MPA
SINGAPORE

CHARTING A SUSTAINABLE MARITIME FUTURE

Sustainability Report 2024

CONTENTS

ABOUT MPA

Established on 2 February 1996, the Maritime and Port Authority of Singapore (MPA) is the driving force behind Singapore's maritime and port development. MPA takes on the roles of maritime and port regulator and planner, international maritime centre champion, and national maritime representative. We are also a champion of digitalisation and decarbonisation efforts at regional and international fora such as the International Maritime Organization (IMO) and the International Organization for Marine Aids to Navigation.

MPA partners industry, the research community and other agencies to enhance safety, security and environmental protection; facilitate maritime and port operations and growth; develop multi-domain capabilities; and support the cluster of maritime ancillary services and manpower development.

Our Vision

A leading maritime agency driving Singapore's global maritime aspirations.

Our Mission

To develop and promote Singapore as a premier global hub port and an international maritime centre, and to advance and safeguard Singapore's strategic maritime interests.

ABOUT THIS REPORT

MPA started sustainability reporting in 2014. This edition of MPA's Sustainability Report uses the Global Reporting Initiative (GRI) 2021 standards. It offers an updated picture of our position on environmental sustainability and how we manage material sustainability issues in carrying out our mission to maintain Singapore's status as a global hub port and international maritime centre.

The report sets out MPA's policies and practices to monitor the risks and opportunities arising from material topics that are significant for us and our stakeholders. It details MPA's efforts to enhance environmental sustainability in the maritime industry. We focus on forging consensus and collaboration and setting standards at the international level; driving transformation through maritime innovation and digitalisation, and growing opportunities as we embark on efforts to reduce emissions domestically; and enabling positive change and managing resources effectively as a public sector organisation.

MPA's efforts support the United Nations Framework Convention on Climate Change (UNFCCC), the 2023 IMO Strategy on Reduction of Greenhouse Gas (GHG) Emissions from Ships, and Singapore's Nationally Determined Contribution (NDC). There are also disclosures, such as environmental targets and measurements.

Reporting Standards

This report is guided by the GreenGov.SG requirements and prepared with reference to the GRI 2021 standards. It incorporates relevant disclosures aligned to key global standards and frameworks, and guiding principles from the IMO in alignment with the United Nations Sustainable Development Goals (UN SDGs). The report also considers certain metrics and issues relevant to the maritime industry as discussed in the World Port Sustainability Programme (WPSP).

Reporting Scope and Period

This report covers MPA's sustainability approach, organisational activities, achievements and performance in key environmental, social and governance topics in FY2024 (1 January 2024 to 31 December 2024) across MPA's key premises and assets. For MPA's organisational performance, we recommend that this report be read together with MPA's Annual Report 2024. MPA calculates and scopes its emissions in accordance with the Operational Control approach defined in the GHG Protocol Corporate Accounting and Reporting Standard, which is the world's most widely used GHG accounting standard.

Restatement of Information

We have included restatements of information in this report because of improved data collection and calculation methodologies, as well as refined data collection parameters. Details of restatements can be found in the relevant sections of the report.[1]

Assurance

External assurance has not been sought for this report. However, we have conducted an internal review focused on relevance and reliability of the information.

Questions or feedback on the report can be emailed to Sustainability@mpa.gov.sg.

GreenGov.SG

This is a sustainability movement in the public sector that supports Singapore's national sustainability agenda as set out in the Singapore Green Plan 2030. Statutory Boards have to make their annual environmental sustainability disclosures, starting from FY2023.

Global Reporting Initiative (GRI) Universal Standards 2021

This is an independent international organisation that helps entities understand and report on their impact on the economy, environment and people. The GRI Standards are the world's most widely-used standards for sustainability reporting.

International Maritime Organization (IMO) and United Nations Sustainable Development Goals (UN SDGs)

IMO is the UN specialised agency responsible for regulating international shipping, including on issues of safety and security, and preventing marine and atmospheric pollution by ships. The IMO's work supports the UN SDGs. Singapore is one of the 176 Member States of the IMO.

World Ports Sustainability Program (WPSP)

The WPSP is managed by the International Association of Ports and Harbors (IAPH). It promotes best practices in ports worldwide, applying the 17 UN SDGs and integrating them into organisational practices across six areas: Digitalisation; Infrastructure; Health, Safety and Security; Environmental Care; Community Building; and, Climate and Energy.

[1] Restatement of information fulfils GRI 2021 standards and GreenGov.SG requirements.

CHIEF EXECUTIVE'S MESSAGE

"By harnessing digital innovation and forging strong partnerships globally and locally, we will continue to drive decarbonisation in international shipping, equip our workforce for the future, and work steadily towards our sustainability goals."

Mr Ang Wee Keong
MPA Chief Executive

2024 was the first full year in which global temperatures exceeded 1.5°C above pre-industrial levels. It was also Singapore's hottest year on record. Climate change is already reshaping maritime trade routes — melting Arctic ice is opening new passages, while droughts have lowered water levels in the Panama Canal, increasing costs and uncertainty. Urgent global action is needed to mitigate the effects of climate change and adapt to its impact.

Shipping, which carries over 80 per cent of global trade, contributes about three per cent of global greenhouse gas emissions. As a maritime nation, Singapore is committed to supporting the 2023 International Maritime Organization (IMO) Strategy on Reduction of GHG Emissions from Ships, which aims to achieve net-zero emissions for international shipping by or around 2050. As the national lead for the maritime and port sectors, MPA actively participates in international fora such as the IMO to support global decarbonisation efforts. We are also reviewing measures to reduce business costs and help maritime companies enhance their sustainability capabilities and competitiveness.

Maritime Singapore and International Decarbonisation

MPA is collaborating with our tripartite partners — industry and unions — to drive decarbonisation of the domestic maritime sector. We are facilitating the transition of domestic harbour craft to achieve Singapore's national target of net-zero emissions by 2050. Biofuel capable vessels are already commercially available today. MPA is supporting the development of electric vessels to serve as a decarbonisation pathway. In April 2024, we launched the first pilot trial for an electric harbour craft (e-HC) charging station. Since then, we have developed a Technical Reference (TR 136) to guide the development of charging and battery swap systems and help the industry gain confidence in adopting e-HCs. We are also developing e-HC charging points at key locations in the Port of Singapore to support wider adoption of e-HC.

Singapore is developing its capabilities as an alternative fuel bunkering hub. Sales of alternative bunker fuels exceeded 1 million tonnes in 2024 to reach 1.34 million tonnes, accounting for about 2.5 per cent of total bunker sales. We are taking steady steps to meet the IMO target for zero-emission or near-zero emission fuels to make up 5 to 10 per cent of all shipping fuels by 2030. Milestones in 2024 included the world's first use of ammonia combined with diesel as a marine fuel in March, and Singapore's first simultaneous methanol bunkering and cargo operations (SIMOPS) at Tuas Port in May. These trials contributed to the development of new technical references and IMO guidelines for the safe and efficient use of such fuels.

Given the global nature of shipping, collaboration is key. As Singapore's national representative at the IMO, MPA plays an active role in shaping international decarbonisation efforts. At the IMO, MPA worked closely with member states to reduce global shipping emissions. In 2024, MPA also expanded its network of Green and Digital Shipping Corridors (GDSCs)

to six, establishing new partnerships with Australia and Shandong in China. These add to the GDSCs established earlier with Japan, the ports of Rotterdam in Netherlands, Los Angeles and Long Beach in the US, and Tianjin in China. These corridors enable the trial and adoption of new technologies, fuels, and green solutions across the maritime industry.

MPA's Environmental Performance

MPA aligns with the Whole-of-Government efforts to promote sustainability, including meeting the GreenGov.SG targets on GHG emissions, electricity, water and waste.

We continue to review how our vessels are deployed and used, to ensure operational effectiveness while reducing emissions. Within our facilities, we are implementing green solutions through energy-efficient infrastructure projects. MPA's new net-zero buildings, scheduled to be commissioned in 2027/2028, will incorporate features that are efficient in using energy and water. We are also optimising solar power generation at Marina South Pier. Efforts to reduce water consumption and waste are ongoing. These include using water-efficient technologies and increasing recycling points at MPA's public facilities.

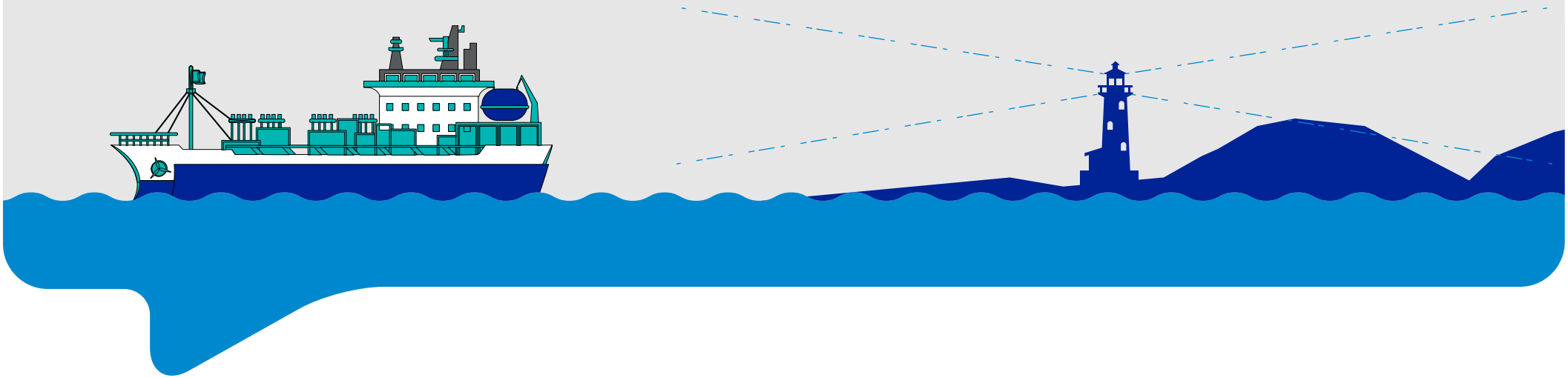
Digitalisation and Talent Development

Digitalisation is a key enabler for maritime decarbonisation. MPA invests in digital solutions to enhance operational efficiency and reduce environmental impact. The Just-In-Time Planning and Coordination Platform cuts greenhouse gas emissions by helping to reduce ship turnaround and idling time. From 1 April 2025, all bunker suppliers in Singapore must offer digital bunkering services by default. This will improve efficiency and transparency, and lead to savings in manpower and cost for the industry.

Preparing the maritime workforce for the future is critical. In 2024, MPA established the Maritime Energy Training Facility (METF) to train maritime professionals in the safe handling of clean marine fuels. To date, more than 500 personnel have been trained. The target is to train over 10,000 seafarers and maritime workers by the 2030s.

Looking Ahead

The global maritime landscape is becoming more challenging. Economic shifts, geopolitical tensions and climate change are disrupting global supply chains. Singapore will navigate these changing tides. By harnessing digital innovation and forging strong partnerships globally and locally, we will continue to drive decarbonisation in international shipping, equip our workforce for the future, and work steadily towards our sustainability goals.



MEMBERS OF THE AUTHORITY

(as at 31 December 2024)

Mr Niam Chiang Meng
Chairman
Maritime and Port Authority of Singapore

Mr Ang Wee Keong
Chief Executive
(wef 16 June 2025)
Maritime and Port Authority of Singapore

Mr Teo Eng Dih
Chief Executive
(until 16 June 2025)
Maritime and Port Authority of Singapore

Mr Abu Bakar Bin Mohd Nor
Group Chairman
M Kapital Holdings Pte Ltd

Mr Chan Cheow Hoe
Director
APAC Public Sector, Google

Mr Allen Lew
Chairman
Certis Group

Ms Mary Liew
General Secretary
Singapore Maritime Officers' Union

Mr Jermaine Loy
Principal Private Secretary
Prime Minister's Office

Mr Jeremy Nixon
Chief Executive
Ocean Network Express Co. Ltd

Mr Chris Ong Leng Yeow
Chief Executive Officer
Seatrium Ltd

Mr Sng Seow Wah
Director
FIDRec

A/Prof Simon Tay
Associate Professor
Faculty of Law, National University of Singapore; Chairman, Singapore Institute of International Affairs

RADM Sean Wat
Chief of Navy
Republic of Singapore Navy

Ms Caroline Yang
Chief Executive
Hong Lam Marine Pte Ltd

Mr Yee Ping Yi
Deputy Secretary (Strategy, Sustainability & Transformation)
Ministry of Transport

Ms Yeo Siew Eng
Director
Keppel DC REIT Management Pte Ltd

Ms Patricia Yim
Member of the Authority

SENIOR MANAGEMENT

(as at 31 December 2024)

Mr Ang Wee Keong
Chief Executive
(wef 16 June 2025)

Mr Teo Eng Dih
Chief Executive
(until 16 June 2025)

Mr David Foo
Assistant Chief Executive (Operations) / Assistant Chief Executive (Operations Technology) / Chief Data Officer

Mr Kenneth Lim
Assistant Chief Executive (Industry & Transformation), Quality Service Manager

Mr Tan Hoe Soon
Assistant Chief Executive (Corporate & Strategy), Chief Risk Officer

Capt M Segar
Chief Marine Officer / Senior Advisor

Ms Tan Beng Tee
Senior Advisor

Ms Angela Png
Senior Legal Advisor & Corporate Secretary

Capt Daknashamoorthy Ganasen
Senior Director, Operations & Marine Services

Ms Cindy Sim
Senior Director, Finance, Procurement & Admin

Ms Tan Woei Tyng
Senior Director, International

Er Tham Wai Wah
Senior Director, Engineering & Project Management / Chief Engineer / Chief Sustainability Officer

Mr Cheah Aun Aun
Director, Shipping / Director, Marine

Ms Chua Chen Yun
Director, Internal Audit

Mr Chua Yeng Hian
Director, Marine Services

Ms Ding Lee Yong
Dean, MPA Academy / Director, Maritime Network & Partnerships Office

Ms Caroline Goh
Director, Business Capability Development

Mr George Goh
Director, Communications & Community

Mr Dennis Khoo
Director, Maritime Systems & Technology / Chief Technology Officer

Mr Koh Chin Yong
Director, Digital & Data Science / Chief Information Officer

Mr Jason Leong
General Counsel

Mr Ng Yi Han
Director, Innovation, Technology & Talent Development / Chief Transformation Officer

Mr Ong Chin Beng
Director, Cybersecurity & Data Governance

Ms Jasmin Tan
Director, International Maritime Centre

Mr Vince Tan
Director, Operations Transformation & Planning

Mr Thai Low Ying-Huang
Chief Hydrographer

Mr Benjamin Wong
Director, Strategy & Policy

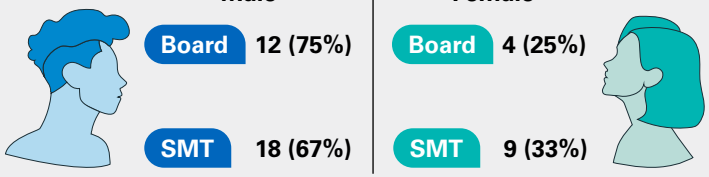
Ms Yeo Suat Lay
Director, Human Resource

