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## Vision

A clean environment, towards a liveable and sustainable Singapore

## Mission

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

## Roles

- Maintain high standards of public health
- Improve and sustain a clean environment
- Promote sustainability and resource efficiency
- Provide timely and reliable meteorological services
- Encourage a vibrant hawker culture

## Core Values

### **E**mpathy

Care for the safety and well-being of our people and stakeholders, and serve them with empathy

### **A**gility

Embrace change and innovation

### **R**esilience

Show courage and fortitude in the face of challenges

### **T**eamwork

Collaborate and co-create with our colleagues and stakeholders

### **H**eat for the Environment

Safeguard the environment with passion and inspire others to do the same

# Chairman's Foreword

Singapore has come a long way in our sustainability journey. 2022 was a significant milestone, with NEA marking 20 years of environmental stewardship, and our parent ministry celebrating its Golden Jubilee.

Together with the Ministry of Sustainability and the Environment, we have made significant progress towards our pursuit of a clean, liveable and sustainable Singapore. In the face of the pressing issue of climate change, we seek to reduce greenhouse gas emissions and enhance energy efficiency efforts in households, industries and the private sector.

We are committed to meeting our various international obligations, such as the United Nation's 2030 Agenda for Sustainable Development, and the Kigali Amendment to the Montreal Protocol. NEA has established Memoranda of Understanding (MOU) with several international offset programmes, in operationalising Article 6 of the Paris Agreement under the United Nations Framework Convention on Climate Change.

Guided by Singapore's public sector and national plan to achieve net zero emissions by 2045 and 2050 respectively, NEA signed a MOU with Keppel Seghers for a Joint Feasibility Study on carbon capture for waste-to-energy (WTE) facilities in Singapore, enabling WTE plants to achieve net zero emissions in their operations, and potentially net negative emissions. Our collaborations reflect continuous efforts in exploring innovative technologies to strengthen our commitments to global

sustainable development and climate mitigation efforts.

As we work towards a Zero Waste Nation, Parliament has approved several measures to reduce Singapore's priority waste streams under the Resource Sustainability (Amendment) Bill 2023. This includes the disposable carrier bag charge, beverage container return scheme, and food waste reporting framework. We are also developing the next generation of waste management infrastructure and capabilities. To extend Semakau Landfill's lifespan beyond 2030, we are exploring solutions for reusing incineration ash and non-incinerable waste, as well as landfill materials.

With the commencement of TuasOne, a more efficient WTE plant, the Tuas Incineration Plant was decommissioned in 2022. Since commencing operations in 1986, it has treated approximately 18 million tonnes of general waste. NEA is studying the possibility of using the site for other waste management facilities.

To help Singapore plan ahead and continually improve our climate mitigation and adaptation methods, NEA's Centre for Climate Research Singapore will be releasing its Third National Climate Change Study in the coming months, which will give climate projections for the coming century and its relevance to Singapore.

As we look to the years ahead, we remain committed to our mission and mandate. Together, we can create a more sustainable future.



# CEO's Message

Building a cleaner, more sustainable and better future for everyone in Singapore. This has been our mission as stewards of the environment since our founding just over 20 years ago. The work that we undertake is wide-ranging. In his foreword, Chuan Seng emphasised our contributions to tackling the climate crisis and closing the waste loop. Let me highlight a few other areas.

We stepped up mosquito inspections last year as we experienced a surge in dengue cases. We will continue to evolve our approach to vector control as we expand Project *Wolbachia*, which has shown much promise. Likewise, we have taken more rat control measures as we saw a slight uptick in the number of rat burrows detected. Additionally, to deter littering, we held Corrective Work Order sessions at city areas for the first time, and introduced a statutory presumption clause to further deter littering from residential flats.

Hawker centres are vital community spaces that we manage. Last year, we opened four new hawker centres and two replacement centres. Six are currently under construction. We supported our hawkers through COVID-19, and will continue to grow our hawker centres as vibrant community nodes. We will also continue to improve cleanliness at our hawker centres through the enforcement of used tray and crockery return.

On monitoring and better understanding of our environment, air quality in Singapore was comparable to previous years. To enhance surveillance of diseases, we adapted our COVID-19 wastewater testing capabilities to monitor other threats, including Zika. In the area of radiological and nuclear safety, we worked with other government agencies to strengthen our nuclear security sustainability plan, and with our regional counterparts to strengthen capability building in ASEAN.

Our efforts as stewards of the environment are greatly amplified by our many partners in the community and industry. We appreciate their contributions and encourage more to step forward. Our gratitude also goes to everyone for supporting and contributing to our initiatives, from recycling right to raising public toilet hygiene to preventing dengue.

As we commemorate our 20th anniversary, let me also acknowledge the dedication and commitment of our officers, some of whom have been with us since the beginning. We are committed to nurturing them, and to creating a conducive and safe workplace for them to grow in. Lastly, I thank my predecessor Luke Goh for his many contributions, and for his strong focus on people amidst the COVID-19 pandemic.



**Mr Wong Kang Jet**  
Chief Executive Officer

# Board of Directors



**Mr Lee Chuan Seng**  
Chairman,  
National Environment Agency



**Mr Ravinder Singh**  
Deputy Chairman,  
National Environment Agency  
Group Chief Operating Officer,  
Technology & Innovation  
President, Defence & Public Security  
Singapore Technologies Engineering Ltd  
*(till 31 March 2023)*



**Mr Luke Goh**  
Chief Executive Officer,  
National Environment Agency  
*(till 31 March 2023)*



**Mr Wong Kang Jet**  
Chief Executive Officer,  
National Environment Agency  
*(with effect from 1 April 2023)*



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



**Ms Sylvia Choo**  
Director, Unions, National Trades  
Union Congress  
Executive Secretary, Singapore  
Industrial and Services  
Employees' Union  
Co-General Manager, Tripartite  
Alliance for Dispute Management



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



**Mr Lim Eng Hwee**  
Chief Executive Officer,  
Urban Redevelopment Authority



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



**Ms Susan Chong**  
Chief Executive Officer,  
Greenpac (S) Pte Ltd



**Dr Andrew Khoo**  
Former Deputy Managing  
Director, Monetary Authority of  
Singapore



**Ms Janet Young**  
Managing Director & Group  
Head, Channels & Digitalisation,  
Strategic Communications &  
Brand, United Overseas Bank Ltd



**Mr Zia Zaman**  
General Manager, Corporate  
Business Development Asia,  
Microsoft



**Ms Jackie Chew**  
Chief Risk Officer,  
Prudential Assurance Company  
Singapore (Pte) Ltd  
*(till 31 March 2023)*



**Mr Bernard Choo**  
Editor, Shin Min Daily News,  
Singapore Press Holdings Media  
Trust  
*(till 31 March 2023)*



**Ms Fang Eu-Lin**  
Partner, Sustainability and  
Climate Change Practice  
Leader, PwC Singapore  
*(with effect from 1 April 2023)*



**Mr Walter Fernandez**  
Editor-in-Chief and Chief  
Sustainability Officer,  
Mediacorp Pte Ltd  
*(with effect from 1 April 2023)*

# Senior Leadership Team



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



**Mr Cheang Kok Chung**  
Deputy Director-General,  
Environmental Protection  
Group Director,  
Resource & Sustainability



**Mr Tony Teo**  
Group Director,  
Environmental Public Health  
Operations



**Mr Lim Yuin Chien**  
Group Director,  
Public Engagement



**Mr Wong Kang Jet**  
Chief Executive Officer



**Ms Koh Li-Na**  
Assistant Chief Executive,  
Meteorological Services and  
Radiation Protection



**Ms Tan Li Yen**  
Group Director,  
Clean Environment



**Mr Andrew Low**  
Group Director,  
Hawker Centres



**Mr Fong Peng Keong**  
Group Director,  
Public Health Services &  
Capabilities



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



**Ms Wong Chin Ling**  
Director-General,  
Meteorological Service



**Mr Tan Eng Kim Francis**  
Group Director,  
Corporate Services



**Mr Desmond Tan**  
Group Director,  
Infrastructure & Engineering



**Mr Ang Kok Kiat**  
Group Director,  
Radiation Protection &  
Nuclear Science



**Mr Ng Chun Pin**  
Deputy Chief Executive Officer,  
Planning, Corporate & Technology



**Mr Khoo Seow Poh**  
Senior Advisor



**Dr Ng Lee Ching**  
Group Director,  
Environmental Health Institute



**Mr S Satish Appoo**  
Group Director,  
Joint Operations & Technology



**Ms Ivy Ong Bee Luan**  
Group Director,  
Strategic Planning & Policy

# Corporate Governance

## BOARD

Appointed by the Minister for Sustainability and the Environment, the NEA Board provides strategic direction and oversight of organisational functions and goals, and steers NEA in fulfilling our vision and mission. In the Financial Year (FY) 2022, the Board comprised 14 members with diverse and extensive experience from both the private and public sectors, with competencies in areas such as sustainability, audit and finance, human resource, legal, industry, and strategic planning.

Led by Chairman Mr Lee Chuan Seng, the Board has set up committees to execute its responsibilities and ensure high standards of corporate governance. Board members serve in these committees according to their expertise and experience, and meet several times a year to examine the risks, challenges and opportunities in their specific areas of governance.

The Audit Committee reviews the annual accounts, audit plans, internal control systems, as well as risk and audit reports, with NEA's external and internal auditors. In FY2022, the Audit Committee was chaired by Ms Jackie Chew and comprised Ms Sylvia Choo, Mr Puah Kok Keong, Dr Andrew Khoo and Mr Bernard Choo. As of 1 April 2023, the Audit Committee is chaired by Dr Andrew Khoo and comprises Ms Sylvia Choo, Mr Puah Kok Keong and Mr Walter Fernandez.

The Human Resource Committee ensures an objective and fair performance management process in NEA. Chaired by NEA's Chairman, the Human Resource Committee comprises Deputy Chairman Mr Ravinder Singh (till 31 March 2023), Mr Lim Eng Hwee (till 31 March 2023), Mr Zia Zaman, and NEA's Chief Executive Officer (CEO).

The Finance Committee looks into matters related to the investment of surplus funds, cash and working capital management, and fundraising activities. Chaired by Mr Quek Suan Kiat, the Finance Committee comprises Mr Suhaimi Zainul-Abidin, Ms Susan Chong (till 31 March 2023), Ms Janet Young, and NEA's CEO.

Formed on 1 April 2023, the new Risk Committee oversees key risks, the risk management framework, and the measures undertaken to mitigate the key enterprise risks. Chaired by Mr Lim Eng Hwee, the Risk Committee comprises Ms Susan Chong, Ms Fang Eu-Lin and NEA's CEO.

The NEA Board is bound by a Code of Conduct, comprising five key principles:

- Work with the elected Government to serve the people of Singapore, and shape Singapore's future
- Uphold the integrity and reputation of the Public Service
- Ensure there is no conflict of interest between its official duties and personal interests
- Be fair and impartial in carrying out its responsibilities, and not be corrupt or seen to be so
- Exercise prudence in managing public resources

Board members are required to disclose their interests through annual declarations. In the event of any potential conflicts of interest, Board members do not take part in the deliberation of a transaction or project in which they may be directly or indirectly involved.

## SENIOR MANAGEMENT

NEA's senior management<sup>1</sup>, led by our CEO, is responsible for implementing the strategic direction of NEA's programmes, and nurturing a high-performance organisation committed to fulfilling NEA's environmental mission and roles. Members of senior management manage the financial, manpower and operational resources of their respective divisions and departments, and work together at committee meetings to guide NEA's continued performance in risk management, innovation and sustainability practices.

Senior management 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 senior management guides NEA in becoming more effective in our dual roles as regulator and champion for the environment. These efforts are aimed at improving how NEA is organised, leveraging technology and utilising resources, thereby enabling better results by working smarter and striving for organisational excellence.

The pay structure for senior management consists of fixed pay and variable pay. While the variable pay component is influenced by economic factors, it is directly linked to the individual's performance achievement. The ratio of variable pay to fixed pay for senior management is relatively higher as this drives performance, which is reviewed and assessed by the Human Resources Executive Committee. The Committee provides an objective and fair performance assessment, and approves the corresponding recommendation of performance bonuses and salary increments.

## AUDIT

NEA's accounts are audited annually by external auditors, approved by the Board and published with the Annual & Sustainability Report.

The external auditors are required to declare their state of independence to the Audit Committee prior to their appointment by the Minister for Sustainability and the Environment, in consultation with the Auditor-General. This provides the Board with reasonable assurance that NEA's financial statements are free from material misstatements. The audit is conducted in accordance with the audit plan presented to the Audit Committee, which also approves any significant non-audit services by the external auditors.

Other government agencies serve as external controls to reinforce ethical and responsible conduct within NEA. The Auditor-General's Office and Accountant-General's Department perform scheduled and ad hoc audits, to ensure that NEA continues to adhere to good governance practices.

NEA's Internal Audit Division evaluates the effectiveness of governance, risk management, and control processes within NEA. It provides independent, objective assurance and consulting services to improve NEA's operations.

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<sup>1</sup> For NEA's organisation chart, visit [www.nea.gov.sg/corporate-functions/who-we-are/people/organisation-chart](http://www.nea.gov.sg/corporate-functions/who-we-are/people/organisation-chart)

# Sustainability Governance

## GOVERNANCE STRUCTURE

Sustainability in NEA is driven by a governance structure, with senior management setting the sustainability direction.

All NEA Directors are appointed as Sustainability Champions to drive sustainability initiatives within their respective divisions. Each division also has an officer appointed as Eco-office Champion to support the Director in implementing the sustainability initiatives for the division.

Eco-office Champions play a crucial role in helping NEA to meet our sustainability goals. Apart from working closely with NEA's Sustainability Office to track and report the resource consumption performance of their premises, the Eco-office Champions also help to identify potential resource conservation measures, such as reducing electricity usage and water consumption.



