



MPA
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A Consortium Approach to drive Maritime Decarbonisation

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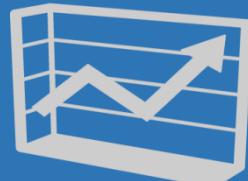
MARITIME SINGAPORE

In a Snapshot

About
1,000
vessels in the Singapore Port at
any one time



30+
MarineTech
Start-Ups and
growing



TOP
bunkering hub

50.04 M tons total
sales volume in 2021



One of the world's
Busiest
container hub ports



More than
5,000 maritime
establishments



Over **170**
international shipping
groups in Singapore



37.5 mil
TEUs of containers
handled in 2021



5th
largest ship registry
in the world



Maritime Singapore Decarbonisation Blueprint 2050

MARITIME SINGAPORE

DECARBONISATION
BLUEPRINT

WORKING TOWARDS 2050

PORT TERMINALS

Transit towards a low-carbon future through the adoption of cleaner energy, automation and digitalisation



in emissions from 2005 levels by 2030



DOMESTIC HARBOUR CRAFT

All harbour craft will operate on low-carbon energy solutions by 2030



in emissions from 2021 levels by 2030



in emissions from 2030 levels by 2050



FUTURE MARINE FUELS, BUNKERING STANDARDS AND INFRASTRUCTURE

Be ready for a multi-fuel transition to support the future of international shipping



Multi-Fuel Bunkering Transition

Supply low and zero-carbon marine fuels and enable green technologies



SINGAPORE REGISTRY OF SHIPS (SRS)

Recognise and incentivise owners to operate green ships



50% of SRS fleet

to be green ships by 2050



EFFORTS AT INTERNATIONAL MARITIME ORGANIZATION (IMO) AND INTERNATIONAL PLATFORMS



Standard-Setter and Bridge-Builder

Advocate strong, credible and inclusive climate action at the IMO and international fora

RESEARCH & DEVELOPMENT AND TALENT



Global Hub for Maritime Decarbonisation R&D

Enabled by a vibrant ecosystem with the talent and expertise to develop and deploy innovations

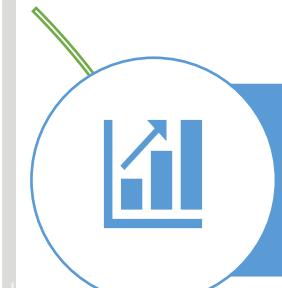
CARBON AWARENESS, CARBON ACCOUNTING AND GREEN FINANCING



Green Maritime Finance Hub

Promote green financing landscape and strengthen carbon accounting and reporting

MPA to commit additional \$300 million to support decarbonisation initiatives over next 10 years



Outline Singapore's strategic vision for maritime decarbonisation



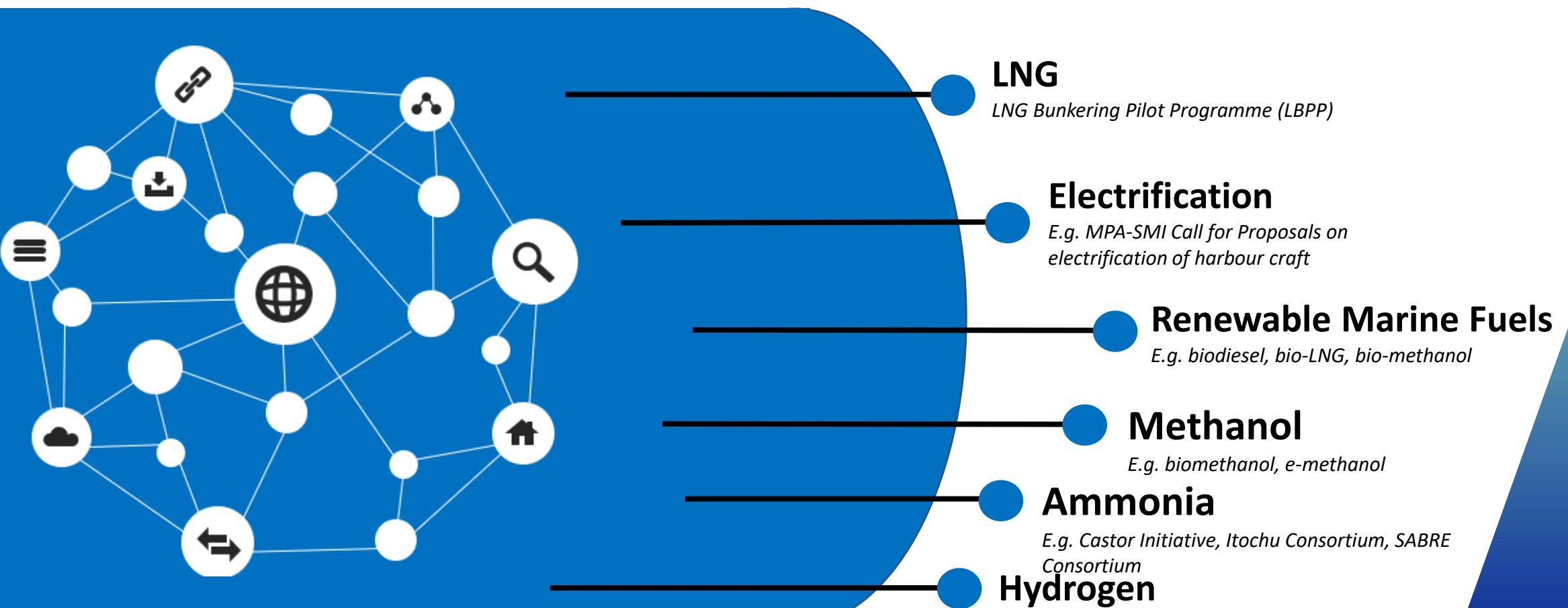
Catalyse cross-sector collaboration amongst value-chain partners, locally and overseas



