued)

(a) Financial assets at fair value through profit or loss ("FVTPL") (continued)

Subsequent to initial recognition, financial assets at FVTPL are measured at fair value. Any gains or losses arising from changes in fair value of the financial assets are recognised in the statement of income and expenditure. Net gains or net losses on financial assets at FVTPL include exchange differences, interest and dividend income.

(b) Held-to-maturity financial assets

Bonds with fixed or determinable payments and fixed maturity dates where the Agency has a positive intent and ability to hold to maturity are classified as held-to-maturity financial assets. Subsequent to initial measurement, held-to-maturity investments are measured at amortised cost using the effective interest method less impairment, with revenue recognised on an effective yield basis.

(c) Loans and receivables

Trade and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as "loans and receivables". Loans and receivables (including trade and other receivables and cash and cash equivalents) are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest method, except for short-term receivables when the effect of discounting is immaterial.

Derecognition

A financial asset is derecognised where the contractual right to receive cash flows from the asset has expired or when all the risks and rewards of ownership of the asset has been transferred to another entity. On derecognition of a financial asset in its entirety, the difference between the carrying amount and the sum of the consideration received and any cumulative gain or loss that had been recognised in other comprehensive income is recognised in income or expenditure.

(ii) Financial liabilities

Initial recognition and measurement

Financial liabilities are recognised when, and only when, the Agency becomes a party to the contractual provisions of the financial instrument. The Agency determines the classification of its financial liabilities at initial recognition.

All financial liabilities are recognised initially at fair value plus directly attributable transaction costs.

2. Summary of significant accounting policies (continued)

(h) *Financial instruments (continued)*

(ii) *Financial liabilities (continued)*

Subsequent measurements

After initial recognition, all financial liabilities are subsequently measured at amortised cost using the effective interest method. Gains and losses are recognised in income or expenditure when the liabilities are derecognised, and through the amortisation process.

Derecognition

A financial liability is derecognised when the obligation under the liability is discharged, cancelled or expired. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, such an exchange or modification is treated as a derecognition of the original liability and the recognition of a new liability, and the difference in the respective carrying amounts is recognised in income or expenditure.

(iii) *Offsetting of financial instruments*

Financial assets and financial liabilities are offset and the net amount is presented in the balance sheet, when and only when, there is a currently enforceable legal right to set off the recognised amounts and there is an intention to settle on a net basis, or to realise the assets and settle the liabilities simultaneously. A right to set-off must be available today rather than being contingent on a future event and must be exercisable by any of the counterparties, both in the normal course of business and in the event of default, insolvency or bankruptcy.

(i) *Impairment of financial assets*

The Agency assesses at each reporting date whether there is any objective evidence that a financial asset is impaired.

For financial assets carried at amortised cost, the Agency first assesses whether objective evidence of impairment exists individually for financial assets that are individually significant, or collectively for financial assets that are not individually significant. If the Agency determines that no objective evidence of impairment exists for an individually assessed financial asset, whether significant or not, it includes the asset in a group of financial assets with similar credit risk characteristics and collectively assesses them for impairment. Assets that are individually assessed for impairment and for which an impairment loss is, or continues to be recognised are not included in a collective assessment of impairment.

If there is objective evidence that an impairment loss on financial assets carried at amortised cost has been incurred, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the financial asset's original effective interest rate. If a loan has a variable interest rate, the discount rate for measuring any impairment loss is the current effective interest rate. The carrying amount of the asset is reduced through the use of an allowance account. The impairment loss is recognised in income or expenditure.

2. Summary of significant accounting policies (continued)

(i) *Impairment of financial assets (continued)*

When the asset becomes uncollectible, the carrying amount of impaired financial asset is reduced directly or if an amount was charged to the allowance account, the amounts charged to the allowance account are written off against the carrying value of the financial asset.

To determine whether there is objective evidence that an impairment loss on financial assets has been incurred, the Agency considers factors such as the probability of insolvency or significant financial difficulties of the debtor and default or significant delay in payments.

If in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed to the extent that the carrying amount of the asset does not exceed its amortised cost at the reversal date. The amount of reversal is recognised in income or expenditure.

(j) *Cash and cash equivalents*

Cash and cash equivalents include cash on hand and at banks, cash maintained with Accountant-General's Department ("AGD") and cash held under Centralised Liquidity Management ("CLM") scheme and Statutory Board Approved Funds ("SBAF") scheme that are readily convertible to a known amount of cash and are subject to an insignificant risk or changes in value.

Government grants received by the Agency for the purpose of property, plant and equipment renewal or replacement is recognised in cash held under Sinking Fund.

The Cash held under SBAF scheme relates to an equity injection by MOF to fund the Integrated Waste Management Facility. Under the SBAF scheme, the interest income generated under CLM scheme will accrue to the Government.

(k) *Provisions*

Provisions are recognised when the Agency has a present legal or constructive obligation as a result of past events, it is probable that an outflow of resources will be required to settle the obligation and the amount can be reliably estimated. Provisions are reviewed at each balance sheet date and adjusted to reflect the current best estimate. If it is no longer probable that an outflow of economic resources will be required to settle the obligation, the provision is reversed. If the effect of the time value of money is material, provisions are discounted using a rate that reflects, where appropriate, the risks specific to the liability. When discounting is used, the increase in the provision due to the passage of time is recognised as finance cost.

(l) *Borrowings*

Borrowings are initially recognised at fair value, net of transaction costs incurred. Borrowings are subsequently carried at amortised cost. Any difference between the proceeds (net of transaction costs) and the redemption value is recognised in income or expenditure over the period of the borrowings using the effective interest method.