SUSTAINABILITY GOVERNANCE

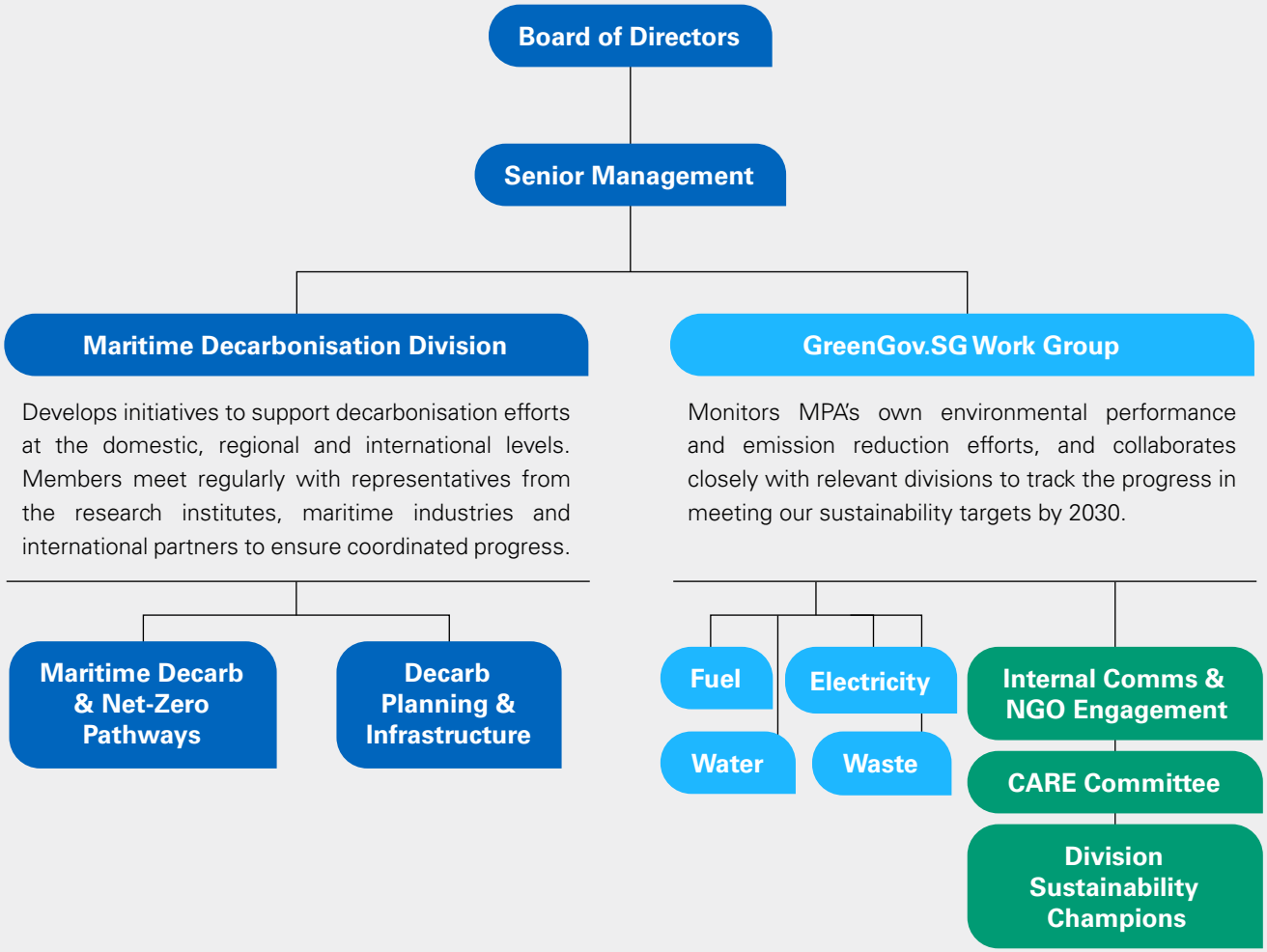
The MPA Board is appointed by the Minister of Transport. Led by Chairman Mr Niam Chiang Meng, the Board plays a crucial role in overseeing and shaping the organisation's sustainability efforts. It ensures that sustainability is integrated into MPA's strategic vision and operations, and guides policies that promote environmental responsibility, social equity and economic viability. By actively engaging with stakeholders and fostering a culture of good governance and accountability, the Board helps MPA meet regulatory requirements and build long-term value and trust. (Learn more about the Members of the Authority).

The senior management team, led by the Chief Executive, translates the Board's strategic directions and goals into action plans. The senior management team is responsible for meeting the environmental targets set under GreenGov.SG, and the Environment, Social and Governance (ESG) metrics under GRI. It drives the digitalisation, decarbonisation and manpower development efforts of Maritime Singapore, and leads efforts to foster consensus, collaboration and partnerships at the international level, such as the IMO, the International Organization for Marine Aids to Navigation, and the International Hydrographic Organization. (Learn more about our Senior Management.)

Gender Representation in Board and Senior Management Team (SMT)



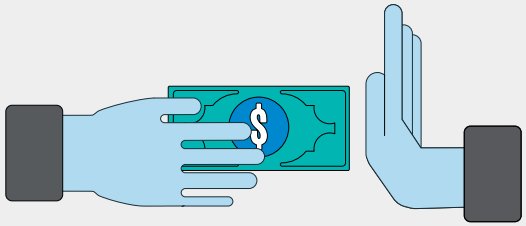
MPA's Sustainability Governance Structure



Organisational Ethics and Standards

Organisational ethics and standards underpin the integrity and credibility of MPA, so that we always maintain public trust. Our Internal Audit Division (IAD) provides independent assurance that MPA's governance, risk management and internal control processes comply with established policies and procedures, and function effectively. It independently runs a dedicated whistleblowing channel for reporting suspected fraudulent activities, improper conduct or wrongful acts in MPA and/or involving MPA's appointed vendors, regulated entities and business partners. Reports may be made without fear of retaliation or discrimination, so long as they are made in good faith and based on legitimate concerns.

The IAD publishes Risk Digest, an internal staff publication, to raise awareness among MPA staff and strengthen our risk culture. It is part of MPA's Enterprise Risk Management (ERM) framework. IAD regularly briefs the staff on topics such as how to build and strengthen controls in operational, financial, administrative and corporate processes; media reports on fraud and corruption cases; and learning points gleaned from the Auditor-General's Office Report of significant audit findings of public agencies.



There were

no confirmed incidents of fraud, including corruption, in 2024.

Risks and Opportunities

MPA uses our ERM framework to identify, monitor and assess risks that may derail us from our mission. The ERM also sets out mitigation measures to reduce the likelihood and impact of the risks. On climate-related risks, MPA has identified mitigation measures such as working towards meeting national and IMO decarbonisation targets and having sufficient supply of new fuels to support the maritime industry.

The Board is responsible for and oversees MPA's risk management. A member of the senior management team is designated as the Chief Risk Officer to drive and coordinate efforts to identify key risks and develop mitigation measures. Chaired by the Chief Executive, the ERM Steering Committee oversees the assessment of risks and monitors the implementation of mitigation measures.

MATERIAL TOPICS

MPA engaged an external consultant to conduct materiality assessment of the ESG material topics in 2023. The exercise involved more than 70 MPA stakeholders from various sectors. This ensured that MPA's sustainability strategy continues to be aligned with the priorities of internal and external stakeholders and our sustainability efforts remain relevant.

The materiality assessment was conducted in four steps: (1) Identification, (2) Rating, (3) Prioritisation, and (4) Validation. A final list of 15 material topics was approved by the Board.

01 IDENTIFY

A preliminary list of potential ESG issues was identified from desktop research on topics relevant to the maritime industry.

02 RATE

Through surveys and one-on-one interviews, key external stakeholders were invited to rank the identified ESG topics according to their importance to MPA and the maritime industry.

03 PRIORITISE

The ESG topics were prioritised by MPA's internal stakeholders, accounting for financial and impact materiality.

04 VALIDATE

The prioritised list was validated through peer benchmarking involving port authorities, port operators, shipping companies, statutory bodies and companies with sustainability reporting best practices.

Environment

Material topic	Why topic is material	Aligning to UN SDGs
Energy management and climate mitigation	With the public sector leading the national effort to achieve Singapore's net-zero emissions goal by 2045, MPA has a vital role to play. This includes demonstrating our commitment to responsible energy management, energy efficiency, the use of renewable energy sources, and net-zero emissions.	7
Climate resilience and adaptation	Climate change poses significant risks to Singapore as we are a coastal state. MPA works closely with the Public Utilities Board (PUB), which is the national coastal protection agency, to protect Singapore's coastlines and make our ports resilient.	11, 13
Water and effluent management	Singapore is a water-stressed nation as well as an island. MPA has a role to play in ensuring proper water management, such as by regulating the discharge of effluents from vessels. Singapore is also a signatory of the International Convention for the Prevention of Pollution from Ships (MARPOL) set by the IMO.	6, 14
Biodiversity	MPA's ports and activities are located near natural habitats. We have a responsibility to protect biodiversity.	14, 15
Waste	We promote a circular economy within MPA's facilities as well as Singapore's port waters, where resources are used efficiently and waste is minimised. It is particularly important to meet our national zero-waste goals given Singapore's limited land.	12
Supplier environmental assessment	MPA incorporates supplier environmental assessments aligned with the GreenGov.SG initiative.	16

Social

Material topic	Why topic is material	Aligning to UN SDGs
Public policy	As a port authority and regulator, MPA monitors and influences public policy to foster growth in the maritime domain and safeguard Singapore's maritime interests. This includes providing marine and coastal geospatial data so that the Government can analyse rising sea levels and ensure that measures to protect the coast are adequate.	8, 16
Port safety and security	A core function of MPA, as a port operator and regulator, is to ensure safety and security in Singapore's port waters.	16
Employment practices	Fair employment practices are essential to safeguard employees' interests and motivate them, as well as to attract maritime talents.	8
Occupational health and safety	MPA gives top priority to the safety and physical and mental well-being of our employees and the workers of our contractors. It is important that all of them can perform their duties safely.	3
Training and education	MPA will equip our employees and stakeholders with the necessary knowledge and skills to meet the challenges of a rapidly evolving maritime industry driven by digitalisation and decarbonisation.	4, 8, 17

Governance

Material topic	Why topic is material	Aligning to UN SDGs
Indirect economic impacts	MPA's sustainability efforts and contributions to the Singapore economy are portrayed more comprehensively as we include indirect impacts in our reporting.	11
Anti-corruption	It is paramount that MPA, a public agency, upholds a culture of integrity and non-corruption.	16
Economic performance	MPA must make financially responsible decisions to ensure that we have sufficient funds for our operations and development.	8
Secure and reliable information technology infrastructure	Digitalisation is crucial for the development of the maritime industry. In MPA's work to promote digitalisation, it is important to address data security vulnerabilities and manage big data and algorithms responsibly. As the sector lead in the world's busiest transshipment hub, MPA monitors data on activities across maritime and port critical information infrastructure (CII), and takes early action to prevent major disruptions to port operations and delivery of services.	9

STAKEHOLDER ENGAGEMENT

To achieve shared sustainability goals and objectives, MPA engages a wide range of stakeholders to forge effective partnerships and deliver innovative solutions for the maritime industry.

Key Stakeholder Groups	Key Engagement Methods	Key Interest Areas & Material Topics
Board Members	• Board meetings	• Public sector targets • Economic growth
Employees	• Townhall meetings • Staff intranet • Electronic Direct Mails (EDMs) • Engagement and employee wellness activities	• Corporate direction and growth plans • Remuneration and benefits • Talent attraction and capacity-building • Occupational safety, health and well-being • Labour and human rights • Diversity, equity and inclusion • Work-life balance
Maritime Ecosystem and Value Chain (Port terminal operators, harbour craft, ship owners and management companies, ship operators, maritime law and arbitration, ship finance)	• Media releases • Circulars and notices • Annual reports and sustainability reports • Conferences and exhibitions • Meetings	• Environmental sustainability • Climate risks • Maritime safety for future fuels adoption • Economic impacts • Supply chain • Maritime competitiveness and transition • Talent attraction and capacity building • Governance and oversight • Human rights
Non-profit/supporting organisations (MaritimeSG Youth Ambassadors and environmental groups)	• Media releases • Annual reports and sustainability reports • Dialogue sessions • Events • Instant messaging	• Inter-agency collaboration for tackling biodiversity and sustainability issues • Safety at sea for all users, including dealing with marine pollution • Sustainable supply chain • Greenwashing
Public sector agencies and ministries	• Inter-agency and workgroup meetings • Instant messaging	• Environmental sustainability • Public policy • Climate change mitigation • Leadership diversity • Anti-corruption • Local hiring

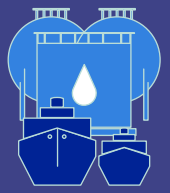
SUSTAINABILITY HIGHLIGHTS

Green and Digital Initiatives

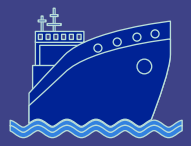
Launched
Maritime Innovation Lab 3.0

Expanded to
6 Green and Digital Shipping Corridors

Conducted Singapore's first simultaneous methanol bunkering and cargo operation



Conducted world's first
ammonia marine bunker operation **in the Port of Singapore**



GreenGov.SG

11,231
tonnes CO_2 equivalent of gross emissions emitted

Energy Utilisation Index =
123 kWh/m²

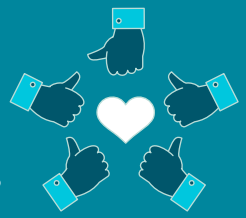
Water Efficiency Index (WEI) =
96.7
litres/person/day

Waste Disposal Index (WDI) =
0.636
kg/person/day

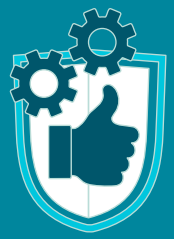
Social

105
average training hours per employee

5 **officers trained as** Wellness Ambassadors



0
work-related incidents



Governance

Women in leadership: 30%
female representation in board and senior management team

0
confirmed incidents of fraud or corruption

bizSAFE 4 certified

PROLOGUE

Singapore's Commitment to Sustainability and Climate Change

Why Climate Change Matters to Singapore

Singapore is vulnerable to the impact of climate change, being a low-lying island nation under threat of rising sea levels. We are also not immune from the effects of extreme weather. We have a stake in the health of the oceans not only for the sake of future generations but also because maritime trade is crucial to our economic well-being.

There is an urgent need to accelerate efforts to deal with the impact of climate change, including reducing GHG emissions and mobilising finance. This was underscored by the significant gaps between current climate action and the goals of the Paris Agreement which were highlighted in the first Global Stocktake[2].

Singapore's Role in Global Climate Efforts

Singapore has participated in global climate discussions since 1992. At the United Nations Climate Change Conference (COP 29/CMP 19/CMA 6), countries agreed to help developing nations by increasing climate funding from US$100 billion to US$300 billion annually by 2035. We underscored our commitment by voluntarily pledging up to US$500 million to support green projects in Asia through the Financing Asia's Transition Partnership.

Singapore has started carbon trading partnerships with over 20 countries. Based on the UN's carbon market mechanism under Article 6.4 of the Paris Agreement, carbon tax-liable companies in Singapore can offset up to 5 per cent of their taxable emissions by purchasing carbon credits from partner countries.

In October 2022, Singapore pledged to achieve net-zero emissions by 2050, contingent on technological advancements and effective international cooperation. In 2024, we submitted our first Biennial Transparency Report (BTR) and National Inventory Report (NIR) to the Conference of the Parties (COP) to the UNFCCC. These track our progress in cutting emissions. In February 2025, we submitted Singapore's 2035 NDC to the UNFCCC and committed to reducing emissions to between 45 and 50 million tonnes of carbon dioxide equivalent ($MtCO_2e$) in 2035[3]. Singapore intends to reach peak emissions at 64.43 Mt in 2028, and achieve our target of net-zero emissions by 2050.

Reducing Emissions in Global Shipping

As a leading maritime nation, Singapore is well placed to contribute to reducing GHG emissions from international shipping. Moving over 80 per cent of global trade, international shipping contributes about 3 per cent of global GHG emissions. It also carries the fuels needed to help other sectors decarbonise.

Singapore is a Council Member of the IMO, the UN specialised agency responsible for maritime safety and environmental protection which is at the forefront of addressing these challenges. We participate actively in shaping regulations. The 81st and 82nd sessions of the Marine Environment Protection Committee (MEPC) in 2024 highlighted the urgent need to develop and implement regulations to reduce GHG emissions from ships, with the focus on improving energy efficiency and adopting alternative fuels. The MEPC 83rd session in April 2025 approved the mid-term GHG reduction measures. These include a new fuel standard for ships and a global pricing mechanism for emissions.

Developing a Sustainable Global Hub Port and International Maritime Centre

Our Global Hub Port

As the world's largest container transshipment hub and top bunkering port, Singapore is in a unique position to catalyse the decarbonisation of international shipping. In 2024, annual vessel arrival tonnage and Singapore's container throughput reached a record of 3.11 billion Gross Tonnage and 41.12 million twenty-foot equivalent units (TEUs) respectively. Bunker sales hit a new record of 54.92 million tonnes.

Sales of alternative fuels more than doubled to 1.34 million tonnes, crossing the one million tonne mark for the first time. LNG sales increased from 0.11 to 0.46 million tonnes. Biofuel blends of up to B50 are commercially available, while trials of B100 are being carried out. Methanol was bunkered on a commercial scale (1,626 tonnes). For the first time globally, ammonia was bunkered in trials in our port, with 9.74 tonnes being transferred. We are developing the training, international standards and technical references to guide the safe adoption of these fuels.