# About the National Environment Agency

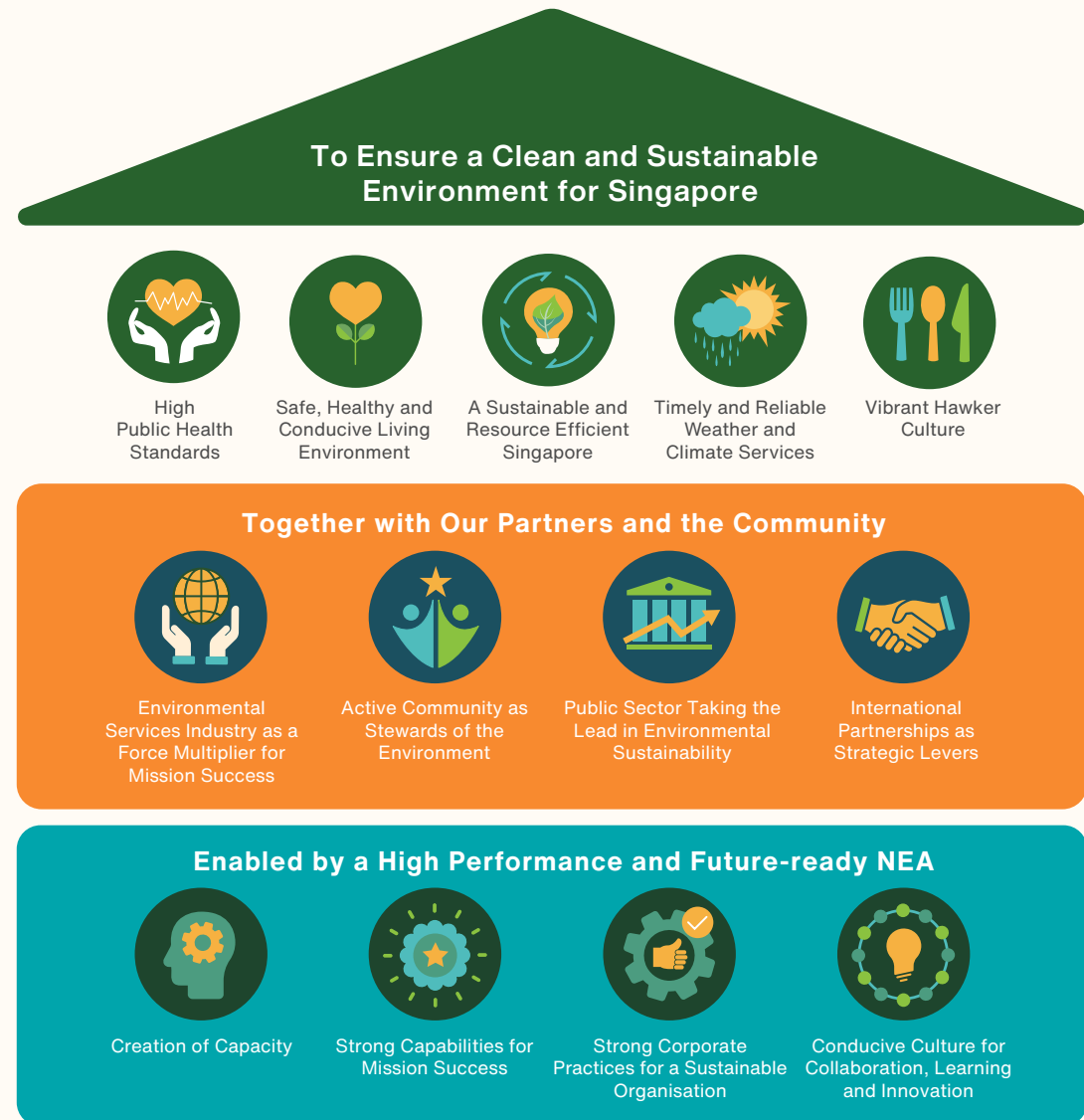
NEA was established on 1 July 2002 by the NEA Act 2002, as a statutory board under the Ministry of Sustainability and the Environment (MSE) of Singapore.

We are a member of these international sustainability associations:

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

Our work is highly diverse. As regulator and advocate for the environment, we strive to formulate clear policies and public initiatives that benefit Singapore's environment, economy and society in the long run.

NEA's strategies are outlined in the following diagram, to achieve our vision of a clean environment, towards a liveable and sustainable Singapore.



# Material Issues

NEA's material issues are reflected in our corporate key performance indicators (KPIs), which are reviewed and endorsed by the Board, and tracked within NEA. Refined every three years based on work priorities and critical areas, our material issues elaborate on the contributions and impact of our strategy, the stakeholders involved, and related risks and opportunities. This ensures alignment with the strategic objectives in our strategy map.

To make a positive impact on Singapore's environment, we work closely with our key stakeholder groups:



Public Sector Agencies






Schools and the General Public











Employees



Industry, Non-governmental Organisations (NGOs), and Partners

Material Issue	Impact (Positive and Negative)	Risks and Challenges	Opportunities
<b>High Public Health Standards</b>	Control of disease vector population; management of public cleanliness, environmental sanitation and hygiene; enforcement of smoking-prohibition laws; and provision of government after-death facilities and services, are necessary for maintaining high environmental public health standards vital to Singapore residents' quality of life  	<ul style="list-style-type: none"> <li>• Vector-borne disease outbreaks</li> </ul>	<ul style="list-style-type: none"> <li>• Use of data to understand epidemiology of diseases for temporal and spatial risk stratification</li> <li>• Leverage technology to enhance our operations and build capability in related areas of research</li> </ul>
<b>Safe, Healthy and Conducive Living Environment</b>	Monitoring, reducing and preventing environmental pollution, as well as incorporating environmental factors into land use planning, development and building control of new developments; are vital in ensuring a safe, healthy and conducive living environment  	<ul style="list-style-type: none"> <li>• Deterioration of ambient air quality</li> <li>• Deterioration of coastal and inland water quality</li> </ul>	<ul style="list-style-type: none"> <li>• Enhance capabilities in air and water quality monitoring and pollution source identification with technology</li> </ul>
<b>Sustainable and Resource Efficient Singapore</b>	Minimising waste generation and disposal, and increasing energy efficiency are vital, as these conserve resources and landfill space. Increasing energy efficiency also helps to reduce greenhouse gas (GHG) emissions and fight climate change  	<ul style="list-style-type: none"> <li>• Resource scarcity</li> <li>• Insufficient waste management capacity</li> <li>• Climate change</li> </ul>	<ul style="list-style-type: none"> <li>• Drive infrastructure enhancement, innovation and behavioural changes to achieve environmental sustainability</li> <li>• Gain public trust for our national policy by walking the talk</li> </ul>

Material Issue	Impact (Positive and Negative)	Risks and Challenges	Opportunities
<b>Timely and Reliable Weather and Climate Services</b>	Timely and reliable meteorological services are vital in providing valuable weather and climate services to support informed decision-making and planning 	<ul style="list-style-type: none"> <li>Severe weather conditions</li> </ul>	<ul style="list-style-type: none"> <li>Leverage technology to boost our capabilities in weather monitoring and forecasting</li> </ul>
<b>Vibrant Hawker Culture</b>	Hawker culture is part of our heritage. Hawker centres are community dining rooms, where people from all walks of life can enjoy affordable food in a clean and hygienic environment 	<ul style="list-style-type: none"> <li>Inability to meet the need for affordable cooked food options in a clean and hygienic environment</li> </ul>	<ul style="list-style-type: none"> <li>Build new hawker centres and rejuvenate existing ones</li> <li>Offer a variety of pathways for aspiring hawkers</li> </ul>
<b>Private Sector as Force Multipliers for Mission Success</b>	Environmental Services (ES) provide essential cleaning, waste management and pest management services, to keep Singapore clean and hygienic, and maintain low incidences of vector-borne diseases 	<ul style="list-style-type: none"> <li>Inability to meet increasing demand for ES</li> </ul>	<ul style="list-style-type: none"> <li>Transform the ES industry through the Environmental Services Industry Transformation Map, by helping the industry adopt technology to improve standards and service delivery, build a skilled and productive workforce, as well as grow and export their businesses</li> </ul>
<b>Active Community as Stewards of the Environment</b>	As NEA is a frontline agency with multiple public touchpoints, collaboration with stakeholders and public support are critical to mission success 	<ul style="list-style-type: none"> <li>Lack of environmental ownership</li> </ul>	<ul style="list-style-type: none"> <li>Work more closely with our partners to achieve environmental ownership</li> </ul>
<b>Public Sector Taking the Lead in Environmental Sustainability</b>	A Whole-of-Government (WOG) approach is essential to achieving a clean and sustainable Singapore 	<ul style="list-style-type: none"> <li>Resource scarcity</li> <li>Insufficient waste management capacity</li> <li>Climate change</li> </ul>	<ul style="list-style-type: none"> <li>Drive innovation and behavioural changes to achieve environmental sustainability</li> <li>Gain public trust for our national policies by walking the talk</li> </ul>
<b>International Partnerships as Strategic Levers</b>	International engagements and partnerships with strategic countries are vital in safeguarding and advancing Singapore's environmental interests in the global arena 	<ul style="list-style-type: none"> <li>Inability to fulfil NEA's obligations set out in environmental agreements</li> </ul>	<ul style="list-style-type: none"> <li>Increase in demand for clean energy, low-emissions transport, and sustainable urban solutions</li> </ul>

Material Issue	Impact (Positive and Negative)	Risks and Challenges	Opportunities
<b>Creation of Capacity</b>	Operational capacity is vital for service delivery and enforcement efforts, especially when we cover a wide range of issues, and have a heavy operational workload 	<ul style="list-style-type: none"> <li>Compromised data due to malicious activities against our IT systems and infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Deepen technical capabilities in key areas, to improve our services</li> <li>Simplify application and compliance processes of our regulations where feasible</li> </ul>
<b>Strong Capabilities for Mission Success</b>	Digitalisation and capability development are key pillars in meeting public sector transformation objectives 	<ul style="list-style-type: none"> <li>Inability to meet NEA's manpower requirements</li> </ul>	<ul style="list-style-type: none"> <li>Uncover new areas for collaboration and deployment of systems and services</li> <li>Improve productivity and forge a future-ready NEA</li> </ul>
<b>Strong Corporate Practices for a Sustainable Organisation</b>	Financial management and manpower management are vital in enabling effective and efficient operations, governance and development. Good procurement practices are vital in enabling fair, transparent, effective and efficient operations and governance 	<ul style="list-style-type: none"> <li>Any unmet rising public expectations</li> <li>Weak controls resulting in fraudulent practices</li> <li>Challenges in recruitment and retention of talent</li> <li>Instances of non-compliance with Workplace Safety and Health regulations or procedures</li> </ul>	<ul style="list-style-type: none"> <li>Spur accountability and resource optimisation</li> <li>Gain public's confidence in how NEA manages our finances as a government funded organisation</li> <li>Encourage strong corporate governance and risk management practices</li> <li>Gain public confidence that NEA uses our resources responsibly</li> <li>Enable a high-performance NEA by driving organisational productivity and growth, and strengthen our brand as an employer of choice</li> <li>Develop a stronger sense of identity and purpose among staff</li> <li>Develop a more engaged and socially responsible workforce that gives back to the community</li> </ul>
<b>Conducive Culture for Collaboration, Learning and Innovation</b>	A strong organisational culture is vital for a high performance and future-ready organisation 	<ul style="list-style-type: none"> <li>Teams work in silos, and data sharing is fragmented</li> </ul>	<ul style="list-style-type: none"> <li>Enable a high-performance NEA by driving organisational productivity and growth, and strengthen our brand positioning as an employer of choice</li> </ul>

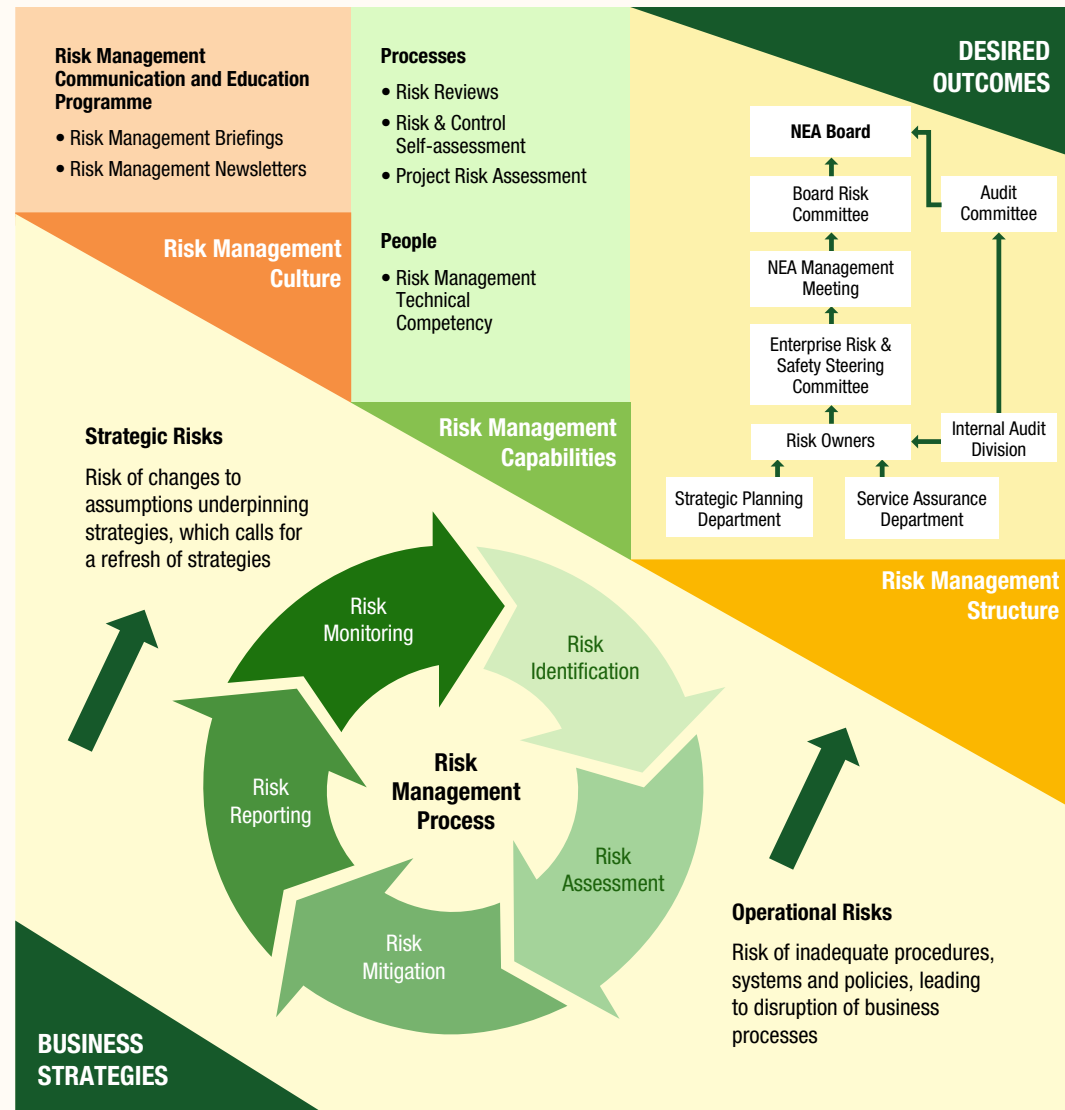
# Enterprise Risk Management Framework

Recognising the importance of effective risk management in enhancing corporate governance and strategic planning, we have established an Enterprise Risk Management (ERM) framework to manage risks and opportunities in a structured, integrated and effective manner.

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

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

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



In planning ERM activities, we are guided by an ERM framework that features three thrusts:

### **Robust Risk Management Governance Structure**

The Board Risk Committee assists the NEA Board to oversee enterprise risks faced by NEA. The Enterprise Risk and Safety Steering Committee (ERSSC) is responsible for driving overall ERM efforts in NEA. It reviews the effectiveness of these risk treatment plans, to ensure that enterprise risks are adequately addressed.

