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Singapore-Rotterdam Green & Digital Shipping Corridor accelerates digitalisation and decarbonisation with new global value-chain partners

Singapore-Rotterdam Green and Digital Shipping Corridor (GDSC) commences the implementation phase and aims to enhance operational efficiencies and lower barriers for first movers to ensure availability, acceptability and affordability of alternative fuels. The GDSC partners will convene for the inaugural GDSC Symposium as part of Singapore Maritime Week 2024.

The Singapore-Rotterdam GDSC was established by the Maritime and Port Authority of Singapore (MPA) and Port of Rotterdam Authority (PoR) in August 2022 to accelerate transformation efforts for maritime decarbonisation and digitalisation. Singapore and Rotterdam are among the largest bunkering ports in the world, making them vital links on the Asian-European shipping lanes and key players to help catalyse global efforts for international shipping to be more efficient, resilient and sustainable. To-date, the GDSC initiative has brought together 26 global value-chain partners across shipping lines, fuel suppliers, port authorities and operator, industry coalitions, banks, leading institutes of higher learning and knowledge partners.

Strong global support for Singapore-Rotterdam GDSC

Hapag-Lloyd, the world's fifth largest liner shipping company operating more than 260 ocean going vessels, is the latest addition to the corridor. Hapag-Lloyd joins four other leading global container shipping lines[1] which have committed to deploying large container vessels running on zero-and near-zero emission fuels along the high-volume Asia-Europe trade lane.

Other new corridor partners include A*STAR's Centre for Maritime Digitalisation (A*STAR's C4MD), led by A*STAR's Institute of High Performance Computing (A*STAR IHPC). A*STAR's C4MD aims to develop advanced computational modelling, simulation and artificial intelligence solutions for a safe, efficient and sustainable maritime ecosystem. The list of GDSC partners can be found in Annex A.

Encouraging the uptake of zero and near-zero emission fuels

The GDSC partners will be implementing several first-mover pilot projects and testing out commercial structures to accelerate the uptake of zero and near-zero emission fuels, such as synthetic and bio-variants of methanol, ammonia, methane, and hydrogen. This implementation follows earlier modelling studies undertaken by the Maersk Mc-Kinney Møller Centre for Zero Carbon-Shipping and the Centre for

[1] The container shipping lines are CMA CGM, Maersk, Mediterranean Shipping Company (MSC), and Ocean Network Express (ONE).

Maritime Studies of the National University of Singapore to explore multiple alternative fuels pathways and their viability as sustainable marine fuel.

Bio-methane Working Group

The bio-methane working group, led by SEA-LNG has examined relevant regulations and certification standards such as the ISCC EU certification to support the adoption of bio-methane for marine bunkering at a commercial scale. The GDSC partners plan to carry out Bio-LNG bunkering pilots over 2024 and 2025. These pilots would be based on mass balancing chain of custody principle that involves physical blending of certified bio-methane with non-certified conventional LNG across shared transport, storage and distribution infrastructure such as pipelines.

Methanol Working Group

Following the conduct of the Port of Rotterdam's green methanol terminal bunkering operation on the world's first methanol-fuelled container ship, and the world's first ship-to-containership methanol bunkering at the Port of Singapore, the methanol working group, led by PoR, has worked on a clear starting point for fuel standards and knowledge exchange on chain of custody principles. The Working Group will also be addressing common challenges such as acceptability, availability, and affordability to carry out commercial methanol bunkering at both Ports of Singapore and Rotterdam.

Ammonia Working Group

The ammonia working group, jointly led by MPA, the Nanyang Technological University Maritime Energy and Sustainable Development Centre of Excellence, and the A*STAR's C4MD will be developing a framework to assess the lifecycle greenhouse gas (GHG) intensity of green ammonia for bunkering, and a decision-making tool for value-chain partners to optimise their green ammonia supply chain network. This study, to be completed by 2025, will support ongoing efforts by the International Maritime Organization (IMO) to develop the Life Cycle GHG Assessment (LCA) framework and guidelines for alternative marine fuels.

Hydrogen Working Group

With Shell's contribution, the hydrogen working group has been assessing the technical and economic feasibility of hydrogen as a marine fuel for ocean-going container vessels. Going beyond desktop-based studies, the working group aims to develop novel ship designs allowing the GDSC partners to understand the cost differential and how to practically overcome the challenges, whilst maximising the opportunities that hydrogen as a sustainable marine fuel offers.

