Maritime Singapore Decarbonisation Initiatives

14th MPA Co-operation Forum



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Background

• In Oct 2022, Singapore announced the raising of its national climate target to achieve net zero emissions by 2050.



Achieve net zero emissions by 2050

Long-Term Low-Emissions Development Strategy (LEDS)

Reduce 2030 emissions to 60 MtCO₂e after peaking emissions earlier 2030 Nationally Determined Contribution (NDC)





Background

• In July 2023, IMO adopted revised GHG strategy

Revised 2023 IMO GHG Strategy

International shipping GHG emissions reduction targets:

- At least 20%, striving for 30%, by 2030
- At least 70%, striving for 80%, by 2040
- Net-zero by or around, i.e. close to 2050 compared to 2008.
- Uptake of zero/near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5% (striving for 10%) of the energy used by International Shipping by 2030.
- Reduce CO₂ emissions per transport work by at least 40% by 2030, compared to 2008.







Domestic Harbour Craft **Future Marine Fuels**

Maritime Singapore's Decarbonisation Initiatives: Key Focus Areas



Carbon Awareness, Carbon Accounting, and Green Financing Singapore Registry of Ships

Driving International Collaborations



Port Terminals



Reducing Emissions from Port Terminals

Singapore's port terminals will transit towards a low-carbon future, through the adoption of cleaner energy, automation and digitalisation. By 2030, our port terminal operators aim to collectively achieve at least 60% reduction of total emissions from port operations as compared to 2005 levels, and to reach <u>net zero</u> emissions by 2050.





Tuas, Sustainable Port of the Future





Tuas Port, 1 Sep 2022.

A key design feature of Tuas port is sustainability. Examples include:

- Sustainable construction (eg: reusing locally available dredged and excavated materials)
- Electrification of port equipment (eg: yard cranes, prime mover vehicles) to reduce carbon footprint.
- Optimisation of energy through smart grid solutions, battery energy storage systems and green buildings.



Domestic Harbour Craft



Reducing emissions from Domestic Harbour Craft

Harbourcraft sector required to achieve net zero emissions by 2050.

2030

Looking ahead

MPA is working with terminal and harbour craft operators to **pilot the implementation of charging stations**. First charging station deployed at Pulau Bukom in April 2023.

MPA launched an **Expression of Interest** in July 2023, to assess the feasibility of designing and developing best-in-class electric harbourcraft in Singapore.

• From 2030 onwards, new harbour craft operating in our port waters must be **fully electric**, be capable of using **B100 biofuels**, or be compatible with **net-zero fuels** such as hydrogen.

2050







Expression of Interest (EOI) for full electric



MPA has issued an EOI on 10 July 2023 to invite interested parties to submit proposals to **design and promote adoption of full-electric harbour craft (e-HC)** in Singapore.

To promote wider and early adoption of e-HC, MPA intends to support harbour craft companies by:

- 1. Providing e-HC engineering reference designs and safety standards to adopt
- 2. Helping companies access more attractive financing solutions and lower the cost of production through aggregating overall demand for e-HC.



Enabling the use of Biofuel in Singapore

Studies and Trials

- Nanyang Technological University Maritime Energy & Sustainable Development Centre of Excellence (NTU MESD CoE) Biofuel compatibility study for Singapore harbour craft
 - Worked with engine OEMs and shipowners to map compatibility of harbour craft engines with various blends of biofuels.
 - All engines surveyed were compatible with biofuels up to B20, and about half were compatible with up to B30. About a
 quarter were compatible with up to B100.
- Sea trials to demonstrate the feasibility of using drop-in biofuel for Singapore harbour craft
 - NTU MESD's project evaluated the storage stabilities of various blends of biofuels
 - B30 B100 (UCOME/PME) and R20 R100 (HVO) was trialed on a cargo launch vessel. No significant issues were
 observed for the HVOs, but for B100, engine cleaning and regular maintenance is a must.





Enabling the use of Biofuel in Singapore



Review and Development of Standards

- <u>Development</u>: MPA has developed a framework to allow licensed bunker suppliers to supply biofuel within the Port of Singapore to vessels.
- <u>Quality</u>: MPA, ESG, and industry partners have developed a provisional national quality standard (up to B50) for marine biofuel. Standard to be upgraded progressively as trials for biofuel blends up to B100 are expected to be completed by 2025
- <u>Quantity</u>: Existing Singapore bunkering standards on mass flow metering (SS 648) are being reviewed to incorporate delivery of biofuel by 2Q2024.



Future Marine Fuels



The Maritime Industry is heading towards a Multi-fuel Transition.