Support and encourage the development, uptake, and commercialisation of new green technologies

As the top global bunkering hub, Singapore will be ready for a multi-fuel transition to support the future of international shipping

We will supply low and zero-carbon marine fuels and enable green technologies including biofuels, methanol, ammonia, and potentially hydrogen, while enabling abatement technologies such as carbon capture, utilisation and storage.



Supporting Joint Industry Projects, Safety Studies and Pilot Trials



Harbour Craft Electrification

- MPA-SMI awarded funding to 3 consortiums led by Keppel FELS, SeaTech Solutions and Sembcorp Marine to research, design, build and operate 3 full electric harbour craft over the next 5 years
- The electrification pilot project will demonstrate both commercial and technical viability of specific use cases for full-electric harbour craft with interoperable charging stations



Shipboard CCUS

- Proof-of-Concept and Prototype testing to develop and scale up CCS for shipboard application



Kuok (Singapore) Limited

PaxOcean  POSH

Excellence Through Safety



Biofuel Trials

- NTU MESD - Biofuel compatibility study for Singapore harbour craft
- Sea trials to demonstrate the feasibility of using drop-in biofuel for Singapore harbour craft
- Findings contribute to adoption of biofuel for marine vessels in Singapore



Ammonia Bunkering Safety

- GCMD awarded funding to DNV-led consortium on the project "Defining the safety and operational envelopes to enable ammonia bunkering pilot and demonstration"
- The project will define a robust set of safety guidelines and operational envelopes that will establish the basis of a regulatory sandbox for trials at two local bunkering sites.





On-going efforts: Joint Industry Projects on Feasibility of Ammonia as Marine Fuel

Joint Industry Pilot Trials and Test-Beds

- **Castor Initiative** – Led by MISC and involving Lloyd's Register, Samsung Heavy Industries, MAN Energy Solutions & Yara International to develop an ammonia-fuelled tanker
- **Itochu Joint Consortium** – Joining industry consortium to support ammonia bunkering in Singapore
- **SABRE Consortium** – Led by Sumitomo Corporation and involving A.P. Moller - Maersk A/S, Fleet Management Limited, Keppel Offshore & Marine, and Yara International ASA
- **EPS Consortium** – Led by EPS and involving HHI and ABS



Key Milestones

2025/26* – Expected delivery of first ammonia-powered ship, and first bunkering pilot trial

Leveraging maritime centers of expertise and develop green technology ecosystem with like-minded organisations

Maritime Energy & Sustainable Development Centre of Excellence



To **deepen** Singapore's maritime R&D capability in maritime energy and sustainability, **develop** innovative and sustainability solutions for green port and shipping, **grow** local experts and strong track leaders



Global Centre for Maritime Decarbonisation



To help the maritime industry eliminate GHG emissions by **shaping** standards, **deploying** solutions, **financing** projects, and **fostering** collaboration across sectors



Join our green technology ecosystem to co-develop decarbonisation solutions for the maritime sector

Shipping Lines, Ship Owners, Charterers & Port Operators

Shipping Lines, Ship Owners & Operators, Charterers



Port Terminal Operators



Tech providers and OEMs

Engineering Solution Providers, System Integrators



Shipyards & Designers



Classification Society



Supply Chain Partners



Local Institute of Higher Learning & Research Centres



Global Centres and Collaborations



Towards Green and Efficient Navigation



ZERO-EMISSION SHIPPING MISSION

COP 26: Clydebank Declaration for green shipping corridors

Future Fuels Port Network



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Thank You