The port also plays an important role in Singapore's national climate strategy. We are aiming for the terminals and domestic harbour craft sector to achieve net-zero emissions by 2050, by adopting renewable energy, automation and digitalisation.

[2] The Global Stocktake is a process mandated by the Paris Agreement to assess the world's progress towards achieving its climate goals. The first-ever GST concluded at COP 28 in Dubai, UAE.
[3] Singapore Submits 2035 Nationally Determined Contribution.

Tuas Port is being built to adapt to rising sea levels. Long-term adaptation measures are also being studied to ensure its resilience.

We continue to develop GeoSpace-Sea. This marine spatial data infrastructure will enable researchers, port planners and government agencies to take a data-driven approach to understand and anticipate changes in the oceans, particularly those related to climate change, so that the appropriate mitigation and adaptation measures can be implemented.

Our International Maritime Centre

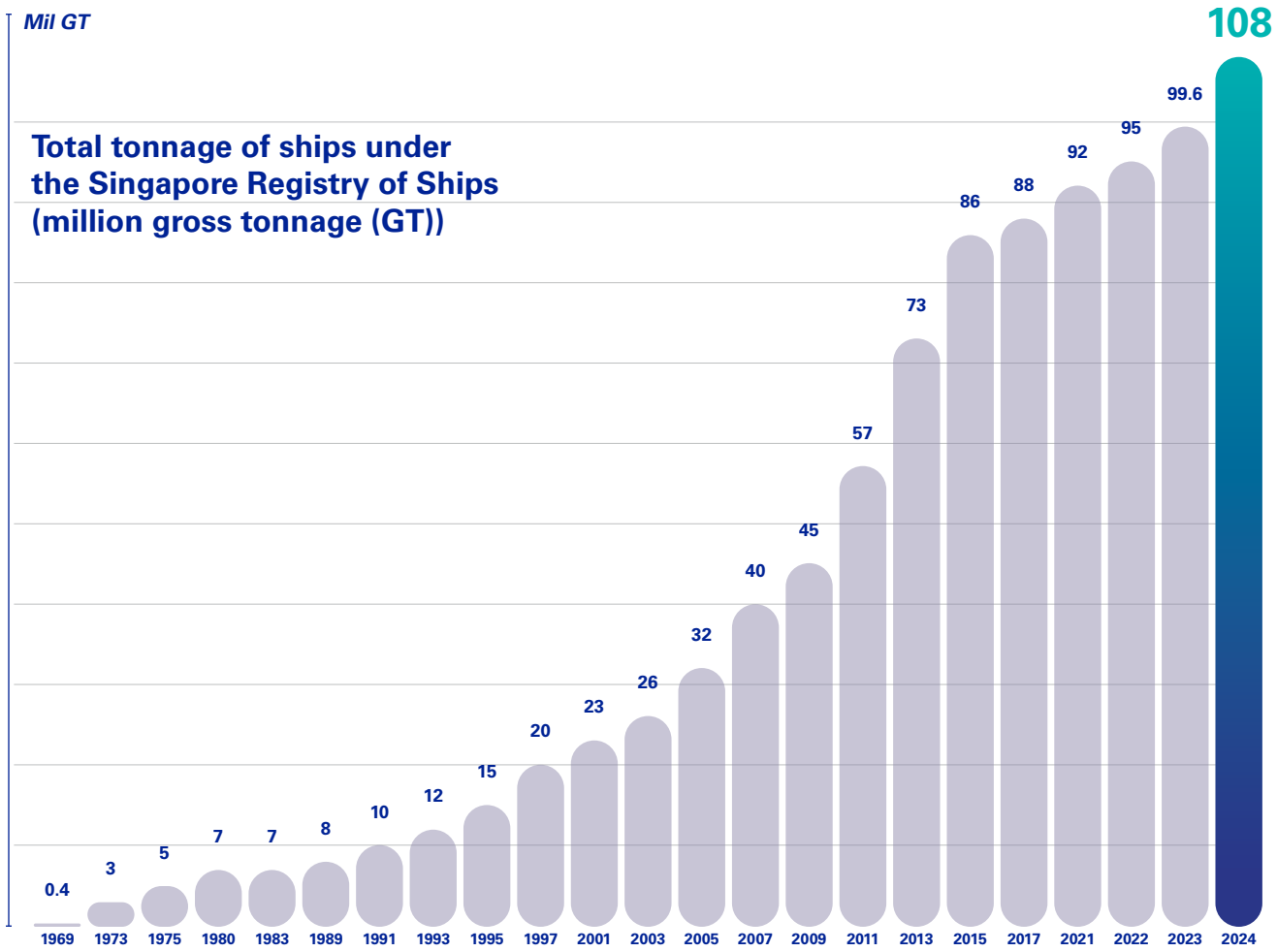
Singapore continues to be a choice destination for maritime business. The International Maritime Centre grew in scale and diversity, with over 200 shipping groups with a presence in Singapore, and more than 30 maritime companies were established or expanded operations in Singapore. Their business span shipping and maritime services, which include marine insurance, ship broking, maritime law and arbitration, ship finance and maritime technology. In 2024, total business spending by the top maritime companies in Singapore amounted to S$5.2 billion.

To support sustainability in the sector, MPA has set aside S$15 million through 2030 under the Maritime Cluster Fund–Sustainability to encourage the early adoption of sustainable technologies.

On 1 January 2025, we launched the refreshed Maritime Singapore Green Initiative. With S$50 million committed to five targeted programmes, this initiative will speed up the adoption of zero and near-zero emission solutions across the maritime value chain.

We are also committed to promoting sustainability with the Singapore Registry of Ships (SRS). The SRS has grown significantly and is now one of the world's largest ship registries. It had about 4,000 vessels amounting to 108 million GT in 2024, and is one of the youngest and highest-quality fleets.

In 2024, 29 Singapore-flagged ships from 12 companies received the Green Ship Certificate under the Green Ship Programme.[4] In April 2024, Eastern Pacific Shipping signed a Memorandum of Understanding with MPA to commit its ammonia dual-fuel newbuilds to be registered under the SRS when they are delivered. More such vessels using new fuels are expected to use Singapore as their flag of choice in the coming years.



[4] The Green Ship Programme was launched in 2011 under the Maritime Singapore Green Initiative. It rewards ship owners who voluntarily adopt solutions that enable their ships to exceed environmental regulatory standards set by the IMO.

CHAPTER | 01

Maritime Singapore Playing a Leading Role in Decarbonisation

Singapore has an important role to play in global efforts to combat climate change, even though we are responsible for only 0.1% of global emissions. The maritime industry is at the forefront of our sustainability efforts as we are a global hub port and international maritime centre. We are pursuing decarbonisation on multiple fronts, in line with the 2023 IMO Strategy on Reduction of GHG Emissions from Ships.

Photo credit: IMO

DOMESTIC INITIATIVES

We are reducing GHG emissions and promoting sustainability in the domestic maritime sector by enabling the adoption of net-zero harbour craft and digital bunkering solutions.

Building a Sustainable Harbour Craft Ecosystem

Within the Port of Singapore, about 1,600 harbour craft carry out a range of essential marine services. These include delivering ship supplies and bunker, towing and crew transfer services. MPA has set the target for the harbour and pleasure craft sectors to achieve net-zero emissions by 2050 in line with Singapore's national target. A number of net-zero emission solutions are available for the harbour craft fleet to make the transition to attain this goal.

Biofuel and the engines that can run on them are already commercially available. Advances in electric vehicle (EV) and battery technologies also have increasing applications in the marine sector. Electric harbour craft (e-HC) offer better energy and operational efficiency. MPA is working to encourage greater use of net-zero harbour craft by:

- making available cost-effective e-HC reference designs suitable for Singapore's operating context,
- developing charging infrastructure, and
- implementing financing and insurance solutions.

The Yinson Hydromover is Singapore's first fully electric cargo vessel

e-HC Design

MPA shortlisted 11 designs for electric passenger launches and cargo lighters from 55 proposals received through an Expression of Interest (EOI) in July 2023. Researchers in the maritime domain, in places such as the Institute of High-Performance Computing and Singapore Institute of Technology, are working on improving the vessel designs to reduce their energy requirements, as well as to enhance safety and cybersecurity. The aim is also to reduce the cost when scaling up these designs.

The Coastal Sustainability Alliance, Pyxis Maritime and Yinson GreenTech are progressively marketing their enhanced e-HC reference designs to aggregate demand from the industry. The remaining designs are ready for prototyping and will be introduced by their companies and consortia.

MPA and the Singapore Maritime Institute (SMI) have launched the Future Ship & Systems Design (FSSD) programme to transform Singapore's e-HC sector. The programme aims to facilitate e-HC adoption through sustainable ship and system design, efficient charging infrastructure and onshore microgrid, and intelligent ships and operations. This will lower the cost of ownership, improve operational efficiencies and reduce greenhouse gas emissions.

MPA is also working with the Coastal Sustainability Alliance to design, develop, build and deploy a fully electric tugboat utilising lithium titanium oxide batteries. This will expand e-HC designs beyond passenger launches and cargo lighters. The fully electric tugboat is expected to be completed in 2026.

e-HC Charging Infrastructure

Following MPA's Call for Proposal, Singapore's first e-HC charging point was commissioned at Marina South Pier in April 2024. This pilot charging point is owned and operated by Pyxis-SP Mobility, and its fleet of e-HCs will serve as the base offtake to optimise the use of the charging infrastructure and allow comprehensive data to be gathered. The trial will run until March 2026.

MPA has worked with Enterprise Singapore (EnterpriseSG) and the Singapore Standards Council to develop the first edition of Technical Reference (TR) 136. This national standard for e-HC charging infrastructure will ensure the safe operation, efficient use and interoperability of e-HC charging systems. We will continue to monitor technology trends and develop pilots to support the development of electric charging standards for domestic maritime activities. The experience we gain will contribute to the development of TR 136.

First pilot trial for e-HC charging point at Marina South Pier

e-HC Financing and Insurance

In 2024, MPA worked with EnterpriseSG to promote the Enterprise Financing Scheme-Green (EFS-Green) to maritime companies. Under this scheme, EnterpriseSG can undertake risk-sharing of 70 per cent to support lending by participating financial institutions. This opened up more financing options for harbour craft owners planning to adopt green technologies and solutions for their fleet.

MPA also brought financial institutions, insurers, insurance brokers and financial intermediaries looking to support e-HC adoption, to network with harbour craft owners and operators at the 2024 Harbour Craft Forum.

MPA is exploring mechanisms such as a data repository platform, safety training programmes, and quality assurance frameworks, to help insurers better assess operational risks so that they can right-price the premiums.

Advancing Clean and Green Shipping Practices with the Maritime Singapore Green Initiative (MSGI)

MSGI was launched in 2011 with a commitment of S$100 million over five years. In 2024, MPA updated the MSGI and committed an additional S$50 million to support five key programmes:

I. Green Ship Programme
II. Green Port Infrastructure Programme
III. Green Craft Programme
IV. Green Energy and Technology Programme
V. Green Awareness Programme

Digital Transformation for Sustainability

Beyond physical infrastructure and policy, digital technologies are key to reducing emissions and improving efficiency. Singapore is adopting digital solutions to reduce waste, optimise resource use, and better monitor and manage port activities.

Digital Port

The Just-in-Time (JIT) Planning and Coordination Platform was introduced on 1 October 2023 for the container, general cargo and bulk sectors in the digitalPORT@SG™ Phase 2. JIT coordination reduces turnaround times and carbon footprint. Trials to expand JIT to vessels calling at oil terminals are underway. The platform will be rolled out to tankers by end-2025.

Public Service Transformation Service Delivery Excellence Award – Digital Port Ecosystem

The MPA Digital Port Ecosystem's strategy and suite of products received the Public Service Transformation Service Delivery Excellence Award. The suite of digital products helped Singapore function as a catch-up port during COVID-19 by enabling faster vessel turnaround and better coordination. The suite of digital products comprises:

- **digitalPORT@SG™**: A one-stop portal for all regulatory clearances. The JIT platform currently supports marine services bookings.
- **digitalOCEANS™**: Facilitates cross-border data exchange and automation across supply chain players and clearance authorities.
- **digitalSHIP™**: Enables 5G network to digitalise maritime connectivity and ship-shore interoperability. MPA is working with M1 and IMDA to extend 5G connectivity to cover Singapore's port waters.
- **digitalPORT™ Global**: Uses cloud services to support global adoption of Maritime Single Window.
- **Singapore Maritime Datahub (SG-MDH)**: A reliable and secure data infrastructure to support data sharing and collaboration.

Digital Bunkering

Singapore became the first port to implement digital bunkering at scale from 1 April 2025. All bunker suppliers have to provide digital bunkering services and issue electronic bunker delivery notes (e-BDNs) by default. This initiative follows successful pilots conducted since 1 November 2023 with bunker suppliers, which included the top 10 bunker players in Singapore.

An e-BDN verification facility allows stakeholders to verify the e-BDNs against MPA records. EnterpriseSG has also launched Singapore Standard (SS) 709 - Specification for Digital Bunkering Supply Chain Documentation, to ensure data consistency. This also enables interoperability among digital systems.

The key benefits of digital bunkering include:

Faster operations

which will save up to 40,000 man-days annually.

Enhanced accuracy and compliance

as digital records have fewer errors.

Fraud prevention

by enabling early detection of anomalies.

Environmental benefits

by eliminating paper-based processes.

Maritime Innovation Lab 3.0

Launched on 4 December 2024, MIL3.0 builds on the success of MIL2.0. It focuses on capability development in six domains – space, air, surface, sub-sea, cyber and sustainability. The lab provides a testbed for new technologies and operational concepts and will be central to MPA's innovation and transformation collaborations with industry, technology companies and the research community.

PIER71™

Co-founded by MPA and NUS Enterprise in 2018, PIER71™ promotes maritime innovation and startup ecosystem growth. As of 2024, it had nurtured over 140 MarineTech startups and raised more than S$80 million in investments. The notable achievements in 2024 included:

1. **Smart Port Challenge (SPC) 2024**: This attracted a record number of almost 200 proposals from 35 countries. The proposals focused on maritime green technologies, smart shipping, next generation ports, and digitalisation.
2. **International Roadshows**: These promoted Singapore's innovation ecosystem in key maritime hubs across Asia, Europe and North America.
3. **PIER71™ Great Circle 2024**: This showcased innovations from Smart Port Challenge finalists.

Winners of Smart Port Challenge 2024, November 2024

Digital Twin (Singapore Port Waters)

The Maritime Digital Twin was launched at Singapore Maritime Week 2025. It is a dynamic virtual model of the Port of Singapore. The digital twin integrates real-time data from vessels, port operations and environmental sensors and uses artificial intelligence and predictive analytics, to optimise port operations, improve energy efficiency, and reduce emissions.

The Digital Twin also enhances safety management and emergency response by supporting risk assessment for incidents such as oil spills and accidental release of chemical gases into the atmosphere.

A limited proof of concept to enhance productivity and efficiency of electric vessel operations will be tested through an optimisation dashboard in the second half of 2025.

Find out more about Digital Twin.

Piloting the Use of Digital Ship Identity with S&P Global and Bunkerchain

MPA signed an MoU with S&P Global Market Intelligence and Bunkerchain to pilot the use of digital ship identity for port clearance and digital bunkering. With this, secure and trusted transactions can be made without the need for physical stamps and wet ink signatures.