2. Summary of significant accounting policies (continued)

(l) Borrowings (continued)

Borrowings which are due to be settled within twelve months after the balance sheet date are presented as current liabilities in the balance sheet even though the original term was for a period longer than twelve months. Other borrowings due to be settled more than twelve months after the balance sheet date are included as non-current liabilities in the balance sheet.

(m) Trade and other payables

Trade and other payables are initially recognised at fair value, and subsequently carried at amortised cost, using the effective interest method.

(n) Operating leases

Leases of assets in which a significant portion of the risks and rewards of ownership are retained by the lessor are classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) are taken to income or expenditure on a straight-line basis over the period of the lease.

When an operating lease is terminated before the lease period has expired, any payment required to be made to the lessor by way of penalty is recognised as an expense in the financial year in which termination takes place.

(o) Research costs

Research costs are recognised as an expense when incurred.

(p) Employee benefits

(i) Defined benefit plans

Pension and other post-employment benefits

Provision for pension benefits is made for pensionable officers transferred to the Agency on 1 July 2002. Provision for death gratuities is made for officers and daily rated employees transferred to the Agency on 1 July 2002.

An actuarial valuation is conducted once every three years or as and when required to determine the cost of pension benefits and death gratuities due to these officers using the Projected Unit Credit Method.

The pension benefits and death gratuities are computed based on existing guidelines found in the Pension Act and circulars issued by the Public Service Division.

-

2. Summary of significant accounting policies (continued)

(p) Employee benefits (continued)

(i) Defined benefit plans (continued)

Pension and other post-employment benefits (continued)

Defined benefit costs comprise the following:

- Service cost
- Interest cost on the provision for defined benefits
- Re-measurements of the provision for defined benefits

Service costs which include current service costs, past service costs and gains or losses on non-routine settlements are recognised as expense in income or expenditure. Past service costs are recognised when plan amendment or curtailment occurs.

Interest cost on the provision for defined benefits is the change during the period in the provision that arises from the passage of time which is determined by applying the discount rate based on the Singapore Government bond yield to the provision. Interest cost on the provision is recognised in income or expenditure.

Re-measurements comprising actuarial gains and losses are recognised immediately in other comprehensive income in the period in which they arise. Re-measurements are recognised in accumulated surplus within equity and are not reclassified to income or expenditure in subsequent periods.

(ii) Defined contribution plan

Contribution to Central Provident Fund ("CPF")

The Agency makes contributions to the CPF scheme in Singapore. Contributions to CPF schemes are recognised as an expenditure in the period in which the related service is performed.

(iii) Employee leave entitlement

Employee entitlements to annual leave are recognised as a liability when they accrue to employees. The estimated liability for annual leave is recognised for services rendered by employees up to the balance sheet date.

(q) Currency translation

(i) Functional and presentation currency

Items included in the financial statements of the Agency are measured using the currency of the primary economic environment in which the Agency operates ("functional currency"). The financial statements are presented in Singapore Dollar (\$), which is the functional and presentation currency of the Agency.

2. Summary of significant accounting policies (continued)

(q) Currency translation (continued)

(ii) Transactions and balances

Transactions in a currency other than the functional currency ("foreign currency") are translated into the functional currency using the exchange rates at the dates of transactions.

Monetary assets and liabilities denominated in foreign currencies are translated at the rate of exchanging ruling at the balance sheet date. Non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rates as at the dates of the initial transactions. Non-monetary items measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was measured.

Currency translation differences from the settlement of monetary items or from the translation of monetary items at the balance sheet date are recognised in income or expenditure.

(r) Government grants

Government grants received for the purchase or the construction of depreciable assets are accounted for as deferred capital grants. The deferred capital grants are amortised and charged to income or expenditure over the period necessary to match the annual depreciation charge of these assets or when the assets are disposed or written off.

Government grants received by the Agency to meet operating expenses are recognised in income or expenditure in the year these operating expenses are incurred.

Other government grants are recognised in income or expenditure based on expenses incurred for the projects which are recognised in the same period.

All grants are recognised when there is reasonable assurance that all attaching conditions are complied with.

(s) Contribution to the Consolidated Fund

Under Section 13(1)(e) and the First Schedule of the Singapore Income Tax Act, Chapter 134, the income of the Agency is exempt from income tax.

In lieu of income tax, the Agency is required to make contribution to the Government Consolidated Fund in accordance with the Statutory Corporations (Contributions to Consolidated Fund) Act, Chapter 319A. The provision is based on the guidelines specified by the Ministry of Finance. It is computed based on the net surplus of the Agency for each of the financial year at the prevailing corporate tax rate for the Year of Assessment. Contribution to the Consolidated Fund is provided for on an accrual basis.

2. Summary of significant accounting policies (continued)

(t) *Related parties*

For the purpose of these financial statements, parties are considered to be related to the Agency if the Agency has the ability, directly or indirectly, to control the party or exercise significant influence over the party in making financial and operating decisions, or vice versa, or where the Agency and the party are subject to common control or common significant influence. Related parties may be individuals or other entities.

The Agency is a statutory board under the purview of MEWR and is an entity related to the Government of Singapore. Accordingly, the Agency's related parties include Government-related entities such as Ministries, Organs of State and other Statutory Boards.

In accordance with Paragraph 28A of SB-FRS 24 *Related Party Disclosures*, the Agency is exempted from disclosing transactions with government-related entities other than Ministries, Organs of State and other Statutory Boards, unless there are circumstances to indicate that these transactions are unusual and their disclosure would be of interest to readers of the financial statements.