The ERSSC updates our CEO, Board Risk Committee and Board, on Tier 1 risks that NEA faces. Risk Work Groups are formed to comprehensively cover our work scope, which is aligned with NEA's structure and strategy map. Risk Owners are assigned the tasks of identifying, assessing, and monitoring key strategic and operational risks, and formulating treatment plans to mitigate those risks. As part of the risk management process, environmental scans are conducted on material issues that may impact the achievement of strategic objectives in the strategy map. Meanwhile, Process Owners provide risk content such as root causes, consequences and controls, as well as implement and monitor the risk treatment plans.

### **Proactive Risk Management Culture**

To strengthen our risk culture, NEA's risk communication and education programme includes briefings and newsletters to create greater awareness and understanding of risk management methodologies, tools and templates, and to communicate how staff can play a part in instilling risk management practices in their areas of work.

Risk Champions, who are nominated by their respective division or department heads to facilitate risk-related initiatives within their division or department, are given due recognition for their contributions in their staff appraisal.

### **Strong Risk Management Capabilities and Tools**

NEA constantly strengthens our risk management capabilities, which comprise processes and people. Processes such as risk reviews, project risk assessment, and risk and control self-assessment are in place, to ensure risk and control issues are proactively managed. Structured training programmes train our people in risk management tools, methodology and templates.

# ENSURING A CLEAN AND SUSTAINABLE ENVIRONMENT FOR SINGAPORE

## High Standards of Public Health

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

### KEEPING DENGUE AT BAY

In 2022, Singapore reported 32,173 dengue cases. While dengue is endemic in Singapore, our population immunity is low and will continue to be so, largely due to comprehensive dengue prevention and control measures over the years. Factors contributing to the surge in dengue cases include the high *Aedes aegypti* mosquito vector population, circulation of the previously uncommon Dengue virus serotype 3 (DENV-3), and the warm, rainy and humid weather.

NEA conducted about 914,000 mosquito inspections islandwide last year, and uncovered about 23,800 mosquito breeding habitats. At dengue cluster areas, about 66 per cent of *Aedes* mosquito breeding detected were in homes, 26 per cent in public areas, and three per cent at construction sites. During the same period, 15,900 enforcement actions were taken against owners of premises for mosquito breeding. About 1,100 fines and 129 Stop Work Orders were issued to construction sites, and 103 contractors were charged in court for repeat offences.<sup>2</sup>

We worked with the Inter-Agency Dengue Task Force (IADTF)<sup>3</sup> in the months before the traditional dengue peak season of May to October, to intensify mosquito control measures within the premises under their charge, and rally their employees and contractors to take action to stem dengue transmission.

As dengue cases since the start of 2023 have remained at a relatively high weekly baseline, and to avert another major dengue outbreak, the National Dengue Prevention campaign was brought forward to March 2023, to urge everyone to take urgent collective action to reduce mosquito breeding habitats. The campaign's tagline, 'Little but Lethal', emphasised the severe health consequences of an *Aedes* mosquito's bite.

The campaign ran on mass media channels and digital platforms to highlight the severe health consequences of dengue, and to urge the public to take action to prevent mosquito breeding habitats. Community partners and NEA volunteers supported with ground outreach activities, especially at dengue cluster areas and areas with high *Aedes aegypti* mosquito population, to share information and tips with residents on how to prevent mosquito breeding and protect against dengue. Partners also reached out to their networks to further raise awareness, by publicising dengue prevention messages on their digital communication platforms, frontline customer engagements, and point-of-sale materials at their retail stores.

### SUSTAINING RAT CONTROL EFFORTS

Rats have adapted well to our urban environment, where food sources are readily available. While the number of rat-borne diseases have remained low, NEA continuously monitors the rat population via a multi-pronged approach, comprising active surveillance and control, stakeholder engagement, enforcement, and research. Findings from our islandwide surveillance of rat burrows at public areas and bin infrastructures at HDB estates are shared with relevant stakeholders.

In 2022, about 4,200 burrows were detected in each bi-monthly inspection cycle, a slight uptick after two years of decline. Surveillance data collected were analysed to prioritise interventions. Managers of premises with rat issues were alerted and recommended rat management measures, such as enhancing refuse management, practising good housekeeping, sealing up potential rat entry points and rat culling, together with regular inspections and checks to monitor the situation. For rat hotspots, NEA and partner agencies stepped in to coordinate the rat control efforts by the stakeholders involved, for a holistic approach towards resolving rat issues.

We also embarked on a two-year trial using camera and sensors to obtain rat activity data at hawker centres and markets.

### EXPANDING ENVIRONMENTAL SANITATION

The environmental sanitation regime was expanded to include additional high-risk premises with vulnerable occupants, or premises with high footfall such as canteens, food

<sup>2</sup> Provisional data as of August 2023

<sup>3</sup> The IADTF comprises members from public agencies, Town Councils and associations from the facility management, construction and pest management industries

courts, specified shopping malls, and student care centres. An estimated 6,400 specified premises are expected to be on board the regime.

With shopping malls being large, complex and multi-tenanted, a specified shopping mall is required to appoint an Environmental Control Officer (Specified Premises) to supervise and coordinate with other stakeholders, to ensure the regime is implemented effectively. Such officers are trained in a diverse range of environmental issues to also facilitate the mall's compliance with other environmental laws. In August 2022, a Code of Practice was launched to guide the development and implementation of the regime in the mall, as well as to detail the roles and responsibilities of the Environmental Control Officer (Specified Premises) and the premises manager of specified shopping mall.

### ENHANCING DETERRENCE AGAINST HIGH-RISE LITTERING

In February 2023, the Environmental Public Health Act 1987 was amended to introduce a statutory presumption clause to enhance deterrence against littering from residential flats. This places greater onus on the registered owners or tenants to prevent the littering acts from being committed from their flats from 1 July 2023 onwards.

The registered owners or tenants can rebut this presumption within 14 days of being required to do so, by proving that they could not have been the offender.

### INCREASING VISIBILITY OF CORRECTIVE WORK ORDER SESSIONS

Corrective Work Orders (CWO) were introduced in 1992 to increase awareness of the impact of littering, and for recalcitrant littering offenders to experience the difficulties faced by cleaners. CWOs required offenders to clean public areas for a duration of up to 12 hours.

In November 2022, CWO sessions were held at city areas for the first time. This was done to further drive home the impact of littering, as everyone has a part to play in upholding high standards of cleanliness and public health in Singapore.

### SAFEGUARDING THE PUBLIC AGAINST SECONDHAND TOBACCO SMOKE

To further protect members of the public from the harmful effects of secondhand tobacco smoke, the smoking prohibition was extended from 1 July 2022 to all remaining public parks and gardens, Active, Beautiful, Clean Waters sites and 10 recreational beaches.

NEA, the National Parks Board, PUB, Singapore's National Water Agency (PUB), and Sentosa Development Corporation officers are authorised to take enforcement action for smoking offences at these newly prohibited places. Signages, posters, and banners on the new legislation were put up at these locations as additional reminders. Designated Smoking Areas have been provided in some larger regional parks and within the vicinity of three beaches at Sentosa.

## Safe, Healthy and Conducive Living Environment

**NEA enforces strict regulations in line with international standards to limit emissions, and implements various initiatives to monitor, prevent and mitigate environmental pollution. NEA plays a pivotal role to sustain a clean environment for all Singaporeans.**

### COMBATING AIR POLLUTION

Our waste-to-energy (WTE) plants and crematoria comply with Singapore's Environmental Protection and Management (Air Impurities) Regulations to manage their air emissions.

The design features incorporated into Tuas South Incineration Plant ensure that flue gas emissions, which are cleaned prior to release through the chimneys, meet regulatory limits. Efficient process control systems are in place to regulate the rate of air distribution and refuse feed. These ensure proper combustion in the furnace, leading to greater fuel efficiency and lower emissions.

NEA installed a telemetric monitoring system that continuously monitors air emissions from the plant. We also monitor air emissions from Mandai Crematorium, to ensure that emissions are kept within limits.

In FY2022, air emissions from the two facilities were within regulatory limits, and the facilities did not have any black smoke or air pollution incidents. We have an effective environmental management system, with processes and practices to boost operational efficiency and minimise environmental impact. We review our performance periodically to ensure alignment with our sustainability goals.

### Air Emissions

NEA's Facilities	Compounds (mg/Nm <sup>3</sup> )	FY20	FY21	FY22	Emission Limits <sup>4</sup>
Tuas South Incineration Plant	Dust	7.8	7.5	4.3	< 50
	SO <sub>2</sub>	83.3	92.1	125.9	< 1,700
	NO <sub>x</sub>	141.2	179.1	167.4	< 400
Mandai Crematorium	Dust	6.8	16.4	14.3	< 50
	SO <sub>2</sub>	7.7	0.2	13.4	< 1,700
	NO <sub>x</sub>	125.7	86.0	240.0	< 400
	HCl	0.5	98	36.4	< 200
	CO	< 0.1	5.0	5.0	< 250

### ENHANCING AIR QUALITY MONITORING

NEA continuously monitors the six criteria pollutants across Singapore through a network of ambient air monitoring systems, and provides hourly updates on air quality information on the NEA website and myENV app.

#### Air Quality

KPI	2020 Results	2021 Results	2022 Results	Targets <sup>5</sup>
PM <sub>2.5</sub> (annual mean)	11.0 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>	11.0 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>
PM <sub>2.5</sub> (24-hour mean, 99th percentile)	24.0 µg/m <sup>3</sup>	28.0 µg/m <sup>3</sup>	26.0 µg/m <sup>3</sup>	37.5 µg/m <sup>3</sup>
PM <sub>10</sub> (annual mean)	25.0 µg/m <sup>3</sup>	28.0 µg/m <sup>3</sup>	24.0 µg/m <sup>3</sup>	20.0 µg/m <sup>3</sup>
PM <sub>10</sub> (24-hour mean, 99th percentile)	43.0 µg/m <sup>3</sup>	51.0 µg/m <sup>3</sup>	51.0 µg/m <sup>3</sup>	50.0 µg/m <sup>3</sup>
SO <sub>2</sub> (24-hour mean, max)	30.0 µg/m <sup>3</sup>	89.0 µg/m <sup>3</sup>	37.0 µg/m <sup>3</sup>	50.0 µg/m <sup>3</sup>
O <sub>3</sub> (8-hour mean, max)	145.0 µg/m <sup>3</sup>	176.0 µg/m <sup>3</sup>	124.0 µg/m <sup>3</sup>	100.0 µg/m <sup>3</sup>
NO <sub>2</sub> (annual mean)	20 µg/m <sup>3</sup>	25.0 µg/m <sup>3</sup>	25.0 µg/m <sup>3</sup>	40.0 µg/m <sup>3</sup>
NO <sub>2</sub> (1-hour mean, max)	118.0 µg/m <sup>3</sup>	123.0 µg/m <sup>3</sup>	128.0 µg/m <sup>3</sup>	200.0 µg/m <sup>3</sup>
CO (8-hour mean, max)	1.2 mg/m <sup>3</sup>	1.2 mg/m <sup>3</sup>	1.7 mg/m <sup>3</sup>	10.0 mg/m <sup>3</sup>
CO (1-hour mean, max)	1.6 mg/m <sup>3</sup>	1.3 mg/m <sup>3</sup>	2.1 mg/m <sup>3</sup>	30.0 mg/m <sup>3</sup>

<sup>4</sup> 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

<sup>5</sup> The ambient air quality targets are currently being reviewed, taking into consideration the latest WHO Air Quality Guidelines

### ENCOURAGING CLEANER PASSENGER CARS AND TAXIS

The Vehicular Emissions Scheme was extended for three years, from 1 January 2023 to 31 December 2025, to encourage the purchase of cleaner cars with lower emissions. Tightened pollutant thresholds will be introduced from next year onwards, to make a clearer distinction between pure internal combustion engine cars, and cleaner alternatives such as hybrids and electric vehicles. The full switch to the Worldwide Harmonised Test Procedure for passenger cars, including taxis, will also take effect from 1 January 2024.

### MONITORING WATER DISCHARGE

The quality of effluent discharge from Tuas South Incineration Plant complies with the allowable limits under the Sewerage and Drainage Act (Chapter 294, Sections 72 and 74) and Sewerage and Drainage (Trade Effluent) Regulations by PUB.

#### Water Discharge

Amount of wastewater discharged (L)	FY20	FY21	FY22
Tuas South Incineration Plant	48,341,000	41,656,000	24,521,450

### PROTECTING THE HEALTH OF BEACHGOERS

We monitor the water quality of the seven popular recreational beaches in Singapore regularly, to assess the suitability of the beaches for primary contact activities – defined as activities where the whole body or face and trunk are frequently immersed, and it is likely that some water will be swallowed. These beaches are Changi Beach, East Coast Park Beach, Pasir Ris Beach, Punggol Beach, Seletar Island Beach, Sembawang Park Beach, and Sentosa Beach.

Since 2009, NEA has published the annual gradings of the beaches based on the World Health Organization (WHO) Guidelines (2003) for recreational water quality. In 2020, NEA introduced the Beach Short-term Water Quality Information, making it available on the NEA website, followed by the myENV app in 2022. This provides the public with weekly water quality assessments of the beaches, accompanied by health advisories and recommendations when participating in recreational water activities at the beaches.

## MANAGING RECALCITRANT CONSTRUCTION SITES

The no-work rule applies to construction worksites located within 150 metres of any hospital, home for the aged sick or residential building. With effect from 1 October 2022, errant contractors who violate the no-work rule are required to install electronic video surveillance systems besides incurring a financial penalty. The use of electronic video surveillance technology has enhanced NEA's operational effectiveness, by enabling our officers to monitor construction activities remotely without being physically present at the construction site, and to deter future violations of the no-work rule. As of 31 March 2023, NEA required contractors of 14 worksites that violated the no-work rule to install electronic video surveillance systems. Since then, there were no further violations of the no-work rule by these contractors.

# Sustainable and Resource Efficient Singapore

**With Singapore's limited land and dense urban population, effective and targeted management of our respective waste streams is key as we progress towards a Zero Waste Nation and circular economy, contributing to the Singapore Green Plan 2030.**

## SETTING TARGETS TO REDUCE AND RECYCLE

Under Singapore's Zero Waste Masterplan and the Singapore Green Plan 2030, we aim to increase the national overall recycling rate to 70 per cent, and to reduce waste-to-landfill per capita per day by 20 per cent by 2026 and 30 per cent by 2030. Achieving these targets will help to extend the lifespan of Singapore's only landfill beyond 2035.

We also have 2030 targets to increase the non-domestic recycling rate to 80 per cent and domestic recycling rate to 30 per cent.