Enabling a multi-fuel transition: Methanol

Standards Development

• Working Group on standard development for methanol bunkering to develop a Technical Reference for methanol bunkering in Singapore that covers custody transfer requirements for delivery

Emergency Response / Table-top Exercises / Mitigation Measures

- Table-top exercise (TTX): Organised with the International Chemical and Oil Pollution Conference and Exhibition (ICOPCE) 2023. Reviewed existing safety measures and standards, identified potential gaps and new safeguards, strengthened cross-agency coordination for an effective response to a methanol spill incident.
- HAZID/HAZOP Workshop. Organised in May 2023 with methanol bunkering trial partners, working group members and relevant government agencies to develop prevention, control and mitigation methods.



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Enabling a multi-fuel transition: Methanol

1st Methanol Bunkering Operation in Singapore

World's first ship-to-containership methanol bunkering – 27 July 2023

- Methanol Plume Model jointly developed by IHPC, A*STAR, TMSI, NUS, TCOMS to forecast dispersion path in event of accidental release and guide operations.
- Drones equipped with methanol detector and infrared cameras to augment detection of potential leaks into atmosphere and methanol flames in event of leak.
- Methanol Firefighting Awareness Programme conducted to educate crew members on risks/challenges of methanol fire, and response methods.



Forecasted Current Velocity at the Bunkering Location





Current direction (Horizontal) [rad

Enabling a multi-fuel transition: Ammonia



Safety studies with Institutes of Higher Learning (IHLs) / Research Institutes (RIs)



Standards Development

 Drafting of the Technical Reference for ammonia bunkering, with the aim to have a first draft to be completed by 2024.

EOI to develop ammonia power generation & bunkering solutions

 EMA/MPA invited proposals under an Expression Of Interest (EOI) to <u>develop end-to-end low or zero-</u> carbon ammonia power generation & bunkering <u>solutions</u> in Jurong Island.

Emergency Response/Table-top Exercises

Managing accidents involving ammonia as fuel for ships

- Three-day workshop featuring 2 accidental release scenarios and involving 70 participants from 12 countries in May 2023.
- Collaboration between MPA, Embassy of France, Innovation Norway, with support of the EU-funded project "Enhancing Security Cooperation In and With Asia".



Driving International Collaborations



As a responsible flag and port State, Singapore will continue to advocate for strong, credible and inclusive climate action at IMO and international fora.

Singapore seeks to plays 3 key roles on the global stage to advance maritime decarbonisation:



MPA formed the Future Fuel Port Network and joined the Zero-Emission Shipping Mission to develop harmonised standards for clean marine fuels. Actively contributed to discussions at IMO on the **Revised IMO Strategy adopted in Jul 2023**, including strengthened levels of ambition for 2030, 2040 and 2050 Working with the IMO Secretariat and Norway's Ministry of Climate and the Environment to develop "NextGEN" portal to visualise maritime decarbonisation projects and "NextGEN Connect" to facilitate inclusive route-based action plans in developing countries



Green & Digital Shipping Corridors (GDSC)



Asia-Pacific Green & Digital Corridor with the Port of Rotterdam





'Slik Alliance' aimed at driving zero emission shipping across the Indian & Pacific Ocean

Memorandum Of Understanding Between Maritime And Port Authority Of Singapore, The Port Of Long Beach, And The Port Of Los Angeles On The Establishment Of A Green And Digital Shipping Corridor



Transpacific Green and Digital Corridor between MPA, Port of LA, Port of Long Beach



Singapore Registry of Ships (SRS)



Singapore Registry of Ships (SRS)

- The SRS is the administration responsible for executing proper registration of ships and ensuring that ships and owners meet the stringent criteria required for their ships to sail under the Singapore flag.
- The SRS is committed to **tackling GHG emissions** arising from international voyages made by Singapore-registered ships.

MPA will continue to build on our existing efforts to encourage the SRS towards a low-carbon future.



SRS Green Notation launched on 1 November 2021

- Singapore-registered ships is awarded to Singapore-registered ships that reduce their carbon intensity to a level that exceeds the IMO EEDI Phase 3 requirements by at least 10% through the adoption of energy efficient technologies and/or adopt the use of alternative fuels.
- Ships awarded the Notation are issued with a Certificate of Recognition, which serves to enhance the vessel's attractiveness to charterers. Qualifying Singapore-registered ships will receive additional benefits such as reduction in their IRF and rebates on their ATT.



Carbon Awareness, Carbon Accounting, and Green Financing



Strengthening Companies' Capabilities in accounting for their Carbon Inventory & Promoting Green Ship Finance Landscape

MPA aims to support and enable a culture of carbon reporting and accounting amongst maritime companies.





MPA's approach towards building a Sustainable Maritime Singapore beyond the commitments pledged









Thank you.