The Agency also applies the exemption in Paragraph 25 of SB-FRS 24 *Related Party Disclosures*. Required disclosures of transactions and outstanding balances with government-related entities are limited to the following information to enable users of the Agency's financial statements to understand the effect of the related party transactions on the financial statements:

- (i) the nature and amount of each individually significant transaction with Ministries, Organs of State and other Statutory Boards; and
- (ii) for other transactions with Ministries, Organs of State and other Statutory Boards that are collectively but not individually significant, a qualitative or quantitative indication of their extent.

3. Critical accounting estimates, assumptions and judgements

The preparation of the Agency's financial statements in conformity with SB-FRS requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses.

Estimates and underlying assumptions are reviewed on an ongoing basis and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. Revisions to accounting estimates are recognised in the period in which the estimates are revised and in any future periods affected. In particular, information about significant areas of critical judgements and estimation uncertainty in applying accounting policies that have the most significant effect on the amounts recognised in the financial statements are described below:

Provision for pensions and death gratuities

The Agency is required to pay pension benefits to pensionable officers and death gratuities to officers and daily rated employees transferred over to the Agency on 1 July 2002. The provision for pensions and death gratuities of the Agency as at 31 March 2018 was \$8,296,507 (31 March 2017 : \$11,084,344) as disclosed in Note 19. The provision has been computed based on certain assumptions and estimates as disclosed in Note 19. Revisions to the assumptions and estimates could affect the provision made.

Useful lives of property, plant and equipment

Property, plant and equipment are depreciated on a straight-line basis over their estimated useful lives. Management estimates the useful lives of these property, plant and equipment to be within 3 to 30 years. The carrying amount of the Agency's property, plant and equipment at 31 March 2018 was \$71,156,396 (31 March 2017 : \$65,986,110). Changes in the expected level of usage and technological developments could impact the economic useful lives and the residual values of these property, plant and equipment, therefore future depreciation charges could be revised (Note 15).

4. Management fees

The Agency has been appointed by the Housing Development Board ("HDB") on 1 April 2004 to manage, lease and maintain HDB markets and hawker centres in consideration of a management fee which represents the rental collected from the markets' and hawker centres' stallholders.

National Environment Agency

Notes to the Financial Statements For the financial year ended 31 March 2018

5. Staff costs

	Note	2017/2018 \$	2016/2017 \$
Wages and salaries		280,027,333	262,673,598
Employer's contribution to Central Provident Fund		36,229,171	33,306,947
Pension contributions and death gratuities	19	643,850	719,554
Other staff costs		12,116,035	12,078,022
		<u>329,016,389</u>	<u>308,778,121</u>

6. Maintenance, services and supplies

Included in maintenance, services and supplies were:

	2017/2018 \$	2016/2017 \$
Public area landscaping, cleaning services and supplies	125,266,877	123,646,983
Incineration services	92,199,130	91,160,678
Maintenance of specialised and industrial equipment	45,542,215	64,026,724
Maintenance of building, markets and hawker centres and office premises	41,627,336	41,369,450
IT services	33,632,999	31,651,316
Security and enforcement services	20,604,343	19,711,271
Industrial supplies	21,008,378	16,636,483
Vector control services	16,365,537	14,198,875
Table cleaning services	7,849,650	7,249,977
Utilities charges	<u>7,730,985</u>	<u>6,997,538</u>

7. Finance expense

	2017/2018 \$	2016/2017 \$
Interest expense on loan from Government	<u>358,074</u>	<u>498,739</u>

National Environment Agency

Notes to the Financial Statements For the financial year ended 31 March 2018

8. Other operating expenditure

Included in other operating expenditure were:

	2017/2018	2016/2017
	\$	\$
GST expense	21,146,750	20,333,439
Communication expense	7,805,720	6,780,898
Research costs	3,810,603	1,298,225
Plant and equipment expensed off	846,152	667,298

9. Government grants

	Note	2017/2018	2016/2017
		\$	\$
Operating grants		798,720,729	807,319,214
Deferred capital grants amortised	20	6,243	34,366
Other grants		7,705,558	7,311,480
		806,432,530	814,665,060

10. Contribution to the Consolidated Fund

The contribution is based on the prevailing statutory corporate income tax rate of 17% for the current financial year (2016/2017 : 17%).

The contribution to the Consolidated Fund was determined as follows:

	2017/2018	2016/2017
	\$	\$
Surplus before contribution to the Consolidated Fund	17,043,131	49,843,910
Contribution to the Consolidated Fund calculated at a tax rate of 17% (2016/2017 : 17%)	2,897,332	8,473,465

National Environment Agency

Notes to the Financial Statements For the financial year ended 31 March 2018

11. Cash and cash equivalents

	At 31 March 2018	At 31 March 2017
	\$	\$
Cash held with AGD - under CLM scheme	260,167,673	386,884,551
Cash held with AGD - under SBAF scheme	598,628,444	-
Cash held with AGD - others	3,647,641	5,131,142
Cash at banks	7,674,277	3,831,587
Cash on hand	1,400	1,600
	<u>870,119,435</u>	<u>395,848,880</u>

Included within the Cash held under Centralised Liquidity Management ("CLM") scheme is an amount of \$131,963,306 (2016/2017 : \$242,022,878) which relates to cash held under Sinking Fund for the purpose of renewal or replacement of property, plant and equipment. The Cash held under Statutory Board Approved Funds ("SBAF") scheme relates to an equity injection by MOF to fund the Integrated Waste Management Facility (Note 21). Under the SBAF scheme, the interest income generated under CLM scheme will accrue to the Government.