## Waste and Recycling Targets

KPI	2020 Results <sup>6</sup>	2021 Results <sup>7</sup>	2022 Results <sup>8</sup>	Targets
Overall recycling rate	52%	55%	57%	70% by 2030
Domestic recycling rate	13%	13%	12%	30% by 2030
Non-domestic recycling rate	68%	70%	72%	80% by 2030
Domestic sector – waste disposed of per capita	0.8 kg a day/person	0.8 kg a day/person	0.8 kg a day/person	–
Non-domestic sector – waste disposed of per \$bn GDP	8.2 tonnes a day/GDP (\$bn)	8.7 tonnes a day/GDP (\$bn)	8.5 tonnes a day/GDP (\$bn)	–

## SEGREGATING, TREATING AND REPORTING FOOD WASTE

Under the Resource Sustainability Act (RSA), building managers and occupiers of prescribed buildings will be required to segregate and treat food waste. Building managers will also have to report the amount of food waste segregated for treatment. In addition to raising awareness of the amount of food waste generated, the food waste segregation for treatment and reporting framework nudges building managers to pursue waste minimisation opportunities.

Segregation for treatment and reporting requirements will commence from 2024 with new buildings, which are required to implement on-site food waste treatment solutions. Building managers of existing buildings have the option of implementing on-site food waste treatment solutions, or treating segregated food waste off-site.

To support the pursuit of innovative food waste treatment methods, such as processing food waste into higher value products, building managers of new buildings may – subject to NEA's approval – choose to treat their segregated food waste off-site. NEA's approval is also required, if occupiers of both new and existing buildings wish to pursue food waste segregation and treatment arrangements separate from those provided by the building managers.

<sup>6</sup> 2020 waste and recycling statistics were impacted by COVID-19, as overall waste generated and overall waste disposed of fell by 19 per cent and five per cent respectively as compared to 2019. For more details, visit [www.nea.gov.sg/media/news/news/index/reduction-in-overall-waste-generation-in-2020-with-less-waste-sent-to-semakau-landfill](http://www.nea.gov.sg/media/news/news/index/reduction-in-overall-waste-generation-in-2020-with-less-waste-sent-to-semakau-landfill)

<sup>7</sup> The resumption of economic activities and normalisation of business and social activities over 2021 led to a 10 per cent and 26 per cent increase in the amounts of waste disposed of and waste recycled respectively, as compared to 2020. In comparison to the pre-COVID-19 pandemic period in 2019, 2021 saw five per cent more waste disposed of and 11 per cent less waste recycled. For more details, visit [www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling](http://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling)

<sup>8</sup> In 2022 as the COVID-19 pandemic tapered off, the amount of waste generated in both the non-domestic and domestic sectors increased, as economic and social activities picked up. The overall recycling rate increased to 57 per cent in 2022, largely due to the increased amounts of construction and demolition waste that were generated and subsequently recycled, as a result of more demolition projects. For more details, visit [www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling](http://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling)

## MANAGING PACKAGING WASTE SUSTAINABLY

### Mandatory Packaging Reporting

Under the RSA, producers of packaged products, as well as retailers such as supermarkets, with an annual turnover of more than \$10 million are required to submit packaging data and 3R (reduce, reuse and recycle) plans to NEA annually. Companies submitted their inaugural reports in 2022; this raises their awareness of the amount of packaging used and the potential for packaging reduction.

To complement this, the Packaging Partnership Programme (PPP), an industry capability-building programme launched in 2021 by NEA and the Singapore Manufacturing Federation, supports companies in adopting sustainable packaging practices. The PPP initiatives have benefitted more than 1,200 companies through the exchange of best practices in sustainable packaging.

### Technical Reference 109 on Sustainable Packaging Guiding Framework and Practices

To equip producers of packaged products, as well as retailers, with industry best practices on sustainable packaging in Singapore, a new Technical Reference (TR) 109 on Sustainable Packaging Guiding Framework and Practices has been developed. This work was undertaken by a multi-stakeholder Working Group, appointed by the Singapore Standards Council, overseen by Enterprise Singapore.

Launched in October 2022, the TR 109 specifies guidelines, criteria, and best practices in implementing the 3Rs for business-to-business and business-to-consumer packaging, taking into consideration practices that are sustainable in Singapore's context. It covers the life cycle of packaging, starting upstream from packaging design to end-of-life management and is applicable across industries.

### Beverage Container Return Scheme

Under the beverage container return scheme, a refundable deposit of 10 cents will be applied to pre-packaged beverages in plastic and metal containers ranging from 150 mL to 3 L. Consumers can claim a full refund of the deposit by returning their empty beverage containers at designated return points, such as supermarkets. The scheme is scheduled to start on 1 April 2025 and after a three-month grace period, all beverages sold in containers covered under the scheme must be labelled, with deposits collected, when supplied in Singapore.

The scheme was a recommendation by the 2019 Citizens' Workgroup on Recycle Right. Subsequently, MSE and NEA conducted over two years of extensive engagement with the public and industry to co-develop a scheme suited to our local context. To solicit views from the public, NEA conducted a month-long public consultation on the proposed scheme in September 2022 via REACH<sup>9</sup>. The responses<sup>10</sup> were reviewed by MSE and NEA, to develop a suitable scheme for Singapore.

After consultations with the beverage industry, several beverage producers have expressed interest to jointly support the establishment of the Scheme Operator. MSE and NEA are continuing to engage industry players on the appointment of a suitable Scheme Operator.

## INTRODUCING THE DISPOSABLE CARRIER BAG CHARGE

The Resource Sustainability (Amendment) Bill was passed on 22 March 2023, to introduce – among other measures – a disposable carrier bag charge at supermarkets. From 3 July 2023, operators of Singapore Food Agency (SFA)-licensed supermarkets with an annual turnover of more than \$100 million, are required to charge at least five cents for each disposable carrier bag provided to customers at their physical stores. Covering about 400 supermarket outlets in Singapore, the charge serves as a behavioural nudge towards the more sustainable habit of using reusable bags and minimising the use of disposables.

MSE and NEA took into consideration the feedback from consultations with close to 6,000 stakeholders from industry and the public; this included a REACH public consultation on the disposable carrier bag charge, a summary of which was published in May 2022. To prepare the legislative framework and subsidiary legislation for the charge, NEA also engaged supermarket operators closely, to balance policy, regulatory, and operational considerations.

## CLOSING THE PLASTIC WASTE LOOP

Chemical recycling treats and converts plastic waste, such as contaminated single-use plastics, into higher value products such as pyrolysis oil, which can be used as feedstock to manufacture new plastics and chemicals.

NEA and Shell conducted a study to better understand the technical and commercial aspects of a chemical recycling value chain in Singapore. Concurrently, NEA embarked on a feasibility study for a Plastic Recovery Facility (PRF) to sort and recover plastic

<sup>9</sup> For more information on REACH (Reaching Everyone for Active Citizenry @ Home), visit [www.reach.gov.sg](http://www.reach.gov.sg)

<sup>10</sup> The findings, published in March 2023, are available at [go.gov.sg/nea-bcrs](http://go.gov.sg/nea-bcrs)

polymer types, such as Polyethylene and Polypropylene, which are suitable feedstock for chemical recycling. The study provided an understanding of the design, suitable waste management technologies and equipment, as well as site requirements and scalability potential for a PRF.

NEA has assessed the findings from both studies, and will call a Multi-Disciplinary Team consultancy tender to develop the PRF. NEA will also call a Request for Information to assess private sector interest in developing and operating the PRF.

### **CLOSING THE E-WASTE LOOP**

To ensure the proper collection and handling of electrical and electronic waste (e-waste), and the extraction of valuable resources from e-waste, NEA implemented the Extended Producer Responsibility scheme for e-waste management, with multiple collection avenues islandwide.

We worked with the Producer Responsibility Scheme Operator, appointed from 1 July 2021 to 30 June 2026, to increase the number of collection points and raise awareness of e-waste recycling. In the second compliance year that commenced in July 2022, more than 6,000 tonnes of e-waste had been collected. To date, there are close to 800 collection points at convenient locations, such as community centres, shopping centres, large electronic retail outlets, and government buildings.

### **ENHANCING THE ENERGY EFFICIENCY FUND**

The Energy Efficiency Fund (E2F) aims to help manufacturing companies, including small and medium-sized enterprises (SMEs), improve energy efficiency. On 1 April 2022, NEA enhanced the E2F by raising the grant support cap from 50 per cent to 70 per cent of qualifying costs. This further lowers the barrier for manufacturing SMEs to adopt energy efficient technologies and reduce their energy costs and carbon emissions. The grant application and disbursement process was also simplified to save both time and costs for applicants. In addition, NEA worked with the Singapore Institute of Technology's Energy Efficiency Technology Centre to offer affordable energy assessments for SMEs.

### **REDUCING HYDROFLUOROCARBONS CONSUMPTION**

Singapore will phase down the consumption of hydrofluorocarbons by 80 per cent over the next two decades, to meet obligations under the Kigali Amendment to the Montreal Protocol.

NEA's regulatory measures to restrict the supply of Refrigeration and Air-conditioning (RAC) equipment that use high Global Warming Potential (GWP) refrigerants took effect in October 2022. Servicing works on water-cooled chillers that involve high GWP refrigerant handling must be supervised or carried out by at least one certified technician. To prevent refrigerant venting, spent refrigerant recovered from decommissioned RAC equipment must be sent to a Toxic Waste Collector for reclamation or destruction. E-waste recyclers that accept household RAC equipment are also prohibited from venting spent refrigerant.

### **COLLABORATING TO IMPROVE WASTE-TO-ENERGY CAPABILITIES**

The NEA-Keppel Seghers MOU for a Joint Feasibility Study on carbon capture for WTE facilities in Singapore was signed on 7 July 2022. This collaboration reflects Singapore's continuous efforts in exploring innovative technologies to strengthen its commitments to global sustainable development and climate mitigation efforts. These include the United Nations' 2030 Agenda for Sustainable Development, the Paris Agreement, and Singapore's public sector and national plan to achieve net zero emissions by 2045 and 2050 respectively.

In addition to considerable volume reduction and energy recovery, WTE plants have been contributing significantly to the avoidance of methane emissions as compared to direct landfilling. To further reduce environmental impact and improve resource recovery, carbon capture technology seeks to capture carbon dioxide emissions from the WTE process for storage and utilisation. If proven viable, carbon capture at WTE plants can potentially lead to a reduction in the overall carbon footprint of solid waste treatment in Singapore.

## Providing Timely and Reliable Weather and Climate Services

**Situated one degree north of the equator, Singapore's tropical climate presents its own unique set of environmental challenges. To prepare for the effects of climate change, NEA's Meteorological Service Singapore (MSS) provides reliable and responsive weather and climate services, towards greater public safety and a climate-resilient economy.**

### COLLABORATING TO ENHANCE FORECASTING CAPABILITIES

NEA and Australia's Bureau of Meteorology (the Bureau) signed a Strategic Relationship Arrangement in 2022, to embark on a multi-year collaboration programme on weather and climate research in Singapore and the wider Southeast Asian and Indo-Pacific regions. MSS and the Bureau will undertake research in key areas, such as very-short-range weather forecasting – known as nowcasting – using advanced weather radar data, seasonal prediction, and analysis of regional climate projections data. These research initiatives will contribute to improved prediction of heavy rainfall in Singapore, improved guidance on emerging seasonal climate trends in the region, as well as enhanced understanding of future regional climate change through the sharing and development of novel climate data analysis tools. Outcomes of the joint research will help MSS and the Bureau deliver enhanced forecast and warning services for decision-making, as well as guide climate change adaptation plans.

### SUPERCHARGING CLIMATE SCIENCE TECHNOLOGIES

NEA's new supercomputer, Utama, was commissioned in August 2022. Housed at the Centre for Climate Research Singapore (CCRS), this new supercomputer has 98 compute nodes and a peak performance of 400 teraflops. The computation capacity of CCRS has doubled, as compared to our previous supercomputer. The new system enables MSS' in-house 'SINGV' numerical weather prediction system to be significantly upgraded to include new capabilities and enhanced features, such as the new 'uSINGV' capability – designed to capture Singapore's complex urban environment on high resolution; and a new coupled model 'cSINGV' that allows for interactions between the land, atmosphere and ocean to be captured.

### LEVERAGING SATELLITE DATA TO ADVANCE MONITORING SERVICES

NEA and the Singapore Land Authority (SLA) signed a MOU in 2022, to develop the use of Global Navigation Satellite System (GNSS) data obtained from SLA's Singapore Satellite Reference Network (SiReNT), to enable us to better monitor islandwide atmospheric moisture. Meteorological observations are vital for forecasting weather, monitoring climate, and producing timely warnings of hazardous weather events. The five-year collaboration is aimed at providing MSS with additional observational data for weather monitoring, as well as facilitating exploratory studies in weather forecasting.

Our GNSS reference station will be integrated into SiReNT, and will enable MSS to obtain islandwide, continuous and near real-time atmospheric moisture readings. This non-conventional moisture data will augment data from our existing observation network, providing higher resolution and more frequent observation data, which allows for investigative studies into potential applications for weather forecasting.

### DRIVING CLIMATE IMPACT SCIENCE RESEARCH

Organised by the World Climate Research Programme (WCRP) and supported by MSS, the WCRP Sea Level Conference 2022 was held from 12 to 16 July 2022. The conference provided a platform for sharing on the present status and future of climate-related sea-level research, alongside a strong focus on the application of sea-level science for adaptation and stakeholder needs. It brought together climate scientists, adaptation practitioners and policymakers, to reflect on the latest Intergovernmental Panel on Climate Change (IPCC) findings, and to envision the future of climate research and adaptation, facilitating robust conversations between these communities that will inform efforts to bridge science and society.

The Climate Impact Science Research Programme was launched at the event, providing \$23.5 million of research funding into key knowledge gaps on climate impact, to better understand the multifaceted effects of climate change on our society and way of life in Singapore. It will focus on five key priority areas – sea level rise; water resource and flood management; biodiversity and food security; human health and energy; and cross-cutting research to bridge science-policy translation. CCRS will work closely with stakeholders to strengthen and build local research capabilities in climate impact science, in alignment with our national needs and priorities.

By adopting a multi-pronged research approach in partnership with public and private entities, research institutes, and institutes of higher learning, this programme will expand the breadth and depth of our knowledge on climate change impacts, allowing us to better understand the imminent challenges and formulate effective adaptation measures.

# Vibrant Hawker Culture

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

## BUILDING NEW HAWKER CENTRES

With close to 120 hawker centres in Singapore, patrons have access to a good mix of affordable cooked food options. These include four new hawker centres that were opened in 2022 at Sengkang (Fernvale), Punggol (One Punggol), Bukit Panjang North (Senja) and Sembawang (Bukit Canberra); and two replacement hawker centres – Market Street Hawker Centre and Margaret Drive Hawker Centre.