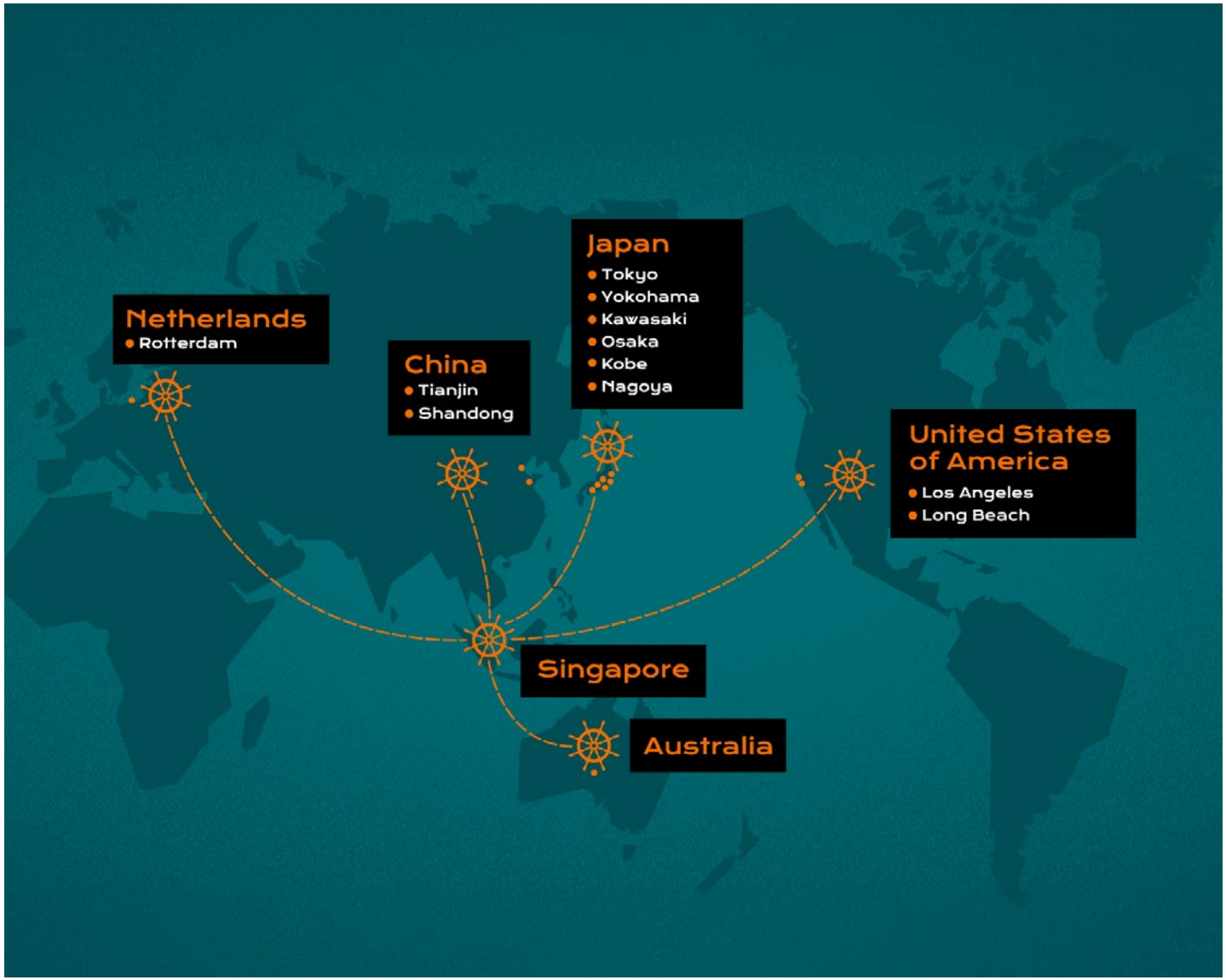
INTERNATIONAL COLLABORATIONS

Maritime decarbonisation is a global challenge which requires collective action. Singapore is forging international partnerships to share expertise and co-develop solutions.

Global Partnership for Green and Digital Shipping Corridors (GDSC)

MPA collaborates with a network of GDSC partners on green and digital shipping. Key partners include:

- Port of Rotterdam.
- Port of Los Angeles (POLA) and Port of Long Beach (POLB).
- China's Shandong Provincial Transport Department and Tianjin Municipal Transportation Commission.
- Japan's Ministry of Land, Infrastructure, Transport and Tourism, and eight Japanese port partners, namely, Port of Tokyo, Port of Yokohama, Port of Kawasaki, Yokohama Kawasaki International Port Corporation supporting the Kanto Region, Port of Osaka, Port of Kobe, Kobe-Osaka International Port Corporation (HPC) supporting the Kansai Region, and Port of Nagoya supporting the Chubu Region.
- [In progress] Australia's Department of Infrastructure, Transport, Regional Development, Communications, and the Arts (DITRDCA), and Commonwealth Scientific and Industrial Research Organisation (CSIRO).



Rotterdam-Singapore GDSC

Launched in 2022, this corridor now includes 28 global partners. Recent additions were Hapag-Lloyd and A*STAR's Centre for Maritime Digitalisation (C4MD).

Highlights in 2024 included:

1 **Alternative Fuels**: 100 tonnes of mass-balanced liquefied bio-methane (LBM) were supplied by Shell to CMA CGM's LNG-powered containership *CMA CGM Tivoli* at the Port of Rotterdam in October. LBM is a lower-emission fuel produced from waste-based feedstock.
2 **New Technologies**: The lifecycle greenhouse gas intensity framework was developed for green ammonia bunkering. Novel designs for ships that use hydrogen as fuel were explored.
3 **Digital Solutions**: Digital tools were adopted between the ports to digitalise shipping documents and enable the exchange of port-to-port data, such as vessel arrival and departure times.
4 **Cost Reduction**: Commercial structures were tested to lower the cost of using zero and near-zero emission fuels.

Demand for greener variants of methane and methanol for the Rotterdam-Singapore route could go up to five million tonnes a year by 2028.

Port of Rotterdam Stakeholder Workshops, October 2024

Singapore-Port of Los Angeles (POLA)-Port of Long Beach (POLB) GDSC

The Singapore – Los Angeles – Long Beach GDSC was established in April 2023. A baseline study on the maritime trade flows and energy demand for vessels on this trans-Pacific shipping corridor has been completed. The study estimated that when fully implemented, the corridor could create over 700 new jobs in zero and near-zero emission fuel production by 2030.

The GDSC partners will also be developing green and digital solutions to advance the corridor's decarbonisation and digitalisation goals. These include adopting net-zero fuels, Just-in-Time route optimisation, and energy efficient technologies like wind-assisted ship propulsion.

Three major shipping lines – Hafnia, K-Line, and MOL – are in talks to join the corridor partnership.

GDSC Symposium POLA POLB, 18 April 2024

Singapore-Shandong GDSC

Established in October 2024, this is the second partnership between Singapore and China. (The first was the Singapore-Tianjin GDSC in 2023.) It will drive the adoption of green and digital solutions, and the growth of the maritime industry between Singapore and the Bohai and Yellow Sea region.

The partnership will focus on collaboration in emerging technologies, training in safe handling of alternative fuels, knowledge sharing, and facilitating port clearances through digital information exchange.

Singapore-Australia GDSC

Singapore and Australia signed a MoU in March 2024 to formally collaborate on establishing the Singapore-Australia GDSC. It focuses on green fuel supply chains and digitalisation.

The ASLET (Australia–Singapore Initiative on Low Emissions Technologies) for Maritime and Port Operations is a $20 million initiative jointly led by MPA and Australia's CSIRO. It was launched at Singapore Maritime Week 2024.

ASLET will fund eight projects that cover innovations in the supply, transport, storage and use of hydrogen, ammonia and methanol, as well as in safety and environmental monitoring, and electrification.

GDSC Symposium during Singapore Maritime Week 2024, 18 April 2024

Other International Partnerships

MPA signed MoUs and LOIs with:

- The International Energy Agency (IEA), Mitsui O.S.K. Lines, Ltd. (MOL), Nippon Yusen Kabushiki Kaisha (NYK), and Hamburg Port Authority to accelerate decarbonisation.
- The International Renewable Energy Agency (IRENA) to promote the clean energy transition of global maritime and port sectors.
- The UN Global Compact (UNGC) Network Singapore to develop carbon accounting workshops.

On the digital front, MPA is partnering with:

- Suzhou Industrial Park Administrative Committee (SIPAC) to support startups.
- MISC to integrate sustainable digital tech in shipping.

Maritime Workforce Development

MPA and the UNGC Ocean Stewardship Coalition are setting training standards for handling new alternative fuels like methanol, ammonia and hydrogen. With the Maritime Technologies Forum, MPA developed safety management systems for alternative fuels. Partnerships with SIPAC and MISC will also support talent development, including upskilling seafarers to operate alternative-fueled vessels.

Advancing Global Maritime Decarbonisation Efforts

In 2024, MPA supported IMO efforts at the 81st and 82nd sessions of the Marine Environment Protection Committee (MEPC).

- **MEPC 81 (March 2024)**: A preliminary "IMO Net-Zero Framework" was developed to guide the reduction of GHG emissions from international shipping.
- **MEPC 82 (September – October 2024)**: A draft legal text was established, incorporating inputs and proposals from IMO Member States and international organisations on possible amendments to the International Convention for the Prevention of Pollution from Ships (MARPOL Annex VI). These amendments will introduce new mid-term measures to regulate GHG emissions from ships. These measures are set to be formally adopted in October 2025 before entry into force in 2027.

MEPC 81

MEPC 82

United Nations Climate Change Conference (COP 29/CMP 19/CMA 6)

MPA organised the 2nd Voyage to Net-Zero Forum at the Singapore Pavilion at COP 29. It was attended by over 120 participants, and featured representatives from MPA's local and international stakeholders, including UNFCCC High Level Climate Champions, IRENA, the NUS Centre for International Law, PSA, and Singapore Maritime Academy.

The programme covered safety and training related to the use of alternative fuels and emphasised the importance of cross-border collaborations among port authorities, shipping lines and policy makers to accelerate international maritime decarbonisation. Participants also watched a VR live demonstration by the Centre for Excellence in Maritime Safety (CEMS) which showcased the innovative digital training capabilities of Singapore's Maritime Energy Training Facility (METF).

Singapore Delegation at COP 29
(Photo credit: COP 29 Singapore Pavillion)

CHAPTER | 02

Igniting Multi-Pathways for Maritime Decarbonisation

At the 83rd session of the Marine Environment Protection Committee, member states approved mid-term measures to reduce global shipping emissions, including a goal-based marine fuel standard and a pricing mechanism for maritime GHG emissions. As the world's leading bunkering hub, MPA is steering the maritime sector to a more sustainable, multi-fuel future in line with the 2023 IMO GHG Strategy. With more ships capable of operating on zero or near-zero emission fuels entering service, MPA is reviewing standards and conducting trials to help the maritime industry transition to sustainable alternative fuels.

Stena Prosperous Ship-to-Ship Methanol Bunkering in May 2024

BUNKER SALES IN 2024

Bunker sales in Singapore increased 6% over the previous year, to a new high of 54.92 million tonnes in 2024. We supplied over one-sixth of the total fuel used by global shipping. Sales of alternative bunker fuels amounted to about 1.35 million tonnes, exceeding one million tonnes for the first time.

Bunker Sales in 2024 (in '000 tonnes)

Conventional Fuel	53,575
Bio-blended Fuel	883
Liquefied Natural Gas (LNG)	464
Methanol	1.626
Ammonia	0.00974
Total:	**54,924**

Biofuel

In 2024, sales of biofuel blends rose nearly 70% from the previous year to 0.88 million tonnes, reflecting growing acceptance of biofuels as a viable option to reduce emissions in the near to mid-term. A wide range of biofuel blends (up to B100) is now commercially available. MPA, through the Singapore Standards Council (SSC), worked with various agencies and stakeholders to upgrade the provisional standard on specifications of marine biofuel (WA 2:2022). A new Technical Reference (TR 140:2025) was also published in May 2025 to ensure the quality of biofuel delivered in Singapore.

Liquified Natural Gas (LNG)

LNG sales grew from 0.11 million tonnes in 2023 to 0.46 million tonnes in 2024. In December 2024, MPA launched an EOI to scale up the supply of LNG as a marine fuel in the Port of Singapore. Eight of the 14 proposals offered bio-methane and e-methane solutions which have lower lifecycle GHG emissions. The range of submissions also reflected the industry's readiness to support sea-based LNG reloading to complement existing onshore infrastructure. MPA will work with the shortlisted companies on options to carry out sea-based LNG reloading trials. We will assess scalability, technical feasibility, safety, operational readiness, and digital connectivity. The insights gained from the EOI will inform MPA's review of the LNG bunkering licensing framework so that we can better meet the needs of international shipping.

Methanol

Singapore is a step closer to delivering methanol bunkering commercially. In 2024, we conducted two milestone methanol bunkering operations. These built on the world's first ship-to-containership methanol bunkering, which was conducted in Singapore in 2023. The first milestone operation was the ship-to-ship bunkering of almost 1,340 metric tonnes of blended methanol. The second was Singapore's first simultaneous methanol bunkering and cargo operation (SIMOPS), which is the preferred mode for container vessels as it is more efficient. This trial also demonstrated the operational feasibility of using the mass flow metering (MFM) system for methanol in conjunction with digital bunkering. These operations provided valuable insights and experience to improve the efficiency and safety of methanol bunkering.

Safety was a key requirement for the two methanol bunkering operations. MPA worked closely with bunkering stakeholders to ensure that crew members were properly trained to handle methanol as a marine fuel and to respond to emergencies. The ship crew attended the MPA-approved training course conducted by the Singapore Maritime Academy. This is one of the courses for the handling of new fuel offered by the Maritime Energy Training Facility.

Stena Prosperous Ship-to-Ship Methanol Bunkering in May 2024

Simultaneous methanol bunkering and cargo operation (SIMOPS) in May 2024 (Photo credit: X-Press Feeders)

Shaping the Methanol Regulatory Landscape

In March 2025, MPA and EnterpriseSG, through the SSC, published a new Technical Reference on Methanol Bunkering. TR 129 provides a comprehensive framework for the safe and efficient use of methanol as an alternative marine fuel and sets out requirements for the safe handling, transfer, and measurement of methanol in bunkering operations.

MPA has also opened applications for licences to supply methanol as a marine fuel. This followed the finalisation of Singapore's methanol bunkering licensing framework and standards, which incorporated input from over 50 proposals received after MPA launched an EOI in December 2023.

Industry consultations show that the demand for methanol as a marine fuel in Singapore can potentially exceed one million tonnes annually before 2030. MPA will pave the way for operationalising methanol bunkering at scale and drive Singapore's efforts to develop as a sustainable, multi-fuel bunkering hub.

Distinction Award for Methanol Bunkering at the Public Service Science, Technology and Engineering Innovation Challenge

MPA received the Distinction Award for the world's first Ship-to-Containership Methanol Bunkering Operation in the Port of Singapore.

MPA officers at the Public Service Science, Technology and Engineering Innovation Challenge

Ammonia

MPA achieved a milestone in operationalising ammonia as a marine fuel over 10 days in April/May 2024. The Singapore-registered *Fortescue Green Pioneer* successfully completed propulsion and maneuverability trials in the Port of Singapore, using 6.4 m^3 (4.4 tonnes) of liquid ammonia in combination with diesel and biofuel.

Safety was paramount throughout the trials, which were conducted in a designated test area at Raffles Reserved Anchorage. An Emergency Operations Centre was set up at MPA's Port Operations Control Centre for representatives from MPA, Fortescue, Vopak, research institutes, and government agencies to monitor the fuel loading and sea trial operations. Ammonia plume modelling and drone surveillance were used to support safety and incident planning and response. The successful trials mark an important step in assessing ammonia's potential as a marine fuel and will help inform the development of ammonia-fueled vessels and ammonia bunkering infrastructure in ports worldwide.

Ammonia Fuel Loading on the Fortescue Green Pioneer in March 2024

Development of Ammonia-Fueled Vessels

Eastern Pacific Shipping signed MoUs with MPA and classification societies ABS and Lloyd's Register for six ammonia dual-fuel newbuilds. These vessels will be registered in the Singapore Registry of Ships when they are delivered, starting from 2026. The MoUs offer the prospect of collaboration in developing capability and capacity for ammonia bunkering and safety training, and for ammonia-related solutions and standards for power generation and bunkering.

Shaping the Ammonia Regulatory Landscape

MPA worked with international partners to develop a set of interim guidelines for the use of ammonia as fuel. These guidelines were adopted by the IMO's Maritime Safety Committee during its 109th session in December 2024. EnterpriseSG and MPA have committed to developing the Singapore standards for ammonia bunkering by 2025. The standards are crucial for ensuring the safe and efficient use of ammonia as a marine fuel.

Ammonia Power Generation and Bunkering

The Energy Market Authority and MPA have shortlisted two consortia to conduct studies to develop a low-carbon or zero-carbon ammonia solution on Jurong Island for power generation and bunkering. This project aligns with Singapore's National Hydrogen Strategy, which was launched in 2022. Ammonia is currently one of the most technologically-ready hydrogen carriers, with an established international supply chain for industrial use.