12. Trade and other receivables

	At 31 March 2018	At 31 March 2017
	\$	\$
Trade receivables	4,634,660	4,666,125
Less: Allowance for impairment of receivables	(562,385)	(578,459)
Trade receivables - net	<u>4,072,275</u>	<u>4,087,666</u>
Revenue to be collected on behalf of MEWR	24,077,329	23,024,994
Prepayments	6,485,308	4,135,923
Deposits	716,286	750,212
Interest receivables	1,988,965	2,776,923
Others	3,354,486	3,480,642
	<u>40,694,649</u>	<u>38,256,360</u>

Trade receivables are generally on 30 days (2016/2017 : 30 days) terms. They are recognised at their original invoice amounts which represent their fair values on initial recognition. All trade receivables are denominated in Singapore Dollars.

In determining the recoverability of a trade receivable, the Agency considers any change in the credit quality of the trade receivable from the date credit was initially granted up to the end of the reporting period. The concentration of credit risk is limited due to the customer base being large and unrelated. Accordingly, the management believes that there are no further credit allowances required in excess of the allowance for impairment of trade receivables.

National Environment Agency

Notes to the Financial Statements For the financial year ended 31 March 2018

12. Trade and other receivables (continued)

The movement in the related allowance for impairment was as follows:

	At 31 March 2018	At 31 March 2017
	\$	\$
Balance at beginning of financial year	578,459	464,151
Utilisation for the year	(165,748)	(106,361)
Allowance	149,674	220,669
Balance at end of financial year	562,385	578,459

Trade receivables that are individually determined to be impaired at the end of the financial year relate to debtors that are in significant financial difficulties and have defaulted on payments.

The age analysis of trade receivables past due but not impaired is as follows:

	At 31 March 2018	At 31 March 2017
	\$	\$
Past due < 3 months	496,165	640,548
Past due 3 to 6 months	115,611	128,186
Total	611,776	768,734

The collateral held by the Agency for trade receivables past due but not impaired is set out below:

	At 31 March 2018	At 31 March 2017
	\$	\$
Deposits received	755,831	582,089

National Environment Agency

Notes to the Financial Statements
For the financial year ended 31 March 2018

13. Held-for-trading investments

	At 31 March 2018	At 31 March 2017
	\$	\$
Held-for-trading investments at fair value:		
- Quoted investment fund	49,692,679	-
- Unquoted investment fund	69,456,612	-
	119,149,291	-

The investment funds offer the Agency the opportunity for return through fair value gains. The funds have no fixed maturity or coupon rate.

Fair value for the quoted investment fund is based on closing quoted market price on the last market day of the financial year.

The quoted and unquoted investment funds are in a diversified portfolios of various asset classes managed by professional fund managers awarded by Accountant-General's Department ("AGD") under the Demand Aggregation III Scheme.

14. Held-to-maturity financial asset

	At 31 March 2018	At 31 March 2017
	\$	\$
Quoted debt security, at amortised cost		
- Current (within 1 year)	-	-
- Non-current (more than 1 year)	10,000,000	-
	10,000,000	-

The held-to-maturity financial asset has a coupon rate of 2.303% per annum and matures in 5 years.

There were no disposals or allowance for impairment for held-to-maturity financial asset.

The held-to-maturity financial asset is denominated in Singapore dollars, the functional currency of the Agency.

National Environment Agency

Notes to the Financial Statements

For the financial year ended 31 March 2018

15. Property, plant and equipment

	Leasehold Land \$	Building and building improvements \$	Furniture and fittings, office equipment \$	Computer hardware and software \$	Motor vehicles \$	Plant and machinery \$	Tugs and barges \$	Construction- in-progress \$	Total \$
Cost									
At 1 April 2017	961,790	13,833,095	6,093,658	90,494,619	8,182,038	119,855,379	28,274,403	144,477	267,839,459
Additions	-	180,373	156,698	2,465,848	564,868	7,066,737	-	11,557,032	21,991,556
Disposals	-	(3,680)	(108,843)	(2,937,542)	(502,955)	(481,468)	-	-	(4,034,488)
Transfers	-	-	-	-	109,002	-	-	(109,002)	-
At 31 March 2018	961,790	14,009,788	6,141,513	90,022,925	8,352,953	126,440,648	28,274,403	11,592,507	285,796,527
Accumulated depreciation									
At 1 April 2017	256,477	9,528,134	5,184,618	75,781,515	3,949,861	87,978,149	19,174,595	-	201,853,349
Depreciation	32,060	302,064	497,325	8,302,711	787,187	5,561,572	1,299,973	-	16,782,892
Disposals	-	(3,680)	(106,771)	(2,926,375)	(500,166)	(459,118)	-	-	(3,996,110)
At 31 March 2018	288,537	9,826,518	5,575,172	81,157,851	4,236,882	93,080,603	20,474,568	-	214,640,131
Net book value									
At 31 March 2018	673,253	4,183,270	566,341	8,865,074	4,116,071	33,360,045	7,799,835	11,592,507	71,156,396
Cost									
At 1 April 2016	961,790	13,765,645	6,268,155	82,155,080	8,238,454	110,574,931	28,274,403	9,029,237	259,267,695
Additions	-	67,450	67,606	1,362,499	121,922	2,594,270	-	10,682,337	14,896,084
Disposals	-	-	(242,103)	(4,877,621)	(178,338)	(701,100)	-	(325,158)	(6,324,320)
Transfers	-	-	-	11,854,661	-	7,387,278	-	(19,241,939)	-
At 31 March 2017	961,790	13,833,095	6,093,658	90,494,619	8,182,038	119,855,379	28,274,403	144,477	267,839,459
Accumulated depreciation									
At 1 April 2016	224,418	9,131,011	4,745,260	67,543,553	3,370,755	83,522,444	17,874,623	-	186,412,064
Depreciation	32,059	397,123	674,683	13,110,598	757,443	5,136,485	1,299,972	-	21,408,363
Disposals	-	-	(235,325)	(4,872,636)	(178,337)	(680,780)	-	-	(5,967,078)
At 31 March 2017	256,477	9,528,134	5,184,618	75,781,515	3,949,861	87,978,149	19,174,595	-	201,853,349
Net book value									
At 31 March 2017	705,313	4,304,961	909,040	14,713,104	4,232,177	31,877,230	9,099,808	144,477	65,986,110