Upcoming hawker centres are located at Sengkang (Anchorvale Village), Bidadari (Woodleigh Village), Punggol (Punggol Digital District), Bukit Batok West, Choa Chu Kang (Town Centre and Yew Tee), and Tampines North. A new hawker centre at Sengkang (Buangkok) and the refreshed Jurong West Hawker Centre are slated to commence operations in 2023.

### New Hawker Centres – Under Construction

- Woodleigh Village Hawker Centre, Bidadari
  - BCA Green Mark Gold<sup>PLUS</sup>
- Anchorvale Village Hawker Centre, Sengkang
  - BCA Green Mark Platinum
- Bukit Batok West Hawker Centre
  - BCA Green Mark Gold (target)
  - BCA Universal Design Mark Gold (target)
- Punggol Digital District Hawker Centre
  - BCA Green Mark Platinum (target)
  - BCA Universal Design Mark Platinum (target)
- Yew Tee Hawker Centre, Choa Chu Kang
  - BCA Green Mark Platinum + Super Low Energy (target)
  - BCA Universal Design Mark Platinum (target)

### New Hawker Centres – Completed Construction

- Fernvale Hawker Centre & Market
  - BCA Green Mark Platinum
  - BCA Universal Design Excellence Award
- One Punggol Hawker Centre
  - BCA Green Mark Platinum
  - BCA Universal Design (Platinum)
- Senja Hawker Centre, Bukit Panjang North
  - BCA Green Mark Platinum
  - BCA Universal Design Mark Gold (Design)
- Bukit Canberra Hawker Centre, Sembawang
  - BCA Green Mark Platinum
  - BCA Universal Design Mark Gold<sup>PLUS</sup> (Design)
- Buangkok Hawker Centre, Sengkang
  - BCA Green Mark Gold<sup>PLUS</sup>
  - BCA Universal Design Mark Gold<sup>PLUS</sup> (Design)

### Replacement Hawker Centres – Under Construction

- Telok Blangah Hawker Centre and Market
  - BCA Green Mark Platinum
  - Replaces Telok Blangah Drive Market & Food Centre

### Replacement Hawker Centres – Completed Construction

- Market Street Hawker Centre
  - BCA Green Mark Platinum
  - BCA Universal Design Mark Gold<sup>PLUS</sup> (Design)
- Margaret Drive Hawker Centre
  - BCA Green Mark certified
  - Replaces Commonwealth Drive Food Centre

# TOGETHER WITH OUR PARTNERS AND THE COMMUNITY

## Environmental Services Industry as a Force Multiplier for Mission Success

Singapore's commitment to environmental sustainability and economic growth is reflected in the Environmental Services Industry Transformation Map (ES ITM) developed by NEA. We form strategic partnerships with our stakeholders and spearhead impactful projects to advance our technological aspirations for the industry, as well as uplift its workforce and improve productivity.

### TRANSFORMING THE ENVIRONMENTAL SERVICES INDUSTRY

The ES ITM has led to good outcomes for the industry since its introduction in 2017. Together with tripartite partners, NEA launched key initiatives, such as the Regulatory Sandbox, INCUBATE (Innovating and Curating Better Automation and Technologies for Environmental Services) Programme, NEA-Industry Scholarship, and Outcome-based Contracting for cleaning services.

On 16 January 2023, NEA unveiled the refreshed ES ITM 2025 to chart the next bound of industry transformation. The ES ITM 2025 focuses on accelerating efforts to strengthen innovation, improve productivity, and create quality jobs, through:

- Intensifying innovation and technology adoption to improve productivity and moderate manpower demand
- Nurturing promising firms to seize new opportunities and growth areas
- Growing productive firms to enhance service delivery, capacity and resilience
- Creating quality jobs and improving job prospects for lower-wage and senior workers

### USING ROBOTICS IN ENVIRONMENTAL SOLUTIONS

Launched alongside the ES ITM, the Environmental Robotics Programme was developed as part of NEA's strategy to leverage robotics technology to transform the industry and create higher-value jobs. We are developing robotic solutions for the cleaning of public spaces, waste management, as well as inspection, monitoring and sampling functions.

NEA, together with the National Robotics Programme office, has supported the Singapore University of Technology and Design to develop an autonomous pavement sweeping robot – Panthera. This project aims to alleviate manpower challenges faced by the industry, and if successful, would pave the way towards the development of a command-and-control system that enables the cleaning workforce to manage fleets of cleaning robots remotely. Aside from reaping benefits in productivity and manpower savings, upskilling the workforce could attract more Singaporeans to join the industry, thus reducing the reliance on foreign manpower.

### UPLIFTING EMPLOYMENT OUTCOMES OF LOWER-WAGE WORKERS

Progressive wages are expected to cover up to 94 per cent of full-time lower-wage workers in Singapore by 2023.

In January 2022, the Tripartite Cluster for Waste Management Industry released its recommendations to implement a new Progressive Wage Model (PWM) for the waste management industry. The recommendations outlined wage, skills and job progression ladders to further boost the productivity and careers of new and existing waste management workers.

The Government accepted the recommendations and introduced the Waste Management PWM, which took effect on 1 July 2023. It aims to increase the wages of up to 3,000 resident workers in the Waste Collection and Materials Recovery sub-sectors, by ensuring sustained wage increases, clear training requirements, and career progression pathways.

# Active Community as Stewards of the Environment

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

## EMPOWERING HOUSEHOLDS TO RECYCLE RIGHT

The Recycle Right campaign aims to reduce the contamination rate in the blue recycling bins and chutes, by improving the public's knowledge of what can and cannot be recycled. In 2022, NEA introduced Bloobin, a recycling mascot to educate the public to recycle correctly.

NEA also launched the Bloobox initiative to encourage households to start a recycling corner at home. From 19 March to 30 April 2023, all residential households in Singapore could collect a Bloobox from vending machines located islandwide. Labels were printed on the Bloobox to help households identify recyclable items.

To inculcate in students the habit of recycling in school and at home, NEA partnered the Ministry of Education to distribute the Bloobox to interested schools, including primary and secondary schools, and junior colleges. As part of the Recycle Right campaign, NEA worked with our stakeholders to promote the use of the Bloobox, through community events at locations such as libraries and shopping malls.

## COLLECTIVE CAMPAIGNING TO REDUCE WASTE

NEA's 'Say YES to Waste Less' campaign aims to bring waste to the forefront, and highlight how everyone can lead a sustainable lifestyle and play their part to reduce waste by using reusables, and buying and ordering just enough.

In February 2023, close to 200 partners across various sectors pledged support for the campaign, where they introduced initiatives and conducted outreach activities to reduce disposables and food wastage. The initiatives illustrated how organisations from any industry and sector, regardless of their size, can contribute to a sustainable Singapore.

In addition to partners' initiatives, campaign messages were shared through multiple touchpoints including digital and social media platforms, as well as on-ground engagements with the community and schools.

## RAISING AWARENESS OF PUBLIC TOILET HYGIENE

NEA's Clean Public Toilets campaign aimed to raise public awareness on keeping public toilets clean, and to promote the four key 'clean toilet' actions of 'Flush, Clean, Bin, Dry'. In 2022, the campaign was launched with an engaging escape-room theme ground activation. The campaign was further publicised over free-to-air television, out-of-home, digital and social media platforms. Posters and stickers were installed in public toilets at hawker centres, coffeeshops, beaches, parks, petrol kiosks and community centres, to remind public toilet users to practise the four good toilet behaviours. We also worked with relevant stakeholders and partners, such as the Restroom Association Singapore, Lazada Singapore, Sport Singapore, Grassroots Organisations, NEA volunteers, schools, as well as NGOs and interest groups, to amplify campaign messages through their channels and networks, galvanise community spirit, and encourage users to practise good toilet behaviour.

## CULTIVATING YOUNG ENVIRONMENTAL LEADERS

NEA held the inaugural Youth Environment Leaders Immersion Programme at the CleanEnviro Summit Singapore 2022, to provide learning and networking opportunities for youth leaders. Attended by 60 youths, the event was part of NEA's national Youth for Environmental Sustainability movement, which provides a robust and well-rounded platform for youths to develop environmental leadership capabilities.

During the event, the youths toured the Environment Expo to learn more about the environmental services industry and career options available. They also exhibited their sustainability projects, and discussed key issues on zero waste, green citizenry and sustainability during a Fireside Chat with the Minister for Sustainability and the Environment.

## ENGAGING THE PUBLIC THROUGH DIALOGUES

The Forward Singapore – Public Cleanliness Conversations was a series of dialogues held in March 2023, aimed at engaging the public on the challenges faced by the cleaning industry, the importance of pro-social behaviours related to public cleanliness, and what each sector – individuals, government, businesses, and community – could do to contribute towards the future of public cleanliness in Singapore.

About 150 people attended both dialogues, including representatives from cleaning companies, volunteers, students, and members of the public through open public registrations. The panellists discussed challenges faced by the cleaning industry, digitalisation, the use of automation to attract and retain talent, and how the public could play a part in maintaining a clean environment.

Audience members resonated with the panellists' call to uplift the cleaning industry and give greater recognition and appreciation to cleaning jobs. There was also consensus that Singapore could not depend on cleaners and cleaning technology alone to upkeep our public cleanliness, and audience members committed to doing more on a personal basis. Overall, the Forward Singapore – Public Cleanliness Conversations was a success in engaging the public on the importance of public cleanliness and the role that each sector could play in contributing towards a cleaner Singapore.

## Public Sector Taking the Lead in Environmental Sustainability

**Public agencies in Singapore often come together to coordinate operations, share expertise and resources, and collaborate in inter-agency committees and task forces. To harness this synergy, NEA partners fellow public agencies in programmes to drive sustainability across the public sector.**

### INTENSIFYING ENFORCEMENT CHECKS AGAINST ERRANT VEHICLES

Reducing vehicle exhaust and noise emissions helps to achieve and sustain a clean and healthy living environment in Singapore. All vehicles, including foreign-registered vehicles entering Singapore, must comply with stipulated emissions requirements, such as Singapore's exhaust and noise emission standards under the Environmental Protection and Management (Vehicular Emissions) Regulations. As part of a multi-agency effort to remind motorists to adhere to our environmental and road safety regulations, NEA, the Land Transport Authority (LTA), and the Singapore Police Force (SPF) carried out several joint enforcement blitzes in FY2022. A total of 60 enforcement actions were taken against errant motorists for vehicular emissions offences at these enforcement blitzes.

### ENGAGING AGENCIES ON INDUSTRY PRACTICES

NEA participated in the Singapore Chemical Industry Council (SCIC) – Joint Agencies Dialogue Session together with the Ministry of Manpower (MOM), Singapore Civil Defence Force (SCDF) and SPF on 1 November 2022. The dialogue session, organised by SCIC, was attended by representatives from the respective agencies and industry stakeholders.

The joint dialogue session serves as a platform for the chemical industry and regulators to effectively engage one another on issues relating to workplace safety, fire safety and environmental areas. NEA presented two topics relating to sustainable management of packaging waste and good industry practices on hazardous waste management at the dialogue session.

## International Partnerships as Strategic Levers

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

### ESTABLISHING INTERNATIONAL CARBON OFFSETTING PROGRAMMES

In operationalising Article 6 of the Paris Agreement, which governs international cooperation on climate change mitigation through carbon markets and other cooperative approaches, NEA has established MOUs with several international offset programmes (IOPs) from July 2022 to March 2023. These are Gold Standard, Verra, Global Carbon Council, American Carbon Registry, and the Architecture for REDD+ Transactions – internationally recognised programmes accepted by the Carbon Offsetting and Reduction Scheme for International Aviation.

The MOUs will facilitate the use of high-quality international carbon credits by taxable companies regulated under the Carbon Pricing Act. Companies can acquire the carbon credits from these IOPs to offset up to five per cent of their taxable emissions from 2024, if they meet Singapore's environmental integrity criteria that will be released in 2023.

## STRENGTHENING EMERGENCY PREPAREDNESS AND RESPONSE IN RADIATION MONITORING AND MODELLING

NEA has been operating a 40-station ambient radiation monitoring network with high data availability of more than 95 per cent to support baseline measurement of radiation levels and provide early warning of elevated radiation levels in Singapore. NEA also participated in the European Commission – ASEAN project in ‘Establishing an Early Warning Radiation Monitoring Network and Regional Data Exchange Platform’ between 2020 to 2023 to enhance ambient radiation monitoring and data sharing in the ASEAN region. High availability and accurate radiation monitoring in the ambient environment is important as it provides valuable information during emergency response and decontamination operations.

Another key aspect in supporting Emergency Preparedness and Response during incidents is to understand the dispersion patterns of radiation plumes to provide information for decision making to safeguard public health and safety. NEA is a member of the Accident Reporting and Guiding Operational System User Group, an international group of peer governmental agencies, which aims to exchange technical knowledge and sharpen skills in performing radiological impact assessment during emergencies. NEA also participated in the European Commission – ASEAN regional project on ‘Enhancing Emergency Preparedness and Response in ASEAN: Technical Support for Decision Making’ between 2018 to 2022 to build a customised decision support system for Singapore’s use and to better understand ASEAN countries’ radiological emergency protocols through table-top exercises.

The capabilities and knowledge gained in radiological impact assessment and plume dispersion modelling have supported WOG contingency planning.

## FORTIFYING NUCLEAR SECURITY AND SAFEGUARDS

NEA reviewed existing nuclear security related requirements and initiatives with the relevant government agencies, to develop Singapore’s Integrated Nuclear Security Sustainability Plan (INSSP). It provides a systematic and comprehensive approach to strengthen the nuclear security regime in six functional areas: legislative and regulatory framework, threat and risk assessment, physical protection regime, detection of material out of regulatory control, response to nuclear security events, and sustaining a nuclear security regime. The INSSP identifies and prioritises all nuclear security needs, and provides a customised framework for coordinating and implementing nuclear security activities within Singapore. It was finalised after a meeting with the International Atomic Energy Agency (IAEA), held in Singapore from 24 to 27 May 2022.

To strengthen the international non-proliferation regime, NEA shared our experiences in implementing nuclear safeguards at several international and regional platforms, such as an international webinar in July 2022 to assist other countries in designating a state authority for safeguards, and a regional workshop in September 2022 to assist other countries in safeguards implementation. Under the IAEA’s programmatic capacity-building support framework for countries, we also assisted a country in the development of a customised manual for safeguards implementation in 2022.

## LEADING ASEAN TO BUILD RADIOLOGICAL AND NUCLEAR SAFETY CAPABILITIES

Five dedicated ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM) Technical Working Groups (TWGs) were formed in 2021:

- Radiation Monitoring (RM)
- Hazard Assessment and Radiological Dispersion Modelling (HARDM)
- Emergency Preparedness and Response
- Radiological and Nuclear Security (RNS)
- Public Emergency Communications

Singapore co-leads the first two TWGs, and supports the other three. Their objective is to develop a long-term structured approach for capability development, design future programmes and projects, sustain the momentum of cooperation, and build expertise and networks within ASEAN.