One consortium will then be selected to develop an end-to-end solution for generating electricity from imported low- or zero-carbon ammonia and bunkering ammonia. A successful solution will make Singapore one of the first countries in the world to deploy a direct ammonia combustion power plant and support the development of ammonia bunkering for international shipping.

NAVIGATING TOWARDS A SUSTAINABLE MARITIME FUTURE

Singapore has made good progress with its multi-pronged approach to alternative fuels in 2024:

- Biofuels showed robust growth, with new standards in development.
- LNG continued to establish itself, with initiatives to scale up LNG bunker supply and plans to promote bio-methane and e-methane as marine fuels.
- Methanol made remarkable strides in bunkering, standards, and licensing.
- Ammonia showed promise through successful trials and future-focused initiatives.

While the journey towards maritime decarbonisation is complex, our progress in 2024 showed that we are on a steady course to ignite multiple pathways for decarbonisation.

CHAPTER | 03

Charting our Commitment to the Environment

Singapore is committed to achieving net-zero emissions by 2050 under its Long-Term Low-Emissions Development Strategy. The public sector is leading the way and aims to reach net-zero by 2045. In line with these national objectives, MPA will track and report its carbon emissions, electricity and water consumption, and waste generation, as required under the GreenGov.SG initiative.

MPA'S GREENGOV.SG TARGETS AND 2024 PERFORMANCE

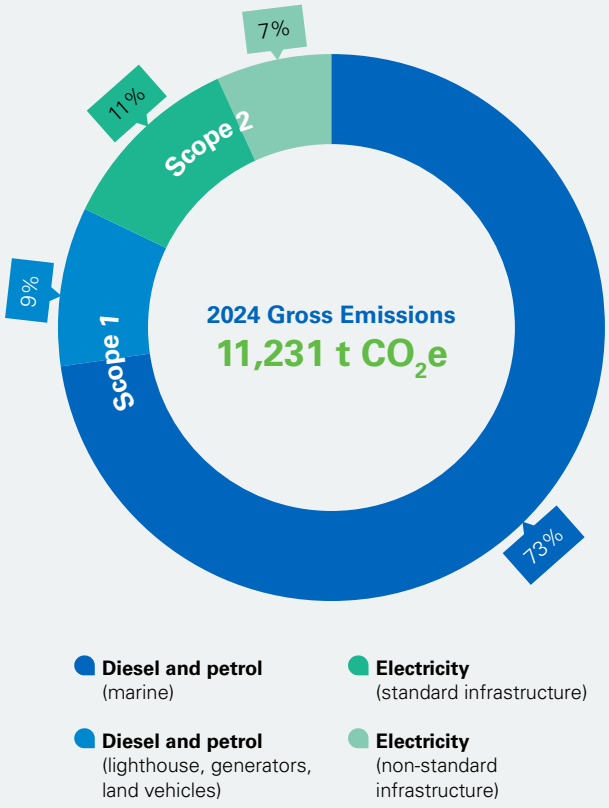
	Greenhouse Gas Emissions *(t CO_2e)*	**Energy Utilisation Index (EUI)** *(kWh/m²)*	**Water Efficiency Index (WEI)[5]** *(litres/person/day)*	**Waste Disposal Index (WDI)** *(kg/person/day)*
GreenGov.SG Targets	Peak emissions by around 2025 and net-zero emissions by around 2045	10% reduction in EUI by 2030, from average of 2018-2020 levels	10% reduction in WEI by 2030, from average of 2018-2020 levels	30% reduction in WDI by 2030 from 2022 level
Baseline EUI & WEI: Average of 2018-2020 levels WDI: 2022 level	-	133 kWh/m²	82.4 L/person/day	0.502 kg/person/day
MPA's Targets	Peak gross emissions around 2027-2028	120 kWh/m² by 2030	74.2 L/person/day by 2030	0.351 kg/person/day
2024 Performance	Gross emission: 11,231 *t CO_2e*	123 kWh/m²	96.7 L/person/day	0.636 kg/person/day
	Renewables: 108 *t CO_2e*			
	Net emission: 11,123 *t CO_2e*			
Status	MPA expects to peak around 2027-2028 when new MPA buildings are fully operational.	On track to meet the target.	MPA will continue to monitor and implement interventions to meet our WEI target.	MPA will continue to monitor and implement interventions to meet our WDI target.

[5] Following the GreenGov.SG baseline (average water consumption from 2018 to 2020), MPA's WEI baseline is relatively low as water was primarily used for amenities and facility maintenance. Water consumption is expected to rise significantly from 2027, when our new buildings with water-cooled Air-Conditioning (AC) become operational. Water-cooled systems are more energy efficient, using 35% less electricity than air-cooled systems, but require more water. To allow a more equitable and meaningful WEI assessment, we have adjusted the WEI baseline to reflect a notional scenario that our existing infrastructure operates on water-cooled AC systems. This provides a more like-for-like reference point that accounts for the trade-off between increased water use and improved energy efficiency.

GREENHOUSE GAS EMISSIONS AND ENERGY UTILISATION INDEX

In 2024, MPA's total Scope 1 and 2 GHG emissions amounted to 11,231 tonnes CO_2 equivalent (t CO_2e). Scope 1 emissions[6] accounted for 82 per cent while Scope 2 emissions[7] accounted for 18 per cent of the total emissions. MPA is on track to reduce EUI to 120 kWh/m^2 by 2030. Our GHG emissions are expected to peak in 2027 or 2028 when our new buildings are fully operational.

Emissions Performance Overview



Emission Reduction (t CO_2e)

	Scope 1	Scope 2	Total (Scope 1 and 2)
Gross Emission	9,214 t CO_2e	2,017 t CO_2e	11,231 t CO_2e
Emission Reduction	-	Renewable: 87 t CO_2e	108 t CO_2e
Net Emissions	9,214 t CO_2e	1,930 t CO_2e	11,123 t CO_2e

Scope 1

- Vessels accounted for 73 per cent of total emissions
- Vehicles, on-site generators and offshore sites contributed 9 per cent of total emissions.

Scope 2

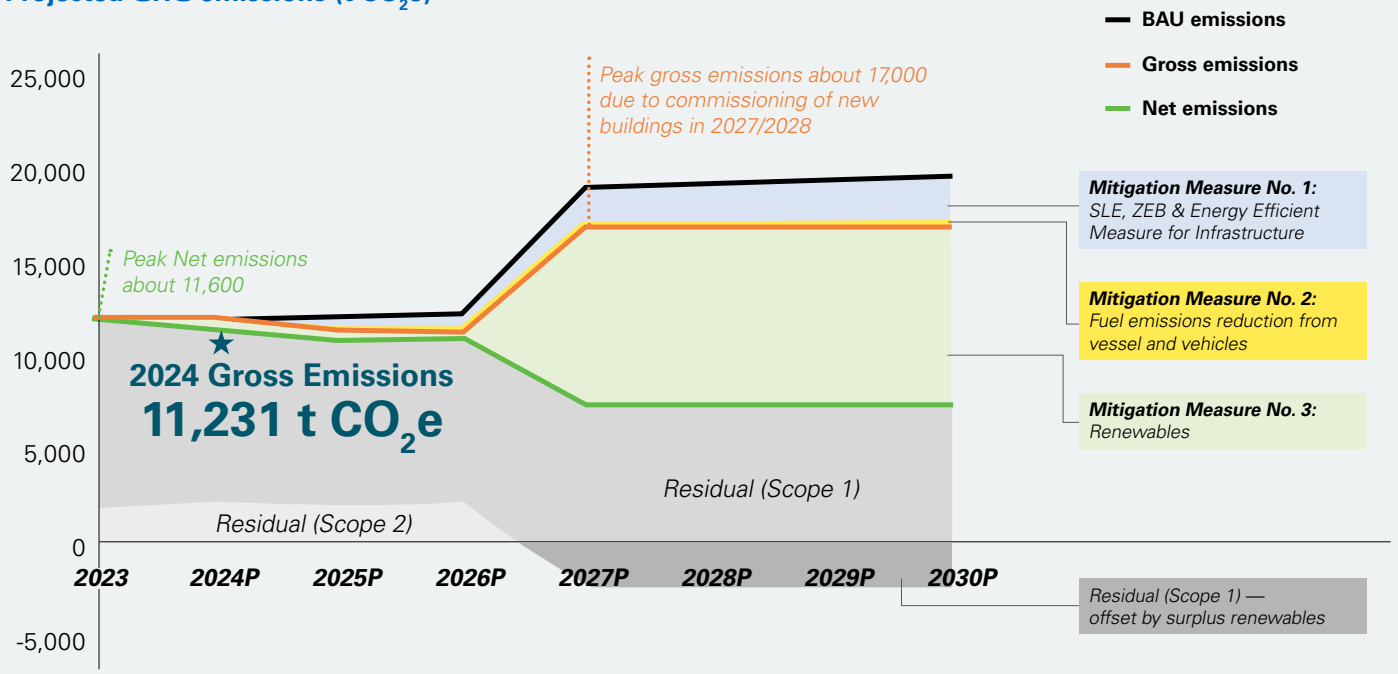
- MPA facilities contributed 18 per cent of total emissions

Notes:

1 MPA adopts the GHG Protocol Corporate Standard to calculate our GHG emissions. MPA's GHG emissions are calculated for our standard and non-standard infrastructure[8], operational vessels and operational motor vehicles.

[6] Scope 1 emissions are direct emissions from sources that are owned or controlled by the reporting entity.
[7] Scope 2 emissions are indirect emissions that result from the use of purchased electricity, heat and steam.
[8] Standard infrastructure refers to publicly accessible buildings with a computable gross floor area, such as MPA's offices and piers. Non-standard infrastructure refers to premises and assets that are either not publicly accessible or have no meaningful floor area.

Projected GHG emissions (t CO_2e)



Total energy consumption for 2024

Total non-renewable energy consumption (GJ)	Total renewable energy consumption (GJ)	Total electricity consumption (GJ)	Total energy consumption (GJ)
127,367	936	17,418	145,720

Renewable Energy for 2024

Renewable Energy Category	Renewable Energy Source	Unit of Measure	Gross Total	Total (GJ)
Solar	Solar Panels	kWh	260,073	936

Business As Usual (BAU) emissions: no extraordinary mitigation measures in place

[Mitigation measure no. 1]
Scope 2 reduction:

- MPA's new buildings are Zero Energy Building (ZEB), Super Low Energy (SLE)
- Lower EUI after office renovation and decommissioning of data centre
- Reduced office lease
- Other energy efficiency measures (e.g. Smart Building Management System)

[Mitigation measure no. 2]
Scope 1 reduction:

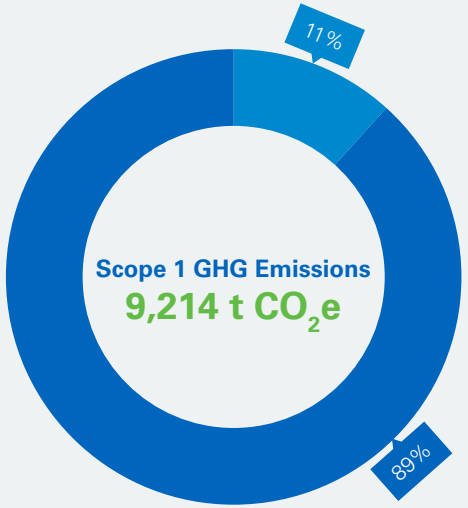
- Reduction of patrol craft and land vehicles
- Switch from fuel to solar from solarisation projects

[Mitigation measure no. 3]
Gross emissions reduction:

- Use of renewables at Marina South Pier and MPA new buildings

Scope 1

MPA's fleet of vessels account for 89 per cent of our Scope 1 emissions. The remaining 11 per cent comes mostly from petrol and diesel consumption for land vehicles and backup generators.



Our GreenGov.SG Strategy

1. Explore electric or biofuel-capable garbage collection craft
2. Leverage technology for hydrographic operations
3. Reduce use of vehicles
4. Solarise waterfront facilities

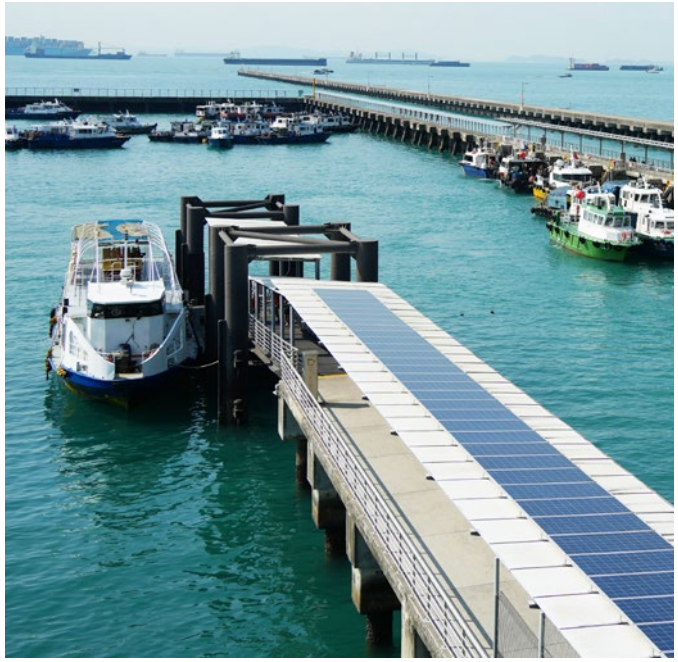
Mitigation Measures

1 ***Patrol Operations and Garbage Collection Services:*** The deployment of the patrol fleet is currently optimised for maximum coverage and minimal surveillance overlaps. We will explore using garbage collection craft that are fully electric, capable of using B100 biofuel or compatible with net-zero fuels. We will also explore using electric, bio-fuelled or net-zero hybrid patrol vessels for the next service contract in 2030.

2 ***Hydrographic Operations:*** MPA will be making more use of remote and autonomous technologies to carry out operations such as hydrographic surveys and monitoring marine aids to navigation. Among other things, this will enable us to reduce our fleet of five hydrographic vessels to four by 2028 and potentially reduce vessel trips for maintenance by half. Three vessel engines can use biofuels, and one is an LNG-diesel hybrid. By 2030, all vessels will be fully electric, compatible with net-zero fuels or use B100 biofuel. Lastly, all our marine aid-to-navigation lanterns are solar powered.

3 ***Vehicle Reduction and Electrification:*** MPA reduced its land vehicles from five to two in January 2024. The remaining two will be replaced with electric cars in 2025.

4 ***Solarisation of Waterfront facilities:*** A feasibility study in January 2024 explored how to optimise the use of solar energy at Marina South Pier in two phases.



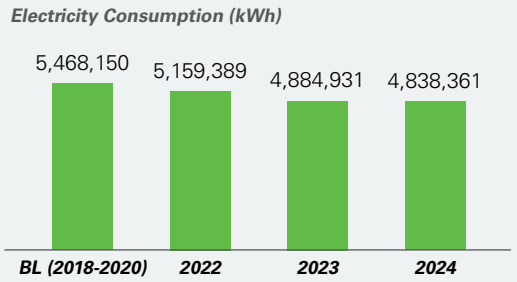
Solar photovoltaic panels at Marina South Pier

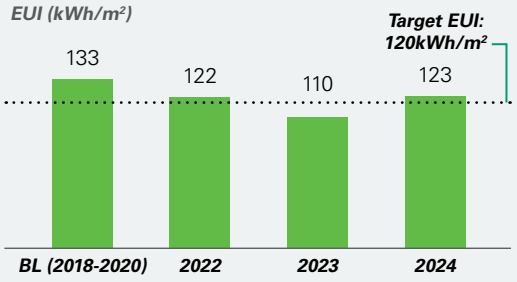
Scope 2

Electricity used to power MPA facilities and onshore operational equipment accounts for about 18 per cent of total GHG emissions.

Energy Utilisation Index (EUI)

Target: 10% reduction in EUI to 120 kWh/m² by 2030, compared to average of 2018-2020 levels.





Our GreenGov.SG Strategy

1. Transition to green data centre
2. Implement smart facilities management
3. Redevelop Maritime House with sustainability in mind

Mitigation Measures:

1 *Transition to Green Data Centre*

Migration of on-premises IT servers to cloud: By 2027, most of the IT server workload at MPA data centre will be migrated to Government on Commercial Cloud (GCC) services and commercial cloud. Commercial cloud options will be selected based on their Power Usage Effectiveness (PUE) and sustainability considerations.