National Environment Agency

Notes to the Financial Statements
For the financial year ended 31 March 2018

16. Trade and other payables

	At 31 March 2018	At 31 March 2017
	\$	\$
Trade payables	53,850,024	56,216,434
Accruals	120,661,748	99,464,407
Accruals for property, plant and equipment	6,679,147	5,828,928
Deposits received	23,500,389	23,645,454
Grants received in advance	-	60,429
Advance payments received	2,247,923	2,102,666
Others	12,227	54,235
	<u>206,951,458</u>	<u>187,372,553</u>

Trade payables are non-interest bearing. Trade payables are usually settled on 30 days (2016/2017 : 30 days) term and are denominated in Singapore Dollars.

17. Payable to the Ministry of the Environment and Water Resources (MEWR)

	At 31 March 2018	At 31 March 2017
	\$	\$
Grant to be returned to MEWR	9,014,308	19,950,067
Payable to MEWR for revenue collected on behalf	28,173,297	23,346,755
Other receivable from MEWR	(447,883)	(37)
	<u>36,739,722</u>	<u>43,296,785</u>

For the financial year ended 31 March 2018, the Agency collected total Government revenue on behalf of MEWR amounting to \$372,008,351 (2016/2017 : \$354,815,339).

The amounts payable to MEWR are unsecured, interest-free and expected to be repaid within the next twelve months.

National Environment Agency

**Notes to the Financial Statements
For the financial year ended 31 March 2018**

18. Loan from Government (unsecured)

	At 31 March 2018	At 31 March 2017
	\$	\$
Amount repayable within one year	3,342,778	3,646,667
Amount repayable after one year	3,950,555	7,293,332
Loan from Government	<u>7,293,333</u>	<u>10,939,999</u>

The loan is repayable over a period of 15 years, commencing 1 April 2005, at a monthly instalment of \$303,889. The long term loan from Government has the following maturity:

	At 31 March 2018	At 31 March 2017
	\$	\$
Less than one year	3,342,778	3,646,667
Later than one year and not later than five years	3,950,555	7,293,332
Later than five years	-	-
	<u>7,293,333</u>	<u>10,939,999</u>

The interest rate of the loan from Government is fixed at 3.86% (2016/2017 : 3.86%) per annum until the maturity of the loan in 2020.

At the balance sheet date, the carrying amount of current portion of loan from government approximates its fair value.

The carrying amount and fair value of non-current portion of loan from government are as follows:

	Carrying amounts		Fair values	
	At 31 March 2018	At 31 March 2017	At 31 March 2018	At 31 March 2017
	\$	\$	\$	\$
Non-current portion of loan from Government	<u>3,950,555</u>	<u>7,293,332</u>	<u>3,915,819</u>	<u>7,265,031</u>

The fair value is determined using discounted cash flow analysis, using a discount rate based upon the borrowing rates which the Agency expect would be available to the Agency at the balance sheet date.

National Environment Agency

**Notes to the Financial Statements
For the financial year ended 31 March 2018**

19. Provision for pensions and death gratuities

	At 31 March 2018	At 31 March 2017
	\$	\$
Balance sheet obligations for:		
Pensions	8,204,486	10,998,270
Death gratuities	92,021	86,074
	<u>8,296,507</u>	<u>11,084,344</u>
Amount payable within one year	1,388,388	3,280,258
Amount payable after one year	6,908,119	7,804,086
	<u>8,296,507</u>	<u>11,084,344</u>
Statement of comprehensive income charge for:		
Pensions	637,903	702,103
Death gratuities	5,947	17,451
	<u>643,850</u>	<u>719,554</u>

The amounts recognised as expenditure were as follows:

	Note	2017/2018	2016/2017
		\$	\$
<u>Pensions</u>			
Current service cost		422,457	584,595
Interest cost		186,137	87,414
		<u>608,594</u>	<u>672,009</u>
<u>Death gratuities</u>			
Current service cost		4,531	15,679
Interest cost		1,416	1,772
		<u>5,947</u>	<u>17,451</u>
Total provision for the financial year - net		<u>614,541</u>	<u>689,460</u>
Pension charged directly to income or expenditure		<u>29,309</u>	<u>30,094</u>
Total included in staff costs	5	<u>643,850</u>	<u>719,554</u>

National Environment Agency**Notes to the Financial Statements
For the financial year ended 31 March 2018**

19. Provision for pensions and death gratuities (continued)

The amounts recognised in other comprehensive income were as follows:

	At 31 March 2018 \$	At 31 March 2017 \$
Actuarial loss arising from changes in demographic and financial assumptions used in determining the Agency's pensions obligations	-	1,367,274
Actuarial gain arising from changes in demographic and financial assumptions used in determining the Agency's death gratuities obligations	-	(197,503)
Net re-measurement loss on defined benefit plans, recognised in other comprehensive income	-	1,169,771

The movement in liability recognised in the balance sheet was as follows:

	At 31 March 2018 \$	At 31 March 2017 \$
Balance at beginning of financial year	11,084,344	10,576,887
Provision for the financial year - net	614,541	689,460
Net re-measurement loss on defined benefit plans	-	1,169,771
Less: Amount paid during the financial year	(3,402,378)	(1,351,774)
Balance at end of financial year	8,296,507	11,084,344

The Agency and the Singapore Government jointly finance the payment of gratuity, pension or allowance to pensionable officers at their retirement. The split of pension costs is determined based on the accumulated pensionable emoluments earned by the pensionable employee while he was in the government services as compared with his service with the Agency up to his retirement.