At the 9th ASEANTOM meeting in 2022, the 10-year roadmaps for TWG-HARDM, TWG-RM, and TWG-RNS were endorsed. They focus on longer-term goals such as resourcing, project enhancements, and capability building, to ensure sustainability of the technical capabilities, systems and infrastructure built within ASEAN.

NEA led the development of the TWG-RM and TWG-HARDM roadmaps, and spearheaded the planning of activities and projects in radiation monitoring and modelling operations in ASEAN. This is to ensure the long-term sustainability of operations and maintenance of the Early Warning Radiation Monitoring Network and ASEAN Radiological Data Exchange Platform, established under the European Commission-ASEAN project, as well as upkeep the region’s technical competency in plume dispersion modelling.

## FOSTERING INTERNATIONAL EXCHANGES TOWARDS SUSTAINABLE CITIES

Since its inception in 2012, the biennial CleanEnviro Summit Singapore has served as a global networking platform for thought leaders, industry captains and policy makers. Held from 17 to 21 April 2022, the fifth edition of the event was built on the theme, 'Towards Sustainable and Climate-Resilient Cities', and explored solutions in the Environment Expo in five key areas: Waste as a Resource, Sustainable Energy, Enhanced Hygiene Standards, Effective Pest Management, and Pollution Control.

Delegates from around the world gathered in Singapore to address environmental challenges and discuss the pressing and pertinent climate issues that cities face, as well as solutions such as promoting circular economy frameworks, adopting climate-resilient policies, safeguarding public health standards, and building successful partnerships to bring about immediate climate action.

## BUILDING INTERNATIONAL CAPABILITIES FOR DISEASE CONTROL

NEA is dedicated to the control of vector-borne, airborne, and environmental-borne diseases, globally.

Scientists from NEA's Environmental Health Institute (EHI) hold 20 international expert and adjunct academic appointments in various domains in environmental public health. These appointments enabled our scientists to contribute to various platforms, such as chairing the WHO Working Group on Global Arbovirus Initiatives, as well as developing the WHO Zika Virus Research and Development (R&D) Roadmap and the American Society of Heating, Refrigerating and Air-Conditioning Engineers ventilation standards and guidelines. EHI scientists were also invited to speak at various international meetings, symposiums and conferences, including the fifth Asia Dengue Summit, the Rockefeller Foundation's World Health Assembly Reception, and the Global Health Security Conference.

As a testimony to NEA's contributions and strong partnership, EHI was re-designated as a WHO Collaborating Centre for Reference and Research of Arbovirus and their Associated Vectors from 2023 to 2027. EHI and IAEA also co-hosted two training sessions for participants from 11 IAEA Member States, on the development of Sterile Insect Technique programmes in 2022. These reinforce EHI's status as a centre of excellence for the control of vector-borne diseases internationally.

## LEADING ASEAN TALKS ON CHEMICALS AND WASTE

Singapore, represented by NEA, took on the chairmanship of the ASEAN Working Group on Chemicals and Waste from 2020 to 2022.

During our chairmanship, NEA stewarded capacity-building initiatives on Basel Convention for ASEAN Member States, as well as led and collaborated with ASEAN Member States to develop the ASEAN Joint Statement on Chemical and Waste for the Basel, Rotterdam and Stockholm (BRS) Conventions. The development of the Joint Statement allowed ASEAN Member States to register their shared interests and concerns on hazardous waste and chemicals at the BRS Conference of the Parties (COPs), and raise ASEAN's profile at these platforms. The endorsed Joint Statement was published on the 2021/2022 BRS COPs meeting intranet, with key elements incorporated into the Asia and the Pacific Regional Statement.

## ENHANCING REGIONAL COOPERATION IN PEATLAND MANAGEMENT

Singapore, represented by NEA, chaired and hosted the seventh Meeting of the ASEAN Task Force on Peatlands and its Associated Meetings from 6 to 8 September 2022. The Meeting was attended by the ASEAN Member States, the ASEAN Secretariat, and the ASEAN Peatland Partners community. It discussed opportunities to enhance regional cooperation in sustainable peatland management, which has an essential role in preventing transboundary haze pollution, reducing GHG emissions, and in incentivising climate action.

## FOSTERING BILATERAL TIES VIRTUALLY

With the lifting of restrictions to international travel by most countries, NEA started to re-engage our foreign counterparts through physical exchanges of visits, while also continuing our engagements through virtual platforms where necessary. These initiatives included institutionalised meetings, workshops and training programmes, as well as ad-hoc professional and technical exchanges of information. Through these efforts, we continued to deepen our bilateral cooperation on environmental matters with key partners, including Brunei Darussalam, China, Denmark, Japan, Republic of Korea, Malaysia, the Netherlands, and the United States of America.

# ENABLED BY A HIGH PERFORMANCE AND FUTURE-READY NEA

## Creation of Capacity

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

### MAINTAINING HIGH PROFICIENCY IN RADIOACTIVITY MONITORING

NEA's National Radiochemistry Laboratory continued to show high proficiency in conducting accurate and precise laboratory analysis, in the IAEA Worldwide and ALMERA (Analytical Laboratories for the Measurement of Environmental Radioactivity) Proficiency Tests over the past five consecutive years. Given the niche area and small nucleus of radiochemists in Singapore, we recognised the need to consolidate resources and build competency in this area.

NEA champions the Community of Practice for Radiochemistry Laboratories in Singapore, comprising members from the Home Team Science and Technology Agency, PUB, and SFA. In 2022, it performed several cross-agency work activities to harmonise test methodologies, and advance the technical knowledge and competency in radiochemistry. This competency buildup and harmonisation across agencies will come in useful during times of crisis, when the laboratories could be activated at short notice to help in sample analysis.

### SAFEGUARDING HEALTH AND SAFETY OF RADIATION WORKERS

We provide personal dose monitoring to monitor workers' and licensees' occupational dose exposure and ensure that the occupational exposure is below the regulatory limits for the safety of radiation workers. In October 2022, NEA expanded our personal dose monitoring service to include two new services, neutron and extremities dose monitoring. These services ensure that the occupational radiation exposure of medical professionals and researchers in new and advanced methods of cancer treatment in Singapore, such as in proton beam therapy and the handling of radioactive medical isotopes, is monitored accurately and timely. This way, the work is carried out safely and prevents occupational overdose.

## ENHANCING NATIONAL REGULATORY INFRASTRUCTURE FOR RADIATION SAFETY

NEA reviewed our national regulatory infrastructure for radiation safety, against the IAEA safety standards and international practices. A self-assessment was completed which identified opportunities for continuous improvement. The outcome of the self-assessment was shared with an international team of 12 senior regulatory experts and three IAEA staff members, during the first Integrated Regulatory Review Service (IRRS) mission to Singapore from 10 to 19 October 2022, conducted at Singapore's request. Using IAEA safety standards and international good practices, IRRS missions are designed to strengthen the effectiveness of the national regulatory infrastructure while recognising the responsibility of each country to ensure radiation safety. The IRRS team identified a number of areas of good performance that could serve as a model of implementation for other countries. These include Singapore's active participation in IAEA initiatives and technical committees, and regional and global networks and associations, related to radiation safety, despite its limited scope of licensable activities; as well as NEA's transparent regulatory activities supported by Singapore's modern information and communications technology infrastructure. In addition, the IRRS team gave recommendations and suggestions to improve the regulatory system and the effectiveness of the regulatory functions in line with IAEA safety standards.

On 16 September 2022, Singapore pledged its support to two supplementary guidance documents to the IAEA Code of Conduct for the Safety and Security of Radioactive Sources, namely the Guidance on the Import and Export of Radioactive Sources, and the Guidance on the Management of Disused Radioactive Sources. The pledge was done after having a) assessed the readiness to implement the supplementary guidance documents, b) enhanced the regulatory measures and processes, and c) developed a National Policy and Strategy for Radioactive Waste Management. In addition, NEA revised the Radiation Protection (Ionising Radiation) Regulations to align with international standards and practices, and to streamline the licensing regime to reduce administrative burden on licensees. The revised regulations came into operation on 20 February 2023.

At the WHO International Advisory Committee meeting on Non-Ionising Radiation held from 7 to 9 June 2022, NEA shared Singapore's efforts to raise awareness on health risks and promote safe use of ultraviolet-C (UVC) sterilisers, through publication of an advisory on the use of UVC devices in the home, and safety guidelines for the use of UVC devices in commercial or industrial settings, and the work with major retailers to remove unsafe UVC devices in the market.

## **ADOPTING A MORE SUSTAINABLE MODEL TO MANAGE MARINE OIL SPILLS**

NEA manages the landward clean-up operations in the event of marine oil spills. Previously, we procured the consumables for response, and engaged a contractor to provide storage and deployment. This was financially and environmentally unsustainable, as the consumables had to be discarded upon expiry.

We switched to a new and more sustainable model in September 2022, where we engaged the services of an oil spill management contractor to tap on the contractor's stockpile of equipment and consumables, and then pay them on a per-use basis. This results in significant cost savings over four years, and also generates less waste.

## **RAISING STANDARDS AND PROFESSIONALISM OF CLEANING BUSINESSES**

On 9 January 2023, it was announced that the current licensing scheme will be revised as part of overall efforts to drive capabilities and raise public health standards of cleaning businesses.

The revised cleaning business licensing framework will take effect on 1 January 2024, after taking into consideration the industry's request for more time to meet the new requirements. The current cleaning business licensing and the voluntary Enhanced Clean Mark Accreditation Scheme will be merged into a single framework.

The revised framework will differentiate cleaning businesses through tiered requirements into three classes of licences with a two-year validity. Service buyers will be able to make better informed decisions when procuring cleaning services. To attain the highest Class 1 licence, cleaning businesses will have to ensure that cleaners are trained in additional competencies. The business must also have a good track record and be equipped with more resources, to provide greater assurance on their ability to undertake larger cleaning contracts.

## **BOOSTING OPERATIONAL EFFICIENCY ACROSS NEA**

The Integrated Operations Management System was conceptualised to integrate operations planning and management across NEA departments, achieve greater synergy, and complement NEA's current Integrated Field Operations System. The deployment of best-fit technology optimises manpower usage to achieve operational efficiency, which in turn supports NEA's ground operations.

Through the pilot system implementation in July 2022, NEA has verified the technological solution to enable better situational awareness, aid in resource forecasting, provide early warning in resource contention, and support pre-emptive resource deployment. Full-scale development is underway following the pilot's conclusion, to automate manual processes and standardise operational regimes for public cleanliness operations. The system is expected to go live in September 2023, with progressive rollout to other operational areas.

## **RE-ENGINEERING DIGITAL INFRASTRUCTURE**

In November 2018, the Government's 'Cloud First' policy was announced, requiring agencies to migrate all their systems classified 'restricted and below' to Cloud in the following five years by 31 December 2023. The policy is a key initiative of the Government's re-engineering of digital infrastructure to deliver better, faster and more cost-effective digital services to citizens and businesses. GovTech implemented Government Commercial Cloud (GCC) to facilitate migration of systems to commercial cloud. The benefits of GCC include the ability to monitor cloud hosting charges to view monthly costs, identify areas of optimisation such as under-utilised resources, unused resources as well as to identify any non-compliance, and remediate in a timely manner.

NEA has implemented 22 systems in GCC and commercial cloud, with another 13 systems in the pipeline by May 2024. On average, we have achieved 30 per cent savings in hosting costs after migrating systems to commercial cloud.

## **IMPROVING DEATH REGISTRATION SERVICES FOR CITIZENS**

The streamlined death registration process is part of the WOG's digital transformation and continuous efforts to integrate and improve the delivery of services to citizens. The death registration process was digitalised to significantly ease the administrative burden of post-death matters on bereaved family members.

Under this initiative, the death registration process, including post-death matters, was simplified through the issuance of digital death certificates in place of physical certificates. Next-of-kin of the deceased will be able to conveniently download and store the digital certificates on their personal mobile devices and laptops. With the digital death certificate, next-of-kin, the public, and appointed funeral directors can apply for the 'Permit to Bury/Cremate' seamlessly via the NEA ePortal.

We worked closely with relevant government agencies to ensure all systems and processes were developed in sync to support the launch of the digital death registration on 29 May 2022. Extensive briefings and trainings to internal staff and funeral directors were conducted to familiarise them on the enhanced procedures.

### DRIVING INNOVATION EXCELLENCE IN NEA

To cultivate and sustain an innovation-driven culture, NEA has an innovation framework based on the tenets of organisation development and behavioural sciences. The framework pulls together six levers to drive innovation excellence for value creation.



### INSPIRING INNOVATION FOR CONTINUOUS IMPROVEMENT

Encouraging innovation is our way of inspiring staff to keep thinking out of the box. In FY2022, 27 NEA innovation awards were presented to recognise individuals and project teams for their innovative spirit and solutions.

NEA received three awards at the International Convention on Quality Control Circles 2022 – two Golds and one Silver, for the development of a wastewater aliquoting valence machine, creation of a new operation model to better tackle the issue of high-rise littering and the innovations to reduce processing time for Electric Works orders. These awards affirm our commitment to innovation and reflect our innovation-driven culture.

In cultivating the spirit of innovation within NEA, we have various initiatives and a strong community of InNEAvators to sustain the momentum of continuous improvement:

- Million Hours Challenge Portal, for the submission of improvement projects
- Crowdsourcing Challenges
- Ideathons
- InNEAvation Scoreboard, where the best performing divisions will win incentives
- Innovation and Collaboration Fund

#### The InNEAvation Scoreboard Matrix

#	Item	Score
1	Organised a crowdsourcing programme	10 points per internal session 15 points per external session (capped at 50 points)
2	Completion of improvement projects	10 points per project, for projects within the division 15 points per division, for cross-division projects
3	Completion of project, trial or pilot with innovation seed funding	10 points for NEA-funded projects 15 points for MSE-funded projects 20 points for projects funded by the WOG Public Service Transformation budget
4	Contributed to an innovation feature or sharing	5 points for internal feature or sharing at organisational level 10 points for external feature or sharing (capped at 5 projects or topics)
5	Won an innovation award	10 points per internal award 20 points per external award

## Strong Capabilities for Mission Success

To harness data analytics effectively, NEA works in tandem with a network of relevant partners to advance our capabilities through R&D. Continuously improving our internal capabilities allows us to respond swiftly and effectively in today's complex environment. With the aim of optimising regulations, and strengthening our collective science, technology and engineering resources, we strive to ensure win-win solutions for all stakeholders. NEA is also committed to optimising operational efficiency and delivering citizen-centric services through digitalisation.