With the planned migration to the cloud, MPA will decommission all 28 Solaris physical servers in 2025, and over 100 physical Windows servers and network equipment by 2027. This is expected to save about 600,000 kWh of electricity a year.

Green Mark Platinum Disaster Recovery Centre (DRC): The DRC is an alternative data centre for MPA. It was shifted to a BCA Green Mark Platinum certified data centre in August 2024. The new data centre has a PUE of 1.3, which is the industry's gold standard for efficient use of data centre power.

2 *Smart Facilities Management (FM) for MPA Facilities:*

A tender was called in December 2024 for the progressive installation of a central integrated Smart FM platform by 2027. This will incorporate Smart FM technologies such as digital meters, IoT sensors, and a building and energy management system.

Notes:

1. EUI is defined as the total electricity consumed by a facility in one year divided by its total gross floor area (GFA).
2. The formula used to calculate the EUI is: Total amount of electricity consumed in Year N / Total GFA in Year N
3. Following GreenGov.SG requirements, electricity consumption is consolidated for both standard and non-standard infrastructure. EUI is calculated only for MPA's standard infrastructure.
4. Following refinement of data collection parameters and improved data collection methods, electricity consumption for 2023 is restated to 4,884,931 kWh (from 4,888,718 kWh) and EUI figures for baseline and 2022 are restated to 133 kWh/m² (from 135 kWh/m²) and 122 kWh/m² (from 123 kWh/m²) respectively.

3 *Building Sustainable MPA Facilities*

MPA is implementing green and sustainable solutions within its own facilities through energy-efficient infrastructure projects.

Redeveloping Maritime House with Sustainability in Mind: The 22-storey Maritime House will be a net-zero energy facility. It will incorporate energy-efficient designs such as low-emissivity glass, shading fins, natural and mechanical ventilation, and a hybrid cooling system. This will save more than 40 per cent energy. Over 2,000 m^2 of photovoltaic systems will be installed on the roof and facade to generate more than 320,000 kWh of green electricity annually. When the re-development is completed in 2027, it will have 172 hotel rooms for seafarers and house maritime-related organisations such as the Singapore Maritime Foundation, Singapore Chamber of Maritime Arbitration, MPA Academy, and Maritime Energy Training Facility (METF). Dedicated ventilation systems and other facilities can turn the hotel rooms into a stay-home facility if required, such as in the event of a pandemic.

Artist's impression of Maritime House

Tuas Port Development Progress

The development of Tuas Port is testimony to Singapore's commitment to innovative and sustainable port development.

The Engineering and Design consultancy contract for Phase 3 of Tuas Port was awarded in October 2024. The design phase will explore sustainable initiatives, including the use of materials from Semakau landfill for reclamation, sustainable site offices, and integration of automation and robotics. Phase 3 is progressing steadily with 79 per cent of soil investigation work completed and an ongoing Environmental Impact Assessment.

Artist's impression of Tuas Port

OUR WATER AND EFFLUENTS DISCHARGE MANAGEMENT

Water is used in all MPA offices and facilities for operations and amenities. We track our water consumption using two indicators: total water consumption and Water Efficiency Index (WEI).

In 2024, MPA's total water consumption was 23,593 m^3. Marina South Pier (65 per cent), West Coast Pier (16 per cent), and Changi Point Ferry Terminal (8 per cent) accounted for 89 per cent of total consumption.

Public usage and the maintenance of piers account largely for the water consumption at these locations. At Marina South Pier, we are exploring alternative technologies, such as a seawater jet spray followed by a minimal amount of fresh water, to clean the jetties. We are investigating the areas of high water consumption at Marina South Pier, and will continue to monitor and manage the water usage to meet our WEI target.

Adjusted Baseline for Water Efficiency Index (WEI)

The current GreenGov.SG baseline for WEI is based on the average water consumption from 2018 to 2020, during which water use was primarily for amenities and general facility maintenance. This is a relatively low baseline. Water consumption is expected to rise significantly from 2027 onwards, when our new buildings with water-cooled air-conditioning (AC) systems become operational. The water-cooled systems are more energy efficient. They use about 35% less electricity than air-cooled systems for the same cooling load, but require the use of more water.

To allow a more equitable and meaningful WEI performance measurement from 2027, we have adjusted the WEI baseline[9] to reflect a notional scenario in which our existing infrastructure also operates on water-cooled AC systems, based on current technologies. This provides a more like-for-like reference point that accounts for the trade-off between increased water use and improved energy efficiency. (See WEI chart.)

To conserve water, the new buildings will also use energy-efficient AC systems featuring higher cycles of concentration (CoC)[10] and water-efficient fittings. The buildings will be designed to maximise naturally ventilated spaces and the temperature in air-conditioned spaces will be set higher. NEWater will be used to replace water lost in the cooling cycle, and the cooling tower will be designed to minimise the escape of water droplets and mist to reduce the loss of water.

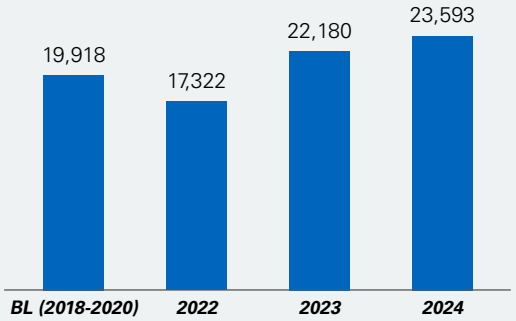
[9] Virtual AC water consumption from 2018 to 2026 is estimated using gross floor area from standard Infrastructure which include mTower, Integrated Simulation Centre and Maritime House, and deriving the cooling load (in RT) using typical cooling load from "BCA cooling load 2015 report" and typical cooling tower make-up water of 0.25 m^3/day/RT.

[10] This is the theoretical number of times water circulates within the cooling tower system before being discharged. A water quality monitoring system with automatic chemical dosage will be used to increase the CoC.

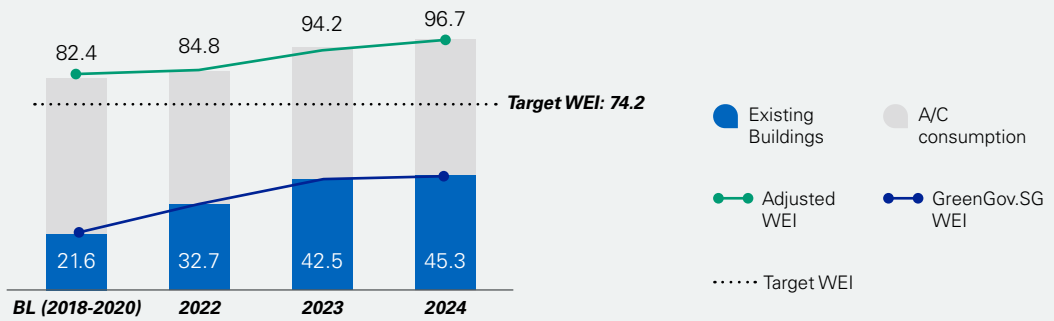
Water Efficiency Index (WEI)

Target: 10% reduction in WEI to 74.2 litres/person/day by 2030, compared to the average of 2018-2020 levels

Water Consumption (m^3)



WEI - adjusted baseline vs GreenGov.SG baseline (litres/person/day)



Notes:

1 WEI is defined as the water consumption per day divided by the total public officer headcount plus visitors.

2 The formula used to calculate WEI is:
[Total amount of water consumed at all Agency premises in Year N × 1000] / [Average number of operational days in Year N at all Agency premises × (Average number of staff per day at all Agency premises + (0.25 × Average number of visitors per day at all Agency premises))]

3 The water consumed by MPA comes from a third-party water source, the national water agency Public Utilities Board (PUB).

4 Water consumption data is extracted from water utility bills.

5 Following GreenGov.SG requirements, water consumption is consolidated for both standard and non-standard infrastructure. WEI is calculated only for MPA's standard infrastructure where water consumption is managed by MPA.

6 Following refinement of data collection parameters and improved calculation methodologies, water consumption and WEI figures for baseline, 2022 and 2023 are restated. Refer to the water consumption and WEI charts.

OUR WASTE MANAGEMENT

Our Waste Disposal Index in 2024 was 0.636 kg/person/day, with 386,693 kg of total waste disposed. MPA is taking active steps to meet our WDI target of 0.351 kg/person/day by 2030.

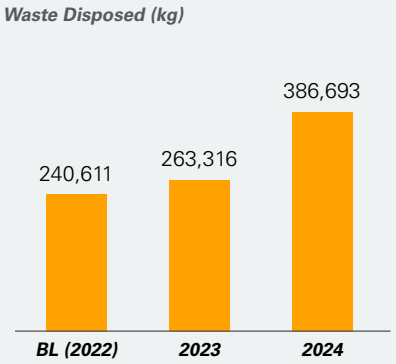
Total waste generated, disposed and recycled in 2024

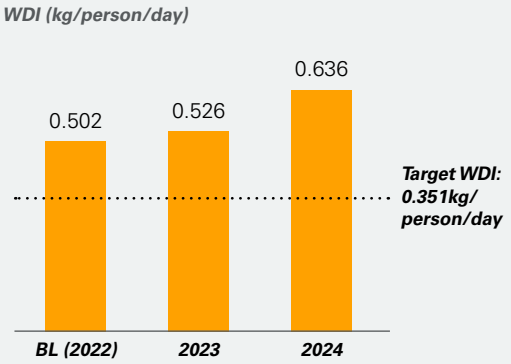
Total Waste Generated[11]	**392,377 kg**
General Waste[12] (Total waste disposed)	**386,693 kg**
Waste diverted from disposables by recycling	**5,684 kg**
• Paper Waste	4,500 kg
• Plastic Waste	1,047 kg
• Metal/Can Waste	137 kg

In 2024, 5,684 kg of recyclables were collected. To reduce waste generation and encourage recycling, we halved the number of waste bins and doubled the recycling bins at Marina South Pier in January 2024. New recycling bins and posters have also been placed along the jetty for harbour craft crew, and recycling numbers have gone up. We will continue to monitor the amount of general waste generated.

Waste Performance Overview

Target: 30% reduction in Waste Disposal Index (WDI) to 0.351 kg/person/day by 2030, compared to 2022 levels





Notes:

1 WDI is defined as the total waste disposed of per day divided by the total public officer headcount plus visitors.

2 The formula used to calculate WDI is:
[Total amount of waste disposed of for all Agency premises in Year N] / [Average number of operational days in Year N for all Agency premises × (Average number of staff per day for all Agency premises + (0.25 × Average number of visitors per day for all Agency premises))]

3 Following GreenGov.SG requirements, waste disposed is consolidated for both standard and non-standard infrastructure. WDI is calculated only for MPA's standard infrastructure where waste disposal is managed by MPA.

4 Waste disposed for 2023 is restated to 263,316 kg (from 263,260 kg) due to improved data collection methods.

[11] All waste is non-hazardous waste.
[12] All general waste is diverted to disposal. MPA's waste is collected and disposed by the National Environment Agency.

CHAPTER | 04

Maintaining Operational Excellence and Safety Standards

Operating one of the world's busiest ports requires constant attention to safety. MPA continues to prioritise safe and reliable operations while working to strengthen a culture of safety within the organisation. Safety incident number has remained low.

16th Joint Oil Spill Exercise (JOSE)

ENSURING A SAFE GLOBAL HUB PORT

Maritime Safety

We conducted various exercises to improve emergency preparedness. They included table-top simulations and ground deployments, such as the Ferry Rescue Exercise (FEREX) and Joint Oil Spill Exercise (JOSE). These exercises tested agencies and industry partners in their readiness to respond to incidents effectively.

FEREX 2024

FEREX 2024 involved over 200 personnel from eight government agencies, industry partners and volunteers to test Singapore's ferry incident response capabilities. This multi-agency exercise simulated a collision between an electric and a diesel-powered ferry, to assess readiness to handle battery fires, passenger evacuations, man-overboard incidents, and medical emergencies.

Watch the FEREX 2024 video here.

Mr Murali Pillai, Minister of State, Ministry of Transport and Ministry of Law, observed the FEREX Ground Deployment Exercise

JOSE 2024

The 16th JOSE brought together over 100 personnel from 18 agencies and companies to evaluate oil spill management in the Port of Singapore. The exercise included a table-top simulation and the deployment of dispersants and protective booms. MPA also explored new technologies to improve the response to oil spills. Demonstrations included the KOBOT, a compact remotely-operated oil recovery robot developed by the South Korean company KOAI and supported by Hyundai.

MPA's oil spill response contractor was activated to lay containment booms around the vessel in case of further leaks during the JOSE Ground Deployment Exercise.

The KOBOT is designed for use in shallow, confined waters such as marinas and canals. It measures 4.5 by 1.5 meters and weighs about 160 kg.

Singapore Safety@Sea Week 2024

The inaugural Singapore Safety@Sea Week was launched by Mr Murali Pillai, Minister of State, Ministry of Transport and Ministry of Law. Held between 19 and 23 August 2024, it brought together over 1,500 participants across 11 events. The Singapore Safety@Sea Conference provided first-hand perspectives on methanol and ammonia bunkering trials conducted in Singapore. The Responders Plus Programme Maritime Workshops were conducted for the first time, in collaboration with the Singapore Civil Defence Force (SCDF), to equip the maritime community with core skills in life-saving and essential emergency procedures. Eight MPA Safety@Sea Awards were presented for outstanding contributions to search and rescue efforts in 2023.

Watch the SS@S 2024 video here.

Launch of the Singapore Safety@Sea Week 2024 by Mr Murali Pillai, Minister of State, Ministry of Transport and Ministry of Law

Safer Seas Volunteer Programme (SSVP)

MPA launched the SSVP on 19 August 2024 to augment search and rescue capabilities in Singapore waters. The programme allows MPA to request nearby volunteer craft to help search and to report sightings for man-overboard situations. Volunteers were trained in basic search and first aid. The pilot batch of 17 volunteers received appointment letters from Mr Murali Pillai, Minister of State, Ministry of Transport and Ministry of Law. Representatives from Singapore Sailing Federation, ONE°15 Marina, and Marina at Keppel Bay received letters of appreciation for participating in the SSVP.

Appointment of the SSVP Volunteers

Industry Safety Briefing

We conduct half-yearly briefings for the harbour craft, pleasure craft and regional ferry communities to share lessons learnt from incident investigations as well as safety messages on navigation, the proper use of life jackets, and boarding practices.

Safety Briefing for Harbour Craft community

Search and Rescue (SAR)

SAR Coordination and Execution Course

The United States Coast Guard was engaged to conduct the SAR Coordination and Execution course in Singapore from 24 June to 5 July 2024 at the MPA Academy. Nineteen officers from MPA, SCDF, Republic of Singapore Navy (RSN) and Police Coast Guard (PCG) attended.

SAR Coordination and Execution Course

SAR Operations

On 19 July 2024, the Singapore Maritime Rescue Coordination Centre (MRCC) coordinated SAR operations after being alerted to a fire on the Singapore-flagged tanker, *Hafnia Nile*. The MRCC requested assistance from nearby ships, and an RSN frigate, *RSS Supreme*, and Republic of Singapore Air Force (RSAF) helicopter were deployed to aid in firefighting and crew evacuation.

All crew members were rescued.

In 2024, oil spills at sea and leaks from shore facilities tested our emergency protocols and the readiness of our personnel. The swift multi-agency response to these events validated the effectiveness of our emergency response capabilities. These experiences also provided lessons for us to continuously improve Singapore's maritime safety practices.

Oil Spill Clean-Up Operations

Following the allision between the dredger *Vox Maxima* and the bunker tanker *Marine Honour*, MPA led the whole-of-government response to manage the oil spill. MPA immediately activated the oil spill contingency plan, which included stabilising the damaged *Marine Honour* to prevent further oil leakage. The National Environment Agency, National Parks Board, Sentosa Development Corporation and Singapore Land Authority, among others, helped in the containment and clean-up efforts at sea and on land, including at the beaches and biodiversity-sensitive sites.

Refer to our annual report for more information on the allision.

Ship and Environment Safety

As the flag Administration for Singapore-registered ships, MPA carries out the Flag State Control functions to ensure that these ships comply with international and national regulations on maritime safety and security. MPA also conducts Port State Control (PSC) inspections to check that visiting and departing foreign ships comply with international safety and security standards. Click here for inspections conducted by MPA.