The proportion of pension benefits payable to pensionable officers prior to the establishment of the Agency on 1 July 2002, which is to be borne by the Government, is excluded from the amount stated above.

19. Provision for pensions and death gratuities (continued)

The cost of defined benefit pension plans and other post-employment medical benefits as well as the present value of the pension obligation are determined using actuarial valuations. The actuarial valuation involves making various assumptions. The principal assumptions used in determining pension and death gratuity benefit obligations for the defined benefit plans are shown below:

- (i) All pensionable and non-pensionable officers will retire at the age of 62.
- (ii) Pensionable officers are entitled to select one of the following state-managed pension schemes upon retirement:
 - (1) Annual pension payments;
 - (2) Reduced pension together with gratuity payment upon retirement; or
 - (3) Lump sum gratuity payment upon retirement.

Accrual for defined benefit pension obligations is made assuming that scheme (3) will be selected by these employees upon retirement based on the Agency's historical experience, and represents the present value of defined benefit pension obligations.

- (iii) The rate used to discount pensions and death gratuities obligations is 1.90% (2016/2017 : 1.90%) per annum.
- (iv) The expected rate of salary increases for pensionable officers, non-pensionable officers and daily rated employees is 3.00% per annum (2016/2017 : 3.00% per annum).
- (v) Assumptions regarding future mortality are based on published statistics and mortality tables.

The sensitivity analysis below has been determined based on reasonably possible changes of each significant assumption on the defined benefit obligations as of the end of the reporting period, assuming if all other assumptions were held constant:

		At 31 March 2018	
		Provision for pensions	Provision for death gratuities
	Increase/(decrease)	\$	\$
Discount rate	+25 basis points	8,098,648	91,414
	-25 basis points	8,313,605	92,638
Future salary increases	+25 basis points	8,362,832	94,653
	-25 basis points	8,046,139	89,380

National Environment Agency

**Notes to the Financial Statements
For the financial year ended 31 March 2018**

19. Provision for pensions and death gratuities (continued)

		At 31 March 2017	
		Provision for pensions	Provision for death gratuities
	Increase/(decrease)	\$	\$
Discount rate	+25 basis points	10,856,313	85,503
	-25 basis points	11,145,045	86,651
Future salary increases	+25 basis points	11,211,063	88,534
	-25 basis points	<u>10,786,389</u>	<u>83,604</u>

20. Deferred capital grants

	Note	At 31 March 2018	At 31 March 2017
		\$	\$
Balance at beginning of financial year		24,478	58,844
Less: Amortisation of deferred capital grants in income or expenditure	9	(6,243)	(34,366)
Balance at end of financial year		<u>18,235</u>	<u>24,478</u>

21. Share capital

	At 31 March 2018	At 31 March 2017	At 31 March 2018	At 31 March 2017
	Number of ordinary shares		\$	\$
Issued and paid up:				
At the beginning of the year	85,165,100	41,301,000	85,165,100	41,301,000
Issued for cash	-	43,864,100	-	43,864,100
Capital pending issuance	<u>600,570,811</u>	<u>-</u>	<u>600,570,811</u>	<u>-</u>
At the end of the year	<u>685,735,911</u>	<u>85,165,100</u>	<u>685,735,911</u>	<u>85,165,100</u>

The Agency's share capital comprise fully paid up ordinary shares which have no par value. Subsequent to the year end on 25 May 2018, the Agency issued shares of \$600,570,811 mainly to fund the Integrated Waste Management Facility (Note 11).

22. Dividend

On 27 February 2018, first and final dividend for FY2016/2017 of \$1,049,000 equivalent to 1.2317 cents per share was paid to the Government.

National Environment Agency

**Notes to the Financial Statements
For the financial year ended 31 March 2018**

23. Commitments

(a) Capital commitments

Capital expenditure contracted for at the balance sheet date but not recognised as liabilities in the financial statements are as follows:

	At 31 March 2018	At 31 March 2017
	\$	\$
Property, plant and equipment	<u>40,427,008</u>	<u>4,988,593</u>

(b) Operating lease commitments - as lessee

The Agency leases various offices, land and open space under non-cancellable operating lease agreements. The leases have varying lease terms and renewal rights.

	2017/2018	2016/2017
	\$	\$
Minimum lease payments under operating leases recognised as an expense in the year	<u>16,160,583</u>	<u>15,743,230</u>

The future minimum lease payable under non-cancellable operating leases contracted for at the balance sheet date but not recognised as liabilities in the financial statements, are as follows:

	At 31 March 2018	At 31 March 2017
	\$	\$
Not later than one year	10,342,792	14,478,242
Between one and five years	3,751,258	7,303,828
Later than five years	-	-
	<u>14,094,050</u>	<u>21,782,070</u>

(c) Incineration services commitments

The Agency has two incineration services agreements, for terms of between 15 to 25 years. In accordance to the agreements, the Agency pays monthly incineration service fees for the incineration and related maintenance services based on the services received. For the financial year ended 31 March 2018, the Agency incurred incineration service fees amounting to \$92,199,130 (2016/2017 : \$91,160,678).