### SUPPRESSING DENGUE WITH *WOLBACHIA* TECHNOLOGY

Project *Wolbachia* – Singapore involves using *Wolbachia* technology as a novel tool, and complements conventional dengue control measures. Since April 2022, NEA has achieved full coverage of male *Wolbachia-Aedes* releases in whole of Tampines and Yishun, parts of Choa Chu Kang and Bukit Batok HDB towns, and the Marine Parade landed residential estate. By September 2022, the project expanded to eight additional sites, resulting in a total coverage of about 30 per cent of all HDB blocks and nine per cent of landed residential areas, and benefitting over one million residents. Thus far, we have observed up to 98 per cent suppression of the *Aedes aegypti* mosquito population, and up to 88 per cent fewer dengue cases in sites with at least one year of *Wolbachia-Aedes* mosquito releases. NEA will continue to collaborate with commercial partners to innovate and develop engineering solutions to scale up *Wolbachia-Aedes* mosquito production and release capacity. The use of *Wolbachia* technology will continue to be evaluated rigorously, to refine deployment strategies and allow for cost-effective expansion in the next few years.

### STEPPING UP PREVENTIVE MEASURES EARLY

As early as end-2021, NEA raised the alert on the high potential for a dengue outbreak in 2022, to inform operational preparedness. This annual assessment is based on forecast models and other data on the dengue situation, such as population immunity, circulating serotype, and mosquito population. The early warning, together with tiered operation

response plans in response to reported case numbers, proved useful when cases indeed began to surge in the first quarter of 2022, as efforts to step up preventive source reduction, public communications and mobilisation, and intersectoral collaboration were already underway.

### DEVELOPING PREPAREDNESS CAPABILITIES AGAINST DISEASES

In May 2022, when multiple cases of the Monkeypox virus were reported in several non-endemic countries, EHI started developing field and laboratory capabilities for preparedness against the relatively unknown virus. When the first imported Monkeypox case was reported in June 2022, EHI swiftly worked with the National Centre for Infectious Diseases to collect samples for testing in EHI's High Containment Biosafety Level 3 Laboratory, where the findings guided environmental disinfection and personal protective equipment protocols for Singapore.

As we learn to live with COVID-19, NEA continues to conduct surveillance of the COVID-19 virus to monitor the trend of infections, and to monitor the spread of new and more transmissible COVID-19 variants. We have also used wastewater testing to conduct studies on other infectious disease, such as antimicrobial resistant bacteria and the Zika virus.

### DIGITALISING AND STREAMLINING SYSTEM SERVICES

In line with Singapore's vision to achieve a Digital Government that is 'Digital to the Core, and Serves with Heart', our One Integrated Licensing System (OneILS) consolidates and streamlines the processes and workflows of NEA's 54 licences and services under one platform, providing 360-degree view of NEA's customer profiles, demographics and their relationship history with NEA. OneILS integrates with WOG GoBusiness platform, the Maritime Port Authority's digitalPort@SG and NEA's ePortal, providing our customers with the convenience of completing mainly Licence and Service applications digitally end-to-end with NEA, anytime, anywhere and on any device safely and securely. OneILS had also replaced the need for wet ink signatures with issuance of eLicences, ePermits and eCertificates, allowing citizens to verify the authenticity and legitimacy of these digital documents, minimising the risk of tampering or fraud. The final phase of the project was successfully launched in February 2023.

## DEVELOPING CITIZEN-CENTRIC DIGITAL SERVICES

NEA's Digital Shopfront, ePortal, provides a single touch point via a unified online platform, allowing citizens to transact digitally with NEA for a diverse range of online services.

In March 2023, ePortal was successfully integrated with a virtual waiting room feature allowing NEA to manage the online traffic to ePortal for the annual Qing Ming vehicle booking service at our columbarium, providing members of public with a seamless and improved user experience.

As of June 2023, 38 digital services were successfully delivered to 10 NEA departments under ePortal project. An additional six digital services are planned to be delivered by the last quarter of FY2023. Concurrently, ePortal would be re-architected by the second quarter of FY2024 to adopt Cloud technology, improving scalability capabilities, and enhancing system availability to the citizens who transact with NEA.

## OPTIMISING OPERATIONAL EFFICIENCY THROUGH DIGITALISATION

Aligned with the targets in the Digital Government Blueprint, we are digitalising our services and operations for greater efficiency and public responsiveness. NEA has achieved 100 per cent e-payment for outbound services, and we are on target to achieve 100 per cent e-payment for inbound services by 2023. Additionally, 91 per cent of the public's transactions with NEA can be completed end-to-end digitally, marking an increase of 13 per cent from 2021 and meeting the target of 90 per cent.

To improve user experience, 88 per cent of our services are now enabled with pre-filled government data function for greater convenience. We also offer a digital signature option in 67 per cent of our services, and will continue to introduce this in other services.

At the Digital Services Awards 2022, NEA received an award for Best Agency Functionality (Large Agency) for all our websites. NEA scored the highest among large-sized agencies, in search engine optimisation rank, accessibility rank, and page load time rank.

NEA's mobile app, myENV, also received the OpenGov Recognition of Excellence Award 2023, for its innovative and disruptive use of technology in the public sector.

## HARNESSING DATA AND ANALYTICS

NEA continually explores ways to improve service delivery and work processes with data and analytics. In 2022, we organised a data workshop to drive greater adoption of data analytics and Artificial Intelligence (AI), and provide a platform for officers from the MSE Family<sup>11</sup> to learn about analytics and AI applications across WOG. NEA officers also participated in ideation sessions to brainstorm, and craft analytics and AI use cases that support their work.

We also established the MSE Family Data Analytics Community of Practice, to grow the number of data practitioners, share knowledge and expertise, as well as build competencies within the MSE Family.

## CLOSING THE RESOURCE LOOP

NEA is committed to support R&D that contribute to the targets of the Singapore Green Plan and the Environmental Services Industry Transformation Map. To date, NEA had committed \$37 million under the Closing the Waste Loop (CTWL) Funding Initiative (FI) to support 15 R&D projects on the treatment and recovery of resource from priority waste streams – e-waste, food waste and plastic waste, and diversion of residues such as incineration bottom ash and non-incinerable waste from Semakau Landfill. Several R&D projects had seen early successes leading to 11 technologies licensed for test-bedding at industrial scale. Projects outcomes have also informed NEA and agencies' policy decisions and infrastructure planning.

NEA secured \$80 million for the Closing the Resource Loop (CTRL) FI in February 2022 to continue supporting our R&D and innovation efforts. To date, about \$17 million has been committed to continue the Phase 2 R&D under the Singapore-CEA Alliance for Research in Circular Economy on resource recovery solutions for e-waste to be ready for adoption and commercialisation. NEA is also undertaking a major review of the CTWL and CTRL FIs in 2023 to ensure the R&D strategy under CTRL FI remains relevant and can help achieve NEA's sustainability goals.

<sup>11</sup> The MSE Family comprises MSE, NEA, PUB and SFA

# Strong Corporate Practices for a Sustainable Organisation

Building robust capabilities is crucial to NEA, considering our diverse scope of work and wide-ranging stakeholders. We have put in place best practices to ensure continued transparency and accountability to our stakeholders. Other government agencies, such as the Ministry of Finance and the Auditor-General’s Office, serve as external controls to reinforce ethical and responsible conduct within NEA.

## FOSTERING A SENSE OF BELONGING

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

To achieve this, NEA has five long-term human resource strategies:

- Brand NEA to attract the right talent
- Develop workforce capabilities
- Build an engaged and resilient workforce
- Grow leadership pipeline
- Improve human resource processes and systems

## DRIVING EMPLOYEE ENGAGEMENT

NEA’s Employee Engagement (EE) Framework aims to engage staff beyond their core work by tailoring to their different needs through the EE Framework. The framework is also aligned with the Public Service Cares initiative that supports the national Singapore Cares movement to build a caring and inclusive society.

## Employee Engagement Framework



The dimensions of the EE framework are led by respective divisions or departments, and entities for a greater focus and synergy.



## NURTURING A CARING CULTURE

We believe in developing an engaged and socially responsible workforce that makes a positive impact on the environment and community, and contributes to NEA's social sustainability goals. We formed the Captain Green Cares Community to care for our staff, raise the level of staff volunteerism in NEA, and support the initiatives of organisations that look out for the less privileged.

More than \$49,687 in donations were raised through the various philanthropic initiatives that were supported by NEA in FY2022, excluding the monthly Community Chest SHARE<sup>12</sup> programme donations. In recognition of our philanthropic efforts and support for SG Cares Giving Week, NEA was awarded the Bronze Certificate of Appreciation, and featured on the event website as a partner.

## CELEBRATING MILESTONES TOGETHER

As part of NEA's 20th anniversary, a series of celebratory events were planned to commemorate this significant milestone, such as a cake cutting ceremony, attended by 1,900 staff. We also held a fundraiser, the #OneNEA Race, where staff support their colleagues with donation pledges, and raised funds for the Community Chest.

As part of the anniversary celebrations, and to reflect the changes in our operating environment in a post-COVID-19 world, we refreshed our core values to form EARTH: **E**mpathy, **A**gility, **R**esilience, **T**eamwork and **H**eat for the Environment.

## CREATING A POSITIVE WORK ENVIRONMENT

NEA creates a positive work environment for our employees through fair employment and work-life effectiveness. Our management is actively involved in setting the vision and direction, policy formulation, implementation and feedback loop for fair employment practices. We signed the Employers' Pledge of Fair Employment Practices in April 2007, to review employment practices regularly in order to align with the fair employment principles set out by the Tripartite Alliance for Fair Employment Practices. NEA's terms of employment are also guided by Singapore's legislations, including the Employment Act 1968, Workplace Safety and Health Act 2006, and the Retirement and Re-employment Act 1993.

We are also committed to providing every individual with ample opportunities in training and career development, a balanced work life, and a safe and healthy work environment. We are supportive of the UNGC and its Ten Principles in the areas of Human Rights, Labour, Environment, and Anti-corruption.

## Employee Benefits

We value our employees and strive to provide full-time or part-time employees with the same set of benefits. Temporary staff hired via outsourced agencies are covered by their respective agency's benefits policy.

All NEA staff are covered under the Group Personal Accident (GPA) Insurance and Work Injury Compensation (WIC) Insurance. The GPA insurance provides employees with a \$100,000 24-hour worldwide coverage for death and permanent disablement due to accidental means beyond work, while the WIC insurance provides coverage for work-related injuries or death as per the Work Injury Compensation Act 2019.

Staff also have the option to take up additional coverage for themselves, their spouses and eligible children under the Public Officers Group Insurance Scheme. They can decide on the insurance coverage and amount, and purchase this directly from Singlife at special rates for Public Service officers.

## Family-friendly Human Resource Policies

We support our staff in their parenthood journey by providing paid parental leave to both male and female employees. Doing so aims to encourage shared parental responsibilities and strengthen family bonds.

Our human resource policies support the career development of employees with families, and affirm our continued commitment to equality and diversity in the workplace. This has paid off with a high retention rate among male and female employees who took parental leave in FY2022. Among the employees who returned to work after their parental leave ended, 94 per cent were still employed 12 months later.

<sup>12</sup> The Community Chest is the philanthropy and engagement arm of the National Council of Social Service. For details on SHARE, visit [www.comchest.gov.sg/brand/share](http://www.comchest.gov.sg/brand/share)

**Return-to-work and Retention Rates of Employees Who Took Parental Leave**

	Male			Female		
	FY20	FY21	FY22	FY20	FY21	FY22
Return-to-work Rate <sup>13</sup>	99%	100%	100%	100%	100%	100%
Retention Rate <sup>14</sup>	95%	83%	91%	95%	84%	96%

**No. of Employees Who Took Parental Leave**

	FY20	FY21	FY22
Female	56	51	56
Male	111	98	99

**No. of Employees Who Returned to Work After Taking Parental Leave**

	FY20	FY21	FY22
Female	56	51	56
Male	110	98	99

**Inclusive Hiring**

NEA supports the hiring of persons with disabilities as part of our inclusive workplace strategy. We have put in place a holistic framework covering strategies, initiatives and action plans to champion inclusive hiring. We also support SG Enable in its career fairs and internship programmes. As of 31 March 2023, we have created a conducive workplace for 21 persons with disabilities.

**Unions**

Our people are our greatest assets, and we work closely with the Amalgamated Union of Public Employees and the Amalgamated Union of Public Employees - Daily-Rated Workers Branch to ensure we take care of them.

**Code of Conduct**

NEA has an internal code of conduct that applies to all employees as NEA has a zero-tolerance policy on fraud and misconduct by employees. Called the NEA Person Code, the code of conduct articulates NEA’s vision, mission and values, appropriate conduct, and guidelines concerning conflicts of interest, confidentiality, corruption prevention and proper financial stewardship.

The Code also sets out principles to guide employees in discharging their duties and responsibilities to the highest standards of personal and corporate integrity. The NEA Person Code is readily available on the NEA intranet and in the Staff Handbook. All new staff are informed about the NEA Person Code. Reminders on the code are also regularly sent to staff. In the event of a breach of discipline, the NEA Disciplinary Policy details the appropriate procedures to deal with the breach.

Employees are reminded to declare actual or potential conflicts of interest during the course of their work. Should there be declarations, the relevant parties would be informed. To prevent and mitigate conflicts of interest, employees are to declare as soon as they have reason to believe that there is or may be a conflict of interest between their official duties and personal interests. A staff must not participate in such outside activities unless CEO’s approval is given. Examples of scenarios whereby declarations are required:

- Directly or indirectly make use of any official information or position to further a private interest
- Be concerned in the activities of any organisation – whether in their personal capacity or as an office bearer of a recreational club, society, association, and more – where such activities may interfere with the objective performance of their official duties whether for personal advantage or gain

**Whistleblowing Policy**

Under NEA’s whistleblowing policy, employees and third parties are encouraged to report any incidents of fraud and serious misconduct. Our staff can report wrongful practices that they have observed in NEA to our CEO as stated in the Internal Disclosure Policy, which is available on the NEA Intranet.

NEA is committed to providing a safe environment for employees to report wrongful practices. All reports are treated in utmost confidence, and every effort is taken to protect the identity of staff who make reports or provide evidence of any wrongful practice, to the extent feasible and permissible under the law.

<sup>13</sup> The ‘return-to-work-rate’ is defined as the percentage of employees who returned to work after parental leave in comparison against the total number of employees due to return to work after taking parental leave

<sup>14</sup> The ‘retention rate’ is defined as the percentage of employees retained 12 months after returning from parental leave in the previous FY

NEA's whistleblowing channels<sup>15</sup> provide stakeholders with avenues to report any incidents of fraud or misconduct occurring within NEA or relating directly to NEA's staff, in good faith, without fear of reprisal, for appropriate investigation and action. The channels are independently managed by our Internal Audit Division. Any person who makes a report in good faith is assured that no action will be taken against him or her, even if the investigation reveals no wrongdoing. However, firm action, including reporting the matter to the police, will be taken against any person who makes false, malicious or frivolous reports.

### Employee Grievance

NEA has put in place a grievance handling framework, and is committed to working closely with the union to address and resolve staff feedback and concerns expeditiously.