Ensuring Safety of Singapore-registered Ships

- Under the US Coast Guard QUALShip 21 programme, the SRS has upheld its QUALShip 21 status for the seventh consecutive year. The latest qualification covered the period 1 July 2024 to 30 June 2025.
- The SRS also achieved a record 3-year rolling average detention ratio of 0.30 percent under the QUALShip 21 programme in 2024.
- The SRS has consistently excelled and maintained its status on the whitelist of both the Tokyo and Paris PSC regimes.

Supporting the SRS fleet in the Red Sea and Gulf of Aden

In response to heightened security risks in the Red Sea and Gulf of Aden, MPA worked with the Information Fusion Centre in Singapore to monitor the movement of SRS vessels and put in place a process to coordinate support during emergencies. Along with MPA-issued advisories, these measures have strengthened collective situational awareness and readiness to respond to situations involving SRS in those areas.

Prototyping the Next Generation Vessel Traffic Management System (NGVTMS)

The NGVTMS will leverage data analytics to identify traffic hotspots, and advanced algorithms and machine learning to predict collisions and avert incidents. With improved situational awareness and enhanced communications, Singapore will be able to handle higher volumes and more complex vessel traffic without compromising navigational safety. Three vendors – Kongsberg Norcontrol AS, Tidalis BV, and Wartsila Singapore Private Limited – were contracted in April 2024 to develop NGVTMS prototypes for MPA's evaluation. MPA will test the prototypes and collate feedback on their use before the system is implemented.

Cybersecurity

MPA has taken steps to strengthen the maritime sector's cyber defences and response capabilities. Key initiatives include:

1 **Strategic Partnerships**: MPA has signed an MoU with Tallinn University of Technology (TalTech), Foundation CR14, Singapore Maritime Institute (SMI), and Singapore University of Technology and Design (SUTD) to advance human and technological capabilities in maritime cybersecurity.

MoU with TalTech, Foundation CR14, SMI and SUTD signed during Singapore Maritime Week

3 **Maritime Cyber Assurance and Operations Centre (MCAOC)**: This prototype centre provides real-time cybersecurity monitoring, disseminates information on cyber threats, and offers advisory services to companies on system recovery and response measures. By consolidating and economising the cybersecurity monitoring demands, the MCAOC reduces the need for subscribing companies to maintain their own monitoring capabilities and enables them to deploy manpower to higher-value activities.

2 **Cybersecurity exercises**: MPA conducted and participated in several cybersecurity exercises in 2024. The annual MPA-led cybersecurity tabletop exercise (TTX) brought together 10 companies from across the maritime sector, along with international participants from the Port Authorities CIO Cybersecurity Network (Pacc-Net) and other ports. The TTX simulated multi-regional cyber-attacks to test the pilot Maritime Cyber Assurance and Operations Centre (MCAOC).

Other exercises in 2024:

- Exercise CyberMaritime
- Participation in SAF Critical Infrastructure Defence Exercise (CIDEX) by Jurong Port Pte Ltd (JPPL), MPA and PSA
- Participation in CSA Exercise Cyber Knight by JPPL, MPA and PSAC

Competition:

- The team was ranked first in the US Maritime Transportation System Information Sharing and Analysis Center (MTS-ISAC)'s Capture the Flag 2024 Competition

Critical Infrastructure Defence Exercise (CIDEX)

Exercise CyberMaritime

SAFETY IN THE WORKPLACE

MPA sets clear standards for workplace safety in line with our Workplace Environment, Health and Safety (EHS) Policy, which is endorsed by the Chief Executive and communicated to all staff.

Employees have the right to stop work they deem unsafe and to raise such concerns without fear of reprisal. Both management and staff are responsible for maintaining a safe, healthy and sustainable workplace. Staff are expected to follow safe work practices and take responsibility for their own safety and the safety of co-workers. MPA supports open discussions on safety matters and considers staff suggestions for improvements, including measures to support mental wellness and well-being.

There were no work-related incidents reported in 2024.

[13] *MPA also complies with the Ministry of Manpower's Workplace Safety and Health (WSH) requirements. These requirements include the WSH (General Provisions) Regulations; WSH (Incident Reporting) Regulations; WSH (Safety and Health Management System (SHMS) and Auditing) Regulations; WSH (Workplace Safety and Health Committees) Regulations; WSH (First Aid) Regulations; and, WSH (Risk Management) Regulations.*

MPA's Safety Management System

MPA's Chief Executive oversees the implementation of our EHS policy through our Safety Management System (SMS)[13], and reports directly to the Board.

All divisions must conduct Risk Assessments (RA) to identify, evaluate and control risks in their respective work activities and environment. After every incident, the RA would be reviewed to improve the effectiveness of the control measures. All RAs were reviewed in MPA's bizSAFE 3 certification process.

The EHS Committee promotes a culture of safety. Its members come from various MPA divisions. The committee disseminates information and updates on MPA's safety systems and performance. It also conducts site visits to understand conditions and identify safety blind spots so that processes can be improved. Four site walks were conducted in 2024.

MPA's bizSAFE Certification Journey

In 2024, MPA attained the bizSAFE 4 certification. This is an initiative supported by MOM to enhance workplace safety and health capabilities. The certification underscored MPA's commitment to safeguard employee safety and well-being, reduce the risk of accidents and incidents, and improve operational efficiency.

Milestones:

bizSAFE 1	bizSAFE 2	bizSAFE 3	bizSAFE 4
Senior management completed the Top Executive WSH Programme.	EHS Committee members and divisional representatives attended a course on Developing a Risk Management Implementation Plan.	Comprehensive Risk Assessments were conducted and audited for all workplace activities and processes, in compliance with the WSH (Risk Management) Regulations.	Attainment of certification after the core team completed the 4-day "Develop a WSH Management System Implementation Plan" course.

MPA's bizSAFE Certification Journey

The bizSAFE 3 audit, conducted by a MOM-approved independent auditor, included document reviews, site visits and staff interviews. The audit revealed no violations or lapses, and the auditor commended MPA for:

- its strong leadership commitment to health and safety;
- allocating resources for safety programmes and measures (e.g., annual health screening, EHS committee, regular safety walks and talks);
- building a proactive safety culture by enabling staff to report near misses easily through the myMPA app;
- implementing hazard controls and ensuring staff are aware of risk control measures;
- extensive staff participation in bizSAFE 2: Risk Management training.

This certification journey underscored MPA's dedication to maintaining a safe and healthy workplace for all employees.

Senior management attending the Top Executive WSH Programme

Incident Reporting and Investigation

myMPA App
Staff report incidents, near-misses and unsafe conditions without fear of blame.

Daily Situation Report (SITREP) Emails
Reports are included in SITREP emails, triggering immediate investigation by affected divisions.

Investigations
Affected divisions investigate to identify root causes and implement appropriate corrective and preventive measures.

EHS Meetings
Findings from investigations are reviewed to share lessons learned across the organisation. Significant incidents are reported to senior management.

Safety Training

MPA's employees are given comprehensive safety training on medical emergencies, risk management, workplace safety, and community emergency preparedness.

MPA officers completed **3,570** hours of safety training.

Fostering A Safety Culture

Various events were organised by the EHS committee to promote workplace safety.

Lunch talk on strategies to manage workplace stress effectively.

MPA and SCDF jointly organised two rounds of the Responders Plus Programme Workshop to train MPA staff in essential emergency response skills. These included first aid, CPR, and the use of AED and fire extinguishers.

In April 2024, MPA implemented a desktop screensaver campaign to promote near-miss reporting through the myMPA app.

MPA disseminated heat stress management guidelines to all staff via email, emphasising the increased risks posed by warmer climate, particularly for outdoor workers.

CHAPTER | 05

Anchored in People and Culture

MPA is committed to developing a maritime workforce that is adaptable and ready for the future. We work in partnership with international organisations, our tripartite partners, and educational institutions to equip the Maritime Singapore workforce with new skills in digitalisation, decarbonisation and cybersecurity.

MPA also invests in our own people. We offer specialised training and upskilling programmes to ensure that we stay agile and ready to navigate the evolving maritime landscape. We prioritise employee well-being, fostering a fair and inclusive workplace with family-friendly policies. MPA staff regularly participate in community and environmental stewardship activities.

FUTURE-READY MARITIME WORKFORCE

MPA aims to build a resilient and adaptive maritime workforce through investing in education, skills development and collaborative innovation. A workforce that can support the digitalisation and decarbonisation of the maritime sector is a priority. We have several initiatives in place to develop this.

Maritime Energy Training Facility (METF)

In April 2024, MPA launched METF to equip the maritime workforce with skills to handle clean marine fuels safely. The training includes emergency response, safe handling, storage and transfer of alternative fuels like methanol and ammonia.

METF offers the Asia Pacific's first training course on the use of methanol as a fuel. Developed in partnership with the Singapore Maritime Academy (SMA), this course builds on the learning from the first methanol bunkering operation in our port in 2023.

Aside from SMA, the METF brings together over 50 other stakeholders, including marine engine manufacturers, international organisations, shipping companies, classification societies, trade associations, unions and institutes of higher learning. MPA will continue to work closely with industry partners and the unions to expand METF's training curricula and infrastructure.

With hundreds of crew changes taking place in Singapore daily, METF is well placed to train international seafarers. Since its launch, more than 500 have been trained, and about 10,000 seafarers and maritime personnel are expected to be trained by the 2030s.

In 2025, MPA will launch the METF Digital Platform to extend the training on the safe handling of alternative marine fuels and new technologies to a wider global maritime workforce. The prototype platform was showcased at Singapore Maritime Week 2025.

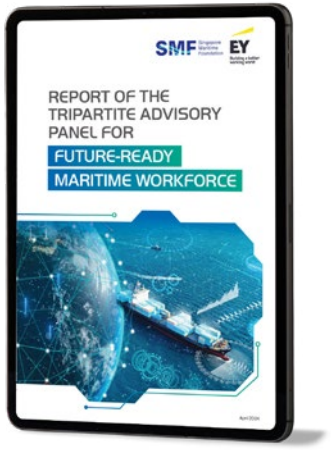
MoU on Maritime Cybersecurity Talent Development

At Singapore Maritime Week 2024, MPA signed an MoU with the Singapore Shipping Association, Singapore Institute of Technology, and Singapore University of Technology and Design. The partnership aims to improve collaboration and information-sharing on cybersecurity among maritime companies, develop maritime cybersecurity capabilities, and strengthen the cybersecurity talent pipeline. The signatories will develop specialised training curriculum, set training standards, and use simulation technologies to accelerate learning. This will also create more career opportunities in cybersecurity for mid-career professionals and youths.

MOU with SSA, SIT and SUTD signed during Singapore Maritime Week

Tripartite Advisory Panel (TAP) for Future-Ready Maritime Workforce

Singapore's strong tripartite partnership with the Government, employers and unions is critical to prepare our workforce well for the future. The TAP was formed in 2023 by the Singapore Maritime Foundation (SMF), supported by MPA, to look at how we can equip our workforce with future-ready skills and sustain a steady talent pipeline for Maritime Singapore. The TAP for Future-ready Maritime Workforce Report was published in 2024 to guide the development of skills to support the maritime workforce transformation.



Click here to read the full TAP report.

Joint Office for Talent and Skills

In March 2024, MPA and the SMF set up the Joint Office for Talent and Skills. It coordinates and drives tripartite efforts with industry partners and institutes of higher learning to facilitate training and upskilling opportunities for Singapore's maritime workforce in both shore-based and seafaring jobs.

The initiatives include:

- an MoU with the National University of Singapore to pilot an applied data science and analytics course tailored for maritime professionals; and
- the development of micro-credentials which can be stacked to earn formal or industry-recognised qualifications, in subjects such as cybersecurity and sustainability.

Career Conversion Programme (CCP) for Sea Transport Professionals and Associates

The CCP supports mid-career transitions and skills upgrading by offering salary support for employers and complete flexibility for on-the-job training. The programme was expanded in December 2023 to cover skills in critical new areas, such as maritime digitalisation, decarbonisation and cybersecurity. The Singapore Shipping Association and Association of Singapore Marine & Offshore Energy Industries will help participating employers to customise training programmes for their workforce.

MaritimeONE and Tripartite Maritime Scholarships

At the Awards Ceremony 2024, 63 persons received the MaritimeONE Scholarship while 10 received the Tripartite Maritime Scholarship.

Sail Milestone Achievement Programme (SailMAP) recipients at the Singapore Registry of Ships Forum 2024

The SailMAP was introduced in June 2022 to promote seafaring as a career in Singapore. It offers up to S$50,000 to each eligible seafarer who reaches career milestones. Fourteen seafarers were awarded the SailMAP in 2024.

STAFF DEVELOPMENT AND ENGAGEMENT

MPA prioritises staff development and engagement, helping our staff to develop future-ready skills and promoting employee well-being. MPA provides upskilling and reskilling initiatives focused on both technical competencies and emerging skills. Our performance management framework aligns individual goals with the organisation's objectives. An average of 105 training hours per employee was achieved in 2024.

Training and Learning Opportunities for MPA Staff

MPA has established technical competency frameworks for specialised roles and defined performance indicators using Whole-of-Government frameworks. These guide staff to identify areas for professional development. As the training arm of MPA, the MPA Academy offers specialised training programmes and initiatives for MPA officers, including courses on maritime safety and sustainability.

MPA introduced the Citizen Developer Programme to equip officers with digital competencies in data, automation, Generative AI and geospatial technologies. With these competencies, non-IT officers can develop lightweight digital solutions using low-code and no-code development platforms. This raises their digital proficiency and fosters a culture of digital innovation to improve work efficiency. MPA's IT officers support the programme by offering structured training, development guidelines and consultancy support.

Citizen Developer Training for Automation, July 2024

Employee Performance Appraisal and Feedback

MPA's Performance Management framework aims to build a workforce of high-performing and engaged employees. The performance appraisal process assesses each employee's performance against the goals set for the year, with their individual work goals aligned with MPA's organisational goals. Divisions set out their annual workplans, with details of projects, milestones and training. These plans are reviewed by senior management, and the mid-year and year-end appraisals refer to them. MPA uses competency frameworks and incorporates inputs from other managers to assess officers' performance.

Senior management and department heads are expected to conduct regular check-ins with staff and to keep an open-door policy to support staff in their professional and career development.

100% of employees completed their year-end appraisal in 2024.

Sustainability and Future Skills

MPA is equipping our officers with skills to tackle emerging sustainability issues. In December 2023, we introduced the Sustainability Level 1 course to give them a foundational understanding of key sustainability issues. Around half of MPA's staff have attended the course, and the rest will complete it by 2025. A Level 2 course focusing on practical approaches to sustainability will be introduced subsequently. Relevant teams have also undergone specialised training on sustainability reporting, sustainable finance, and carbon accounting.

Specialist Skills Development

Specialist Skills Development	Professional Development Training	Technology Proficiency Enhancement	Knowledge Sharing
MPA conducts training for our Vessel Operators, Supervisors, Marine Officers and Engineers on the latest safety standards and protocols and industry best practices.	To prepare for future innovations and challenges, MPA staff take courses on maritime decarbonisation and sustainability, and undergo specialised training in Ammonia Emergency Response and Ship Operations.	MPA equips its workforce with the necessary skills to leverage new technologies, with courses such as Python Programming and Systems Thinking.	MPA hosts regular knowledge-sharing sessions on topics such as maritime decarbonisation and supply chain resilience. They help our staff keep abreast of emerging trends and challenges in the maritime industry.

Career Support and Progressions

We actively support our staff's professional development and growth through the following initiatives.

- **Certified Career Coaches**: Two MPA officers have been certified as career coaches under the Public Service Division's Career Coaching Programme, and our staff can approach them for career coaching.
- **MPA's In-Service Sponsorship Programme**: This enables our staff to acquire knowledge and skills in emerging domains like sustainability, data and cybersecurity. They then have the potential to take on new roles in MPA.
- **On-the-job training in collaboration with industry partners**: MPA collaborates with industry partners and international organisations, such as the IMO and International Energy Agency, for attachment opportunities for our staff. There are also placements with organisations such as the American Bureau of Shipping for marine surveyors. The attachments allow our staff to learn and develop new competencies that they can apply when they return to MPA.

Promoting Sustainability Appreciation

We organised the following events to build a culture of sustainability among our staff.