National Environment Agency

Notes to the Financial Statements For the financial year ended 31 March 2018

23. Commitments (continued)

(d) *Other commitments*

Under the Whole Of Government (“WOG”) ICT infrastructure, Agencies are required to lease computer equipment and subscribe to a list of WOG ICT Infrastructure services under specific bulk tenders. The Agency pays monthly fees for WOG ICT Infrastructure services. For the financial year ended 31 March 2018, \$13,656,741 (2016/2017 : \$12,937,626) was recognised in the statement of comprehensive income for expenditure incurred under WOG. The other commitments at balance sheet date are as follows:

	At 31 March 2018	At 31 March 2017
	\$	\$
Not later than one year	8,403,592	4,045,738
Between one and five years	2,399,406	4,642,888
Later than five years	-	-
	<u>10,802,998</u>	<u>8,688,626</u>

24. Financial risk management

The Agency, in its normal course of operations, is exposed to a variety of financial risks: credit risk, liquidity risk, interest risk, price risk and capital risk.

(a) *Credit risk*

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to the Agency. The major classes of financial assets of the Agency are held-to-maturity financial assets, financial assets at fair value through profit or loss, bank deposits and trade receivables. The Agency limits its credit risk exposure in respect of investments by placing its funds only in statutory board bonds or with professional fund managers awarded by AGD under the Demand Aggregation III Scheme. The Agency limits its credit risk exposure in respect of investments by only investing in liquid funds that are regulated by the respective regulators of the jurisdictions in which the funds are domiciled.

Bank deposits are placed in banks and financial institutions which are regulated. The cash with AGD under Centralised Liquidity Management are placed with regulated financial institutions.

The Agency monitors the receivables from customers closely on an on-going basis and has policies in place to ensure the customers maintain sufficient deposits with them. The Agency is not exposed to credit risk for revenue to be collected on behalf of MEWR.

Financial assets that are neither past due nor impaired

Trade and other receivables that are neither past due nor impaired are with creditworthy debtors with good payment record. Cash and cash equivalents are placed with reputable financial institutions with high credit rating and no history of default.

National Environment Agency

Notes to the Financial Statements
For the financial year ended 31 March 2018

24. Financial risk management (continued)

(a) Credit risk (continued)

Financial assets that are either past due or impaired

Information regarding financial assets that are either past due or impaired is disclosed in Note 12.

Collaterals and other credit enhancements

During the financial year, the Agency took possession of collateral held as security as follows:

	At 31 March 2018	At 31 March 2017
	\$	\$
Deposits utilised	<u>371,834</u>	<u>385,251</u>

(b) Liquidity risk

Liquidity risk arises from the general funding of the Agency's operating activities. It includes the risk of not being able to fund operating activities at settlement dates and liquidate position in a timely manner. The Agency obtains its funding requirements from the Government through operating grants. The Agency also manages its liquidity risk by placing primarily its funds in deposits with AGD depending on its immediate cash requirements.

The table below analyses the maturity profile of the Agency's financial assets and liabilities based on contractual undiscounted repayment obligations.

	Less than 1 year \$	Between 1 and 5 years \$	Later than 5 years \$
At 31 March 2018			
Financial assets:			
Held-for-trading investments	119,149,291	-	-
Held-to-maturity financial asset	230,300	10,921,200	-
Cash and cash equivalents	870,119,435	-	-
Trade and other receivables	34,209,341	-	-
Total undiscounted financial assets	<u>1,023,708,367</u>	<u>10,921,200</u>	<u>-</u>
Financial liabilities:			
Trade and other payables	204,703,535	-	-
Loan from Government	3,547,042	4,040,090	-
Payable to MEWR	36,739,722	-	-
Total undiscounted financial liabilities	<u>244,990,299</u>	<u>4,040,090</u>	<u>-</u>
Total net undiscounted financial assets/(liabilities)	<u>778,718,068</u>	<u>6,881,110</u>	<u>-</u>

24. Financial risk management (continued)

(b) *Liquidity risk (continued)*

	Less than 1 year \$	Between 1 and 5 years \$	Later than 5 years \$
At 31 March 2017			
Financial assets:			
Cash and cash equivalents	395,848,880	-	-
Trade and other receivables	34,120,437	-	-
Total undiscounted financial assets	429,969,317	-	-
Financial liabilities:			
Trade and other payables	185,209,458	-	-
Loan from Government	4,004,740	7,587,132	-
Payable to MEWR	43,296,785	-	-
Total undiscounted financial liabilities	232,510,983	7,587,132	-
Total net undiscounted financial assets/(liabilities)	197,458,334	(7,587,132)	-

(c) *Interest rate risk*

Interest rate risk is the risk that the fair value or future cash flows of the Agency's financial instruments will fluctuate because of changes in market interest rates.

The Agency's exposure to interest rates relate mainly to the cash placed with reputable banks and financial institutions and deposits held with AGD. The interest rates for cash with AGD are based on deposit rates determined by the financial institutions with which the cash are deposited and are expected to move in tandem with market interest rate movements.

Interest rate sensitivity analysis has not been presented as management does not expect any reasonable changes in interest rates to have a material impact on the Agency's income.

(d) *Price risk*

Market price risk is the risk that the fair value or future cash flows of the Agency's financial instruments will fluctuate because of changes in market prices (other than interest or exchange rates). The Agency's exposure to changes in market prices relates primarily to unit trusts managed by professional fund managers awarded by AGD under the Demand Aggregation III Scheme.

24. Financial risk management (continued)

(d) Price risk (continued)

The Agency's objective is to manage and control market risk exposures within acceptable parameters, while optimising the return on risk. It is the Agency's policy to achieve an appropriate diversification in its investment portfolio in order to mitigate such risk.