We offer employees ample channels to air their grievances on matters that affect the terms and conditions of their service. Any employee who feels aggrieved due to unfair treatment at the workplace should surface his or her grievance through internal official channels, either verbally or in writing.

All grievances surfaced in good faith will be treated with strict confidence and shared only for the purpose of grievance management. No officer or supervisor should retaliate against the staff who surfaced the grievance, and those who do so may be subjected to disciplinary action. If, however, an allegation is made frivolously, maliciously or for personal gain, disciplinary action may be taken.

All critical concerns are conveyed to either the Director of NEA's Internal Audit Division, or the Chairman of the Board Audit Committee. Direct channels are available for such reporting.

### ENGAGING A DIVERSE WORKFORCE

As of 31 March 2023, NEA had a diverse workforce of 3,672 working in various locations islandwide.

#### Breakdown by Age

NEA continued to recruit employees of all ages, with those between the ages of 30 to 50 years old leading the group. A large proportion of our employees are older workers.

We value our workers regardless of age and actively re-employ our eligible employees. Employees who are ineligible for re-employment are given an Employee Assistance Payment. We also connect them with organisations such as the Employment and Employability Institute, which offers employment and training assistance.

	FY20	FY21	FY22
<b>No. of Employees in NEA (by Age)</b>			
< 30 years old	14%	12%	10%
30-50 years old	49%	49%	52%
> 50 years old	37%	39%	38%
	520	459	351
	1,845	1,870	1,906
	1,426	1,470	1,415
<b>No. of Employees recruited (by Age)</b>			
< 30 years old	47%	29%	33%
30-50 years old	50%	54%	62%
> 50 years old	3%	17%	5%
	191	138	111
	207	255	209
	13	82	16
<b>No. of Employees who left NEA (by Age)</b>			
< 30 years old	20%	18%	21%
30-50 years old	45%	43%	46%
> 50 years old	35%	39%	33%
	56	87	96
	123	209	214
	95	188	153

<sup>15</sup> For information on whistleblowing, visit [www.nea.gov.sg/corporate-functions/contact-us/whistleblowing](http://www.nea.gov.sg/corporate-functions/contact-us/whistleblowing)

### Breakdown by Gender

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

	FY20		FY21		FY22	
<b>No. of Employees in NEA (by Gender)</b>	65%	35%	65%	35%	65%	35%
Male	2,482		2,485		2,371	
Female	1,309		1,314		1,301	
<b>No. of Employees recruited (by Gender)</b>	60%	40%	67%	33%	56%	44%
Male	246		316		187	
Female	165		159		149	
<b>No. of Employees who left NEA (by Gender)</b>	65%	35%	67%	33%	65%	35%
Male	177		324		301	
Female	97		160		162	

### Breakdown by Employment Type

The majority of our employees are employed on a full-time basis.

Breakdown of NEA Employees by Employment Type	Male	Female
Permanent and Fixed Term Contract Employees	2,371 (65%)	1,301 (35%)
Temporary Employees	–	–
Non-guaranteed hours Employees	–	–
Full-time Employees	2,370 (65%)	1,299 (35%)
Part-time	1 (33%)	2 (67%)

<sup>16</sup> NEA's WSH Policy is available at [go.gov.sg/nea-wshpolicy](http://go.gov.sg/nea-wshpolicy)

In FY2022, NEA also engaged 309 non-employees, of which 181 were engaged as Safe Distancing Ambassadors and the remaining 128 were engaged for other purposes such as dengue operations and covering duties for officers on long leave of absence.

### PROMOTING WORKPLACE SAFETY AND HEALTH

Workplace safety and health (WSH) is a top priority for NEA. Everyone plays an active part in building a positive safety culture and ensuring a safe work environment for all our officers and stakeholders:

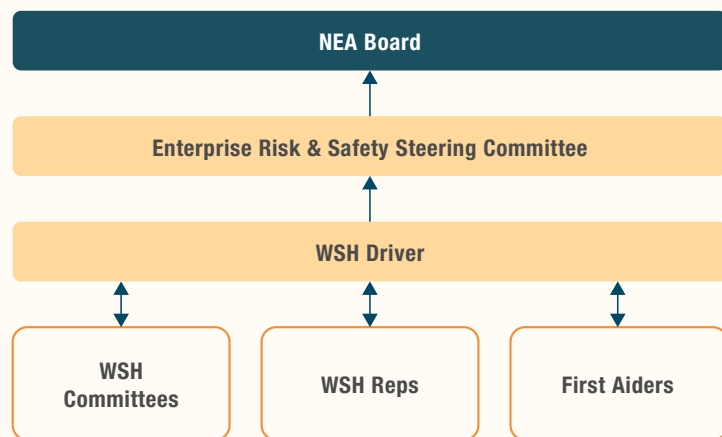
- Our senior leaders lead by example through their regular safety walkabouts at all sites.
- Our WSH team and committees roll out safety messages and engagement through monthly safety posters, WSH alerts (case study sharing), safety pledges and safety talks.
- Our staff are empowered to report near-misses and hazards through our dedicated WSH reporting channel.
- WSH representatives are appointed across NEA divisions and departments to look after risk management of their respective work activities and strengthen safety mindsets amongst their colleagues.



Our WSH Policy<sup>16</sup> is endorsed by our CEO, and aligned with NEA's core values – EARTH. This means that safety is a value embedded into our organisational culture, and signifies our commitment towards WSH.

A WSH governance structure is in place to provide strategic guidance on WSH matters. Led by the Enterprise Risk and Safety Steering Committee, NEA builds strong internal WSH capabilities, tracks WSH incidents and performance, and continuously enhances efforts to build a strong WSH culture. In addition, WSH is one of NEA's key strategic risk that is monitored and tracked closely by the Board.

### WSH Governance Structure



A WSH Review Committee was established in September 2022 for a holistic review of our WSH management system with recommended proposals to strengthen the WSH landscape under 3 workstreams (Structure, Capabilities and Culture) to be presented to management in July 2023.

In 2022, 35 workplace injuries were reported. All cases were minor injuries, with the most common incident type being ‘Slips, Trips and Falls’ (STF). All incidents were investigated, with learning lessons shared across the organisation in a timely manner. To heighten awareness, the focus of our NEA Safety Walkabout on March 2023 was on STF prevention with our senior leaders engaging staff personally on STF awareness and doing validation checks on STF hazards at their work premises. Workplace safety continued to be emphasised across all sites after the 2021 accident at the Tuas Incineration Plant.

#### Employee Workplace injuries in 2022<sup>17</sup>

	No. of Injuries	Injury Rate per 100,000 workers
No. of Fatal Injuries	0	0
No. of Major Injuries	0	0
No. of Minor Injuries	35	946

Apart from monitoring workplace injuries, NEA incentivises holistic WSH performance through internal WSH Scoreboard Awards for low incident rates, strong WSH programmes and innovation, and safe work practices. In addition, we also recognise exemplary WSH contributions through the WSH (Innovation) and WSH (Supervisors) Awards. Safety briefings and trainings are also regularly conducted to raise awareness of work-related hazards and safety incidents. In addition, all our WSH representatives are trained in BizSAFE 2: Develop a Risk Management Implementation Plan, and champion the WSH risk management for their respective divisions and departments. This includes managing the risk assessments of all work activities through the identification of WSH hazards, oversee implementation of mitigating control measures, and monitoring the outcomes, in compliance with WSH (Risk Management) Regulations.

### PURSuing SUSTAINABILITY IN PROCUREMENT PRACTICES

As part of our sustainable procurement practices, we encourage suppliers to follow our criteria in integrating sustainability practices in their work processes.

In FY2022, approximately 215 suppliers were awarded contracts to support NEA’s operations. In compliance with the Instruction Manual on Procurement, NEA ensures that three principles – transparency, open and fair competition, and value for money – are met during the procurement process.

In line with various national initiatives such as Progressive Wage Model and Security Agencies Competency Evaluation framework, NEA has also adapted our sourcing practices to procure from firms that meet adequate employment standards and pay progressive wages to their lower-wage workers. We have also established the Price Quality Scoring Framework for consistent and objective evaluation of bids submitted by suppliers. All open quotations and tenders are posted on a publicly available system – GeBIZ – for suppliers to submit their bids. To avoid conflict of interest, the approving authority for awarding the quotations or tenders cannot be from the procuring division.

To further drive financial prudence and sustainability, NEA has adopted a centralised oversight process to prioritise high-value tenders to achieve cost savings without compromising operations. NEA also improved our procurement processes through digitisation and robotic process automation (RPA), for greater resource optimisation and sustainability. We have further enhanced our RPA capability in FY2022 to automate the evaluation process for quotation bids. NEA is the first government agency to implement this.

<sup>17</sup> There were no injuries for workers who are not employees

## ENSURING ACCOUNTABILITY AND RESOURCE OPTIMISATION

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

### Regular Review of Fees and Charges

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

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

### Continual Review of Financial Policies

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

### Optimal Budget and Resource Allocation

The budget for the new financial year is approved by the NEA Board. As fiscal resources are limited, the budget must be allocated optimally among departments on a needs basis and spendings have to be prudent. To ensure accountability and responsible budgeting, a budget utilisation rate of 95 per cent is set as a target for departments to achieve. Periodic performance against budget allocation is conducted with departments and reported at management meetings regularly.

# Conducive Culture for Collaboration, Learning and Innovation

**NEA advocates fair employment, career opportunities and supporting work-life effectiveness. We are also committed to equipping our employees with skills, knowledge and competencies to perform current and future roles.**

## SUPPORTING EMPLOYEE DEVELOPMENT

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

NEA supports the career development plans set during the performance management review through available programmes under the learning infrastructure for employee development. In FY2022, almost all employees completed their annual performance management review.

### Completion Rate of Performance Management Review

	FY20	FY21	FY22
Male	98.6%	92.2%	97.8%
Female	98.8%	90.1%	96.8%

A comprehensive range of initiatives have been put in place to develop NEA employees. Programmes that build technical capabilities and competencies, such as training workshops and specialist courses are regularly conducted to help employees stay relevant and ahead in a dynamic operating environment. Some of these programmes have been jointly developed with industry experts and training providers.

NEA has developed more than 80 NEA contextualised e-learning modules to-date on various domain areas hosted on LEARN<sup>18</sup> for employees to do self-learning, anytime and anywhere. New learning technologies in the use of virtual reality was piloted, and enhancements to on-the-job training process were conducted, to build the competency and confidence of our operations officers.

We conduct in-house programmes to build awareness on the future of work and encouraged employees to discover their career values and interests, and to have career conversations with their supervisors.

NEA also partners the Council for the Third Age to curate a suite of courses ranging from building digital confidence, active aging to mental wellness for our mature NEA workforce. With increasing importance to maintain good mental health, we introduced new courses focusing on strengthening mental resilience to staff with knowledge and self-care tips to better manage their mental well-being.

**Developmental Initiatives for NEA Employees in FY2022**

Initiatives	Objectives	Outcomes
Enhancement of Posting Framework	Provides more structured posting plans for staff with three postings within the first 10 years, and two postings in the next 10 years	28 of NEA’s promising staff were posted to different portfolios
Internal Market Place (IMP)	Provides staff the opportunity to fill internal positions and develop their career within NEA – all job openings are posted in the IMP, and open for application by staff with at least two years of service in their current positions	33 positions, or 10.1% of all openings, were filled internally by eligible NEA staff
Educational Upgrading	Supports staff in their pursuit of higher education, with opportunities for application of sponsorship even after their course had commenced. This encourages staff to continuously upgrade, upskill and improve themselves through lifelong learning	15 pursued higher qualifications through NEA’s scholarship and sponsorship schemes

**DEVELOPING STAFF COMPETENCIES**

NEA recognises the role of learning and development in driving organisational productivity and growth. Our continued efforts in learning and development ensure that employees will be equipped with the right skills and knowledge, to discharge their duties effectively and be able to meet future challenges. NEA’s Singapore Environment Institute conducts competency-based training to build a relevant, resourceful, and resilient workforce.

The Job Competency Matrix (JCM) framework forms the foundation of NEA’s competency development and training. Under the framework, Skills Maps capture competencies needed for a job role, and Learning Intervention Matrices curate a list of recommended learning interventions for staff to plug competency gaps. The JCM development process and results received commendation from external auditors during the ISO Recertification Audit in 2022.

Since 2020, competency-based Learning Needs Analysis (LNA) has been carried out to identify NEA officers’ competency gaps and training, which are then consolidated into actionable Departmental Learning Plans (DLPs). A total of 97 per cent of NEA’s departments formulated their DLPs during the FY2022 LNA exercise.

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

18 LEARN.gov.sg is a self-directed, digital learning platform for Singapore public officers

# About This Report

In this Annual & Sustainability Report, NEA provides an account of our corporate, financial and sustainability performance in FY2022 (1 April 2022 to 31 March 2023).

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

## REPORTING SCOPE

This report documents NEA's organisational activities, achievements and financial performance in FY2022 across our key premises, unless otherwise stated.

### Stand-alone Office Premises

- Centre for Climate Research Singapore at Kim Chuan Road
- NEA Regional Offices:
  - Central Regional Office at Jalan Bukit Merah
  - Choa Chu Kang Cemetery Office at Old Choa Chu Kang Road
  - Eastern Regional Office at Tannery Lane
  - Eastern Regional Office (Satellite Office) at Sin Ming Drive
  - Western Regional Office at Albert Winsemius Lane

### Tenanted Office Premises

- Changi Meteorological Station
- Environmental Health Institute at Biopolis
- Environmental Health Institute at Ang Mo Kio Tech Place II
- Environmental Health Institute at Van Kleef Centre
- Hawker Centres Group at HDB Hub
- Meteorological Service Singapore at Changi Airport
- National Radiochemistry Laboratory at CREATE Tower, NUS
- NEA Headquarters at Environment Building
- Pollution Control Division 1 and 2 at Bukit Merah Central
- Secondary Standards Dosimetry Laboratory at Health Sciences Authority
- Seletar Meteorological Station
- Singapore Environment Institute at Lifelong Learning Institute

### Industrial Premises

- Semakau Landfill
- Tuas Marine Transfer Station
- Tuas South Incineration Plant

### Other Premises

- Choa Chu Kang Cemetery, Columbarium, and Crematorium
- Burial Preparation Facility
- Garden of Peace (Inland Ash Scattering Facility)
- Kranji State Cemetery
- Mandai Crematorium and Columbarium
- Yishun Columbarium

## ASSURANCE

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

## ENQUIRIES

As part of NEA's environmental conservation efforts, the report will not be printed. Digital copies of past and current report can be found on NEA's corporate website: [www.nea.gov.sg](http://www.nea.gov.sg)

For feedback or enquiries, please contact the NEA Corporate Communications Division: Ms Eleanor Goh: [eleanor\\_goh@nea.gov.sg](mailto:eleanor_goh@nea.gov.sg)



**National  
Environment  
Agency**

Safeguard • Nurture • Cherish

**National Environment Agency**

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