Visit to Sustainable Singapore Gallery to learn about Singapore's sustainable development journey

Workshop to repurpose plastic waste into coasters and carabiners

Workshop on reusable beeswax wraps as alternatives to disposable plastic wraps

Workshop to repurpose eggshell waste into coasters

Employee Engagement and Well-Being

Beyond equipping our staff with the necessary skills, we strive to create an engaging and supportive work environment that promotes well-being and fosters a sense of belonging.

Employee wellness and well-being

MPA supports the personal and professional growth, physical health, and mental wellness of our employees with various initiatives:

- **Professional Development Fund**: This is available to employees with more than two years of service, to encourage participation in professional development, fitness and well-being activities.
- **Bursary Awards and Book Prizes**: These awards support the education needs of employees' families.
- **Annual Health Screening, Flu Vaccination and Wellness Activities**: MPA sponsors annual health screenings and flu vaccinations for our staff. MPA's well-being programmes were guided by the Corporate Health Screening Report. Employees are also encouraged to participate in various interest groups set up by MPA.
- **Wellness Ambassadors**: This initiative contributes to building a healthy and resilient MPA. Five ambassadors have been trained to provide basic mental and emotional support to their colleagues.
- **What 'Bout You (WBU)**: Launched in 2024, WBU supports our employees' physical and mental well-being through physical fitness activities and wellness talks and workshops.
- **Well-Being@Gov**: This is a Whole-of-Government app for public officers that offers self-care tools, face-to-face or virtual counselling and coaching sessions, and a 24/7 counselling hotline.

FIRST Awards, FIRST Champions, FIRST Team Award

The MPA FIRST Award recognises staff who exemplify MPA's FIRST Values[14] in their everyday activities. In 2024, two officers received the Exemplary FIRST Champion Award and 25 received the MPA FIRST Award.

Ms Sheila Teo, Engineer (Digital & Data Science) was awarded Exemplary FIRST Champion

Townhall

Our townhalls keep MPA officers updated on maritime developments, human resource matters and MPA CARES events. The townhalls are also opportunities for staff to have a dialogue with the Chief Executive and the senior management team.

23 September 2024 Townhall

MPA CARES Committee

The MPA CARES Committee, led by the Chief Care Officer (CCO), promotes employee and corporate social responsibility. Key events in 2024 included the Dinner & Dance, Family Day and MOT Family Charity Outreach.

MPA Senior Management at MPA Family Day

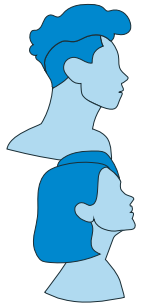
[14] *MPA's FIRST values are Forward Thinking, Integrity, Respect, Teamwork, and Service Excellence.*

A FAIR AND INCLUSIVE WORKPLACE

We are committed to nurturing an inclusive working environment that upholds fairness and equality. Our human resource policies align with the Tripartite Guidelines on Fair Employment Practices set by the Ministry of Manpower (MOM), National Trades Union Congress (NTUC) and Singapore National Employers Federation (SNEF).

We do not tolerate workplace discrimination. All employees and job applicants are treated equally, regardless of age, gender, ethnicity, nationality, religion or physical ability. Channels are available for officers to report discrimination, and all reports are handled in strict confidence and addressed promptly.

MPA values different perspectives and experiences, and we embrace diversity in our governance body (the Board) and workforce.

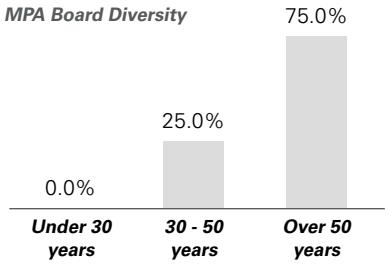


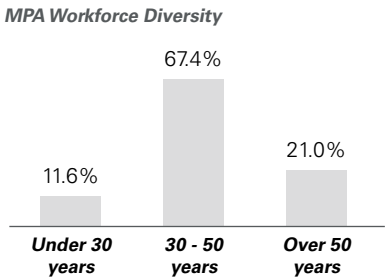
MPA Board

Male: 75%
Female: 25%

MPA Workforce

Male: 64%
Female: 36%





Our employment terms adhere to the Employment Act 1968 and the Retirement and Re-employment Act 1993. MPA offers comprehensive benefits packages to both full-time and part-time employees, which include work-related insurance, various leave options, medical outpatient schemes, annual health screenings and flu vaccinations.

Family-Friendly Employment Practices

MPA regularly reviews our employment practices to help employees balance their careers with personal and family needs. We offer flexible work arrangements, such as staggered reporting hours, part-time employment, job sharing, and working from home.

MPA also supports parents by offering parental leave[15] to both female and male employees. In 2024, 33 employees took parental leave. 88% of those who returned to work remained in the organisation a year later.

	Female	Male
No. of employees who took parental leave	12	21
No. of employees who returned to work after taking parental leave	11	21
No. of employees who returned to work after parental leave ended in FY2023 and were still employed 12 months later	8	21
Return to work rate[16]	100%	100%
Retention rate[17]	89%	88%

[15] Parental leave refers to maternity and paternity leave.
[16] The 'return to work-rate' is defined as the percentage of employees who returned to work after parental leave against the total number of employees who were due to return to work after taking parental leave. Total number of employees due to return to work in 2024 is 11 females and 21 males.
[17] The 'retention rate' is defined as the percentage of employees still in service 12 months after returning from parental leave in the previous FY. Total number of employees returning from parental leave in the previous FY is 9 females and 24 males.

BOOSTING COMMUNITY ENGAGEMENT AND CHARITY INITIATIVES

MPA makes meaningful contributions in areas such as social welfare, environmental conservation and public education.

Fostering Positive Community Impact

MPA recognised as Champion of Good

MPA was conferred the prestigious 'Champion of Good' status by the National Volunteer & Philanthropy Centre. The award recognised our contributions to corporate social responsibility in areas such as People, Society, Governance, Environment, and Economic Impact. MPA was part of the inaugural cohort of Companies of Good under the expanded Company of Good recognition system.

President's Challenge 2024

MPA was recognised as a Volunteering Partner and a Donor at the President's Challenge Appreciation Night (PCAN) on 18 November 2024. The President's Challenge supports efforts to build a more caring and cohesive society, and to help the less fortunate.

MOT Family Charity Outreach Event

The annual MOT Family Charity Outreach Event was graced by Dr Amy Khor, then Senior Minister of State for Transport and Sustainability and the Environment. The programme included a guided tour of Singapore's first fully electric harbour craft, *Penguin Refresh*, for 30 beneficiaries from REACH Community Services Ltd, and the presentation of a donation cheque to Community Chest.

MPA Family Day 2024

Representatives from MPA's two adopted charity organisations – REACH Community Services Ltd and Movement for the Intellectually Disabled of Singapore (MINDS) – were invited to participate in MPA's biennial Family Day on 9 November 2024. Adoption Renewal Certificates were presented to the CEOs of both organisations.

Environmental Stewardship Partnerships

MPA and Jurong Port Beach Clean-up

MPA and Jurong Port conducted a beach clean-up at East Coast Park, where 97 participants removed 213 kg of trash.

Earth Hour 2024

MPA switched off all non-essential lighting across its facilities and patrol craft in support of Earth Hour 2024.

Maritime Evolution Trail (Go Green Edition)

MPA hosted the Maritime Evolution Trail (Go Green Edition), a tour for the public which highlighted Singapore's sustainable maritime development. Forty participants explored interesting maritime sites, and learned about our maritime heritage at Keppel Harbour and green innovations at Tuas Port.

Environmental Education with Xingnan Primary School

MPA partnered Xingnan Primary School's Environmental Club to showcase the students' environmental projects at the Singapore Maritime Gallery. The exhibition featured dioramas, stories and poems to promote awareness and conservation of hawksbill turtles.

GRI Content Index

Statement of use

Maritime and Port Authority of Singapore has reported the information cited in this GRI content index for the period 1 January 2024 to 31 December 2024 with reference to the GRI Standards.

For the Content Index – Essentials With Reference option Service, GRI Services reviewed that the GRI content index has been presented in a way consistent with the requirements for reporting with reference to the GRI Standards, and that the information in the index is clearly presented and accessible to the stakeholders.

GRI 1 used GRI 1: Foundation 2021

GRI Standard / Other Sources	Disclosure		Location
GENERAL DISCLOSURES			
GRI 2: General Disclosures 2021	2-1	Organisational details	Page 02 – 03
	2-2	Entities included in the organisation's sustainability reporting	Page 03
	2-3	Reporting period, frequency and contact point	Page 03
	2-4	Restatements of information	Page 03
	2-5	External assurance	Page 03
	2-6	Activities, value chain, and other business relationships	Page 02, 14 – 15
	2-9	Governance structure and composition	Page 08 Refer to Our Annual Report 2024, Page 08
	2-10	Nomination and selection of the highest governance body	Refer to Our Annual Report 2024, Page 08
	2-11	Chair of the highest governance body	Page 08
	2-12	Role of the highest governance body in overseeing the management of impacts	Page 08
	2-13	Delegation of responsibility for managing impacts	Page 08
	2-14	Role of the highest governance body in sustainability reporting	Page 08
	2-15	Conflicts of interest	Processes to ensure that conflicts of interest are prevented and mitigated are set out in the Code of Conduct for MPA Board members. Instances of conflicts of interest are recorded but not disclosed to stakeholders as such involve business confidentiality and other sensitive matters.
	2-16	Communication of critical concerns	Page 08 – 09, 48 Refer to Our Annual Report 2024, Page 08
	2-17	Collective knowledge of the highest governance body	Page 08
	2-19	Remuneration policies	Refer to Our Annual Report 2024, Page 08
	2-20	Process to determine remuneration	Refer to Our Annual Report 2024, Page 08
	2-22	Statement on sustainable development strategy	Page 04 – 05, 14 – 15
	2-23	Policy commitments	Page 08, 14 – 15 Environment, Health & Safety (EHS), Page 47 – 48 Ethics Policy, Page 57
	2-24	Embedding policy commitments	Page 47 – 48, 57
	2-25	Processes to remediate negative impacts	Page 57
	2-26	Mechanisms for seeking advice and raising concerns	Page 09, 57
	2-27	Compliance with laws and regulations	Page 09, 47
	2-28	Membership associations	Page 14, 24
	2-29	Approach to stakeholder engagement	Page 12
	2-30	Collective bargaining agreements	We work closely with the Amalgamated Union of Statutory Board Employees (AUSBE) to support our employees.

GRI Standard / Other Sources	Disclosure		Location
MATERIAL TOPICS			
GRI 3: Material Topics 2021	3-1	Process to determine material topics	Page 10
	3-2	List of material topics	Page 11
ECONOMIC PERFORMANCE			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 15, 18 Refer to Our Annual Report 2024, page 20
GRI 201: Economic Performance 2016	201-1	Direct economic value generated and distributed	Refer to Our Annual Report 2024, page 07 of the Annual Financial Statements
	201-2	Financial implications and other risks and opportunities due to climate change	Page 09, 14
INDIRECT ECONOMIC IMPACTS			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 17 – 18, 35 – 37 Refer to Our Annual Report 2024, page 20
GRI 203: Indirect Economic Impacts 2016	203-1	Infrastructure investments and services supported	Page 17 – 18, 35 – 37 Refer to Our Annual Report 2024, page 20
	203-2	Significant indirect economic impacts	Page 17 – 18, 35 – 37 Refer to Our Annual Report 2024, page 20
ANTI-CORRUPTION			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 09
GRI 205: Anti-corruption 2016	205-3	Confirmed incidents of corruption and actions taken	Page 09
SECURE AND RELIABLE INFORMATION TECHNOLOGY INFRASTRUCTURE			
GreenGov.SG	/	Cyber Resilience and Digital Threat Preparedness	Page 46
	/	Green Information Technology	Page 36

GRI Standard / Other Sources	Disclosure		Location
ENERGY MANAGEMENT AND CLIMATE MITIGATION			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 36 – 37
GRI 302: Energy 2016	302-1	Energy consumption within the organisation	Page 32, 35 – 37
	302-4	Reduction of energy consumption	Page 32, 35 – 37
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 32 – 37
GRI 305: Emissions 2016	305-1	Direct (Scope 1) GHG emissions	Page 33, 35
	305-2	Energy Indirect (Scope 2) GHG emissions	Page 33, 35 – 37
	305-5	Reduction of GHG emissions	Page 33 – 34
CLIMATE RESILIENCE AND ADAPTATION			
GreenGov.SG	/	Advancing Eco Transportation	Page 35
World Ports Sustainability Programs	/	Infrastructure Resilience in Ports	Page 35 – 37
WATER AND EFFLUENT MANAGEMENT			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 38
GRI 303: Water and Effluents 2018	303-1	Interactions with water as a shared resource	Page 38
	303-2	Management of water discharge-related impacts	MPA complies with the regulatory limits under the Sewerage and Drainage Act (Chapter 294, Sections 72 and 74) and Sewerage and Drainage (Trade Effluent) Regulations enforced by PUB.
	303-5	Water consumption	Page 39

GRI Standard / Other Sources	Disclosure		Location
BIODIVERSITY			
GRI 3: Material Topics 2021	3-3	Management of material topics	MPA actively pursues and supports initiatives to promote biodiversity awareness and environmental stewardship, working closely with various stakeholders.
GRI 304: Biodiversity 2016	304-3	Habitats protected or restored	Page 44, 59 Refer to Our Annual Report 2024, page 12
	304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	Pulau Satumu's sandy shoreline, covering approximately 300 m^2, is a frequent nesting ground for turtles, including the endangered hawksbill turtle.
WASTE			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 40
GRI 306: Waste 2020	306-2	Management of significant waste-related impacts	Page 40 MPA engages the National Environment Agency (NEA)'s licensed e-waste collector to process our e-waste, such as data centre servers and equipment, office IT equipment and mobile devices.
	306-3	Waste generated	Page 40
	306-4	Waste diverted from disposal	Page 40
	306-5	Waste directed to disposal	Page 40
SUPPLIER ENVIRONMENTAL ASSESSMENT			
GRI 3: Material Topics 2021	3-3	Management of material topics	MPA has incorporated Green Procurement requirements into our procurement specifications, so that our suppliers align with national environmental standards and best practices. For MPA-organised events with more than 50 participants, we adhere to the Best Practice Guide for Organising Environmentally-friendly Events Checklist issued by GreenGov.SG.
GRI 308: Supplier Environmental Assessment 2016	308-1	New suppliers that were screened using environmental criteria	

GRI Standard / Other Sources	Disclosure		Location
EMPLOYMENT PRACTICES			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 57
GRI 401: Employment 2016	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	Page 57
	401-3	Parental leave	Page 57
OCCUPATIONAL HEALTH AND SAFETY			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 47 – 48
GRI 403: Occupational Health and Safety 2018	403-1	Occupational health and safety management system	Page 47
	403-2	Hazard identification, risk assessment, and incident investigation	Page 47
	403-4	Worker participation, consultation, and communication on occupational health and safety	Page 48
	403-5	Worker training on occupational health and safety	Page 49
	403-6	Promotion of worker health	Page 56
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	Page 56
	403-9	Work-related injuries	Page 47
TRAINING AND EDUCATION			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 53 – 54
GRI 404: Training and Education 2016	404-1	Average hours of training per year per employee	Page 53
	404-2	Programs for upgrading employee skills and transition assistance programs	Page 53 – 54
	404-3	Percentage of employees receiving regular performance and career development reviews	Page 54

GRI Standard / Other Sources	Disclosure		Location
DIVERSITY AND EQUAL OPPORTUNITY			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 57
GRI 405: Diversity and Equal Opportunity 2016	405-1	Diversity of governance bodies and employees	Page 57
NON-DISCRIMINATION			
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 09, 57
GRI 406: Non-discrimination 2016	406-1	Incidents of discrimination and corrective actions taken	Page 09, 57
PORT SAFETY AND SECURITY			
Global Maritime Forum	/	Navigating Geopolitical & Threats of Terrorism	Page 04 – 05
GRI 3: Material Topics 2021	3-3	Management of material topics	Page 42 – 45
GRI 416: Customer Health and Safety 2016	416-1	Assessment of the health and safety impacts of product and service categories	Page 42 – 45
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	Page 42 – 45
PUBLIC POLICY			
Global Maritime Forum	/	Defending Public Health	MPA is working with the Ministry of Health to review the responses for future pandemics. MPA also supports national efforts with border health screening at sea checkpoints to minimise the risk of importing diseases.

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