At the reporting date, if market prices for the unit trusts investments had increased by 10%, assuming all other variables remain constant, the Agency's surplus for the year would increase by approximately \$11,914,929 (2016/2017: \$Nil). A decrease in 10% of the prices would have an equal but opposite effect.

(e) Capital risk

The Agency defines capital as share capital, accumulated surpluses and loan from Government.

The Agency's objective when managing capital is to ensure that it maintains sufficient capital to carry out its statutory functions. To achieve this, the Agency monitors "net operating surplus/deficit" and "debt-equity ratio". There were no changes in the Agency's approach to capital management during the year.

The Agency is not subject to any externally imposed capital requirements.

25. Fair value of assets and liabilities

(a) Fair value hierarchy

The Agency classifies fair value measurement using a fair value hierarchy that reflects the significance of the inputs used in making the measurements. The fair value hierarchy have the following levels:

- Level 1 - Quoted prices (unadjusted) in active markets for identical assets or liabilities that the Agency can access at the measurement date,
- Level 2 - Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e., as prices) or indirectly (i.e., derived from prices), and
- Level 3 - Inputs for the asset or liability that are not based on observable market data (unobservable inputs)

(b) Assets that are measured at fair value on recurring basis

Some of the Agency's financial assets are measured at fair value at the end of each reporting period. The following table gives information about how the fair values of these financial assets are determined (in particular, the valuation techniques(s) and inputs used).

Notes to the Financial Statements
For the financial year ended 31 March 2018

25. Fair value of assets and liabilities (continued)**(b) Assets that are measured at fair value on recurring basis**

Financial assets	Fair value as at		Fair value hierarchy	Valuation technique and key input
	31 March 2018	31 March 2017		
	\$	\$		
Unquoted investment fund	69,456,612	-	Level 2	Fair value is based on valuation provided by professional fund manager
Quoted investment fund	49,692,679	-	Level 2	Quoted market price on the last market day of the financial year

(c) Assets and liabilities not carried at fair value but for which fair value is disclosed

The following table shows an analysis of the Agency's assets and liabilities not measured at fair value but for which fair value is disclosed:

At 31 March 2018					
	Quoted prices in active markets for identical instruments (Level 1)	Significant observable inputs other than quoted prices (Level 2)	Significant un-observable inputs (Level 3)	Total	Carrying amount
	\$	\$	\$	\$	\$
Assets					
Held-to-maturity financial asset: Quoted debt security	-	9,968,700	-	9,968,700	10,000,000
Liabilities					
Non-current portion of loan from Government	-	3,915,819	-	3,915,819	3,950,555
At 31 March 2017					
	Quoted prices in active markets for identical instruments (Level 1)	Significant observable inputs other than quoted prices (Level 2)	Significant un-observable inputs (Level 3)	Total	Carrying amount
	\$	\$	\$	\$	\$
Liabilities					
Non-current portion of loan from Government	-	7,265,031	-	7,265,031	7,293,332

25. Fair value of assets and liabilities (continued)

(c) *Assets and liabilities not carried at fair value but for which fair value is disclosed (cont'd)*

The basis for determining fair value for level 2 above is disclosed in Note 14 and Note 18.

(d) *Fair value of financial instruments by classes that are not carried at fair value and whose carrying amounts are reasonable approximation of fair value*

Cash and cash equivalents, trade and other receivables, trade and other payables, payable to the Ministry of the Environment and Water Resources and current portion of loan from Government

The carrying amounts approximate fair values due to the relatively short-term maturity of these instruments.

(e) *Classification of financial assets/liabilities*

The carrying amounts of the Agency's financial instruments in each of the following categories are as follows:

	At 31 March 2018 \$	At 31 March 2017 \$
Held-for-trading investments	119,149,291	-
Held-to-maturity financial assets	10,000,000	-
Loans and receivables		
Cash and cash equivalents	870,119,435	395,848,880
Trade and other receivables	34,209,341	34,120,437
	<u>1,033,478,067</u>	<u>429,969,317</u>
Financial liabilities at amortised cost		
Trade and other payables	204,703,535	185,209,458
Payable to the Ministry of the Environment and Water Resources	36,739,722	43,296,785
Loan from Government	7,293,333	10,939,999
	<u>248,736,590</u>	<u>239,446,242</u>

National Environment Agency

Notes to the Financial Statements
For the financial year ended 31 March 2018

26. Related party transactions

(a) *Sale of goods and services*

In addition to the related party information disclosed elsewhere in the financial statements, the following are significant transactions between the Agency and related parties:

	2017/2018	2016/2017
	\$	\$
Meteorological services rendered to Ministries, Organs of State and other Statutory Boards	<u>16,816,624</u>	<u>16,256,862</u>

(b) *Compensation of key management personnel*

	2017/2018	2016/2017
	\$	\$
Salaries and other short term employee benefits	6,791,462	6,478,410
Employer's contribution to Central Provident Fund	265,575	269,146
Post-employment benefits - contribution to pension	<u>95,064</u>	<u>272,860</u>
	<u>7,152,101</u>	<u>7,020,416</u>

Included in the above are Board members' fees amounting to \$292,500 (2016/2017 : \$225,000).

27. Authorisation of financial statements

The financial statements of the Agency for the year ended 31 March 2018 were authorised for issue by the Board members of the Agency on 9 July 2018.



National
Environment
Agency

Safeguard • Nurture • Cherish

National Environment Agency
40 Scotts Road, #13-00
Environment Building
Singapore 228231

www.nea.gov.sg