Commercial Structures Working Group to reduce cost barriers to zero and near-zero emissions fuels

To support these fuel-based initiatives and drive commercial scalability, a working group led by PoR and the Global Maritime Forum (GMF), supported by the GDSC

partners, is developing and testing commercial structures to reduce the cost barriers of using zero and near-zero emission fuels. The working group is currently exploring various demand and supply aggregation mechanisms and public and private financial levers that have the potential to collectively bring down the green premium and help bridge the cost gap.

Adoption of digital solutions for efficient and secure ship-shore data exchange and GHG emissions monitoring, reporting and verification (MRV)

On the digital front, Singapore and Rotterdam have successfully trialled the exchange of port-to-port data and are now able to exchange vessel arrival and departure times to facilitate port planning and for ships to optimise their port call voyage between Singapore and Rotterdam. Following this successful trial, Singapore and Rotterdam have jointly issued a call-for-proposal (CFP) for standards-based solutions that enable efficient and secure data exchange between ship and shore. This exchange will be in accordance with global standards from the IMO, International Hydrographic Organization (IHO), and International Organization for Standardization (ISO). As part of the CFP process, more than 30 representatives from global shipping lines and technology providers have signed up for the industry engagement session to explore the role of digital ship identity solutions, refine data exchange process and align on value quantification[2]. The closing date for submissions is on 31 May 2024.

Together with industry partners, both ports are facilitating a proof of concept to conduct monitoring, reporting and verification (MRV) of GHG emissions along the route. The proof of concept, which aims to be enhanced through future open calls, would be based on global industry standards for emissions reporting and aligned with international and regional emissions reporting requirements such as those under the EU's MRV regime and the IMO's Data Collection System (DCS).

Mr Teo Eng Dih, Chief Executive of MPA said, "The progress made since the establishment of the Singapore-Rotterdam Green and Digital Shipping Corridor in August 2022 demonstrates that public-private collaboration across global value chains can be achieved. This collaboration will allow Singapore and Rotterdam to pilot innovative solutions on one of the world's busiest shipping routes and accelerate the decarbonisation and digitalisation of the shipping industry."

Mr Boudewijn Siemons, Chief Executive Officer of POR said, "The Singapore-Rotterdam Corridor is a very valuable collaboration in accelerating the twin transition: the integration of digital innovation in energy transition efforts. Not only are we seeing the first results in standardization and data sharing for Port Call Optimization but also the first steps in moving towards operationalization of zero and low carbon fuels on this trade lane."

<End of Release>

[2] Details of the CFP can be found at https://www.mpa.gov.sg/regulations-advisory/maritime-singapore/innovation-and-r-d/call-for-proposals/mpa-por-gdsc-cfp

About the Maritime and Port Authority of Singapore (MPA)

MPA was established on 2 February 1996 with the mission to develop Singapore as a premier global hub port and international maritime centre, and to advance and safeguard Singapore's strategic maritime interests. MPA is the driving force behind Singapore's port and maritime development, taking on the roles of port authority, maritime and port regulator and planner, international maritime centre champion, national maritime representative and a champion of digitalisation and decarbonisation efforts at regional and international fora such as at the International Maritime Organization. MPA partners industry, research community and other agencies to enhance safety, security and environmental protection in our waters, facilitate maritime and port operations and growth, expand the cluster of maritime ancillary services, and develops maritime digitalisation and decarbonisation policies and plans, R&D and manpower development. MPA is responsible for the overall development and growth of the maritime domain and Port of Singapore. In 2023, Singapore's annual vessel arrival tonnage crossed 3 billion Gross Tonnage and remains the world's busiest transshipment hub, with a total container throughput of 39.0 million 20-foot equivalent units (TEUs).

For more information, please visit www.mpa.gov.sg/

About the Port of Rotterdam Authority

The aim of the Port of Rotterdam Authority is to strengthen the competitive position of the port of Rotterdam as a logistics hub and a world-class industrial complex in terms of both size and quality. The Port Authority is able and willing to make an impact and so it is focusing on accelerating sustainability in the port and it is a partner in the digitalisation of the port and logistics chains. The Port Authority's core tasks are the sustainable development, management and operation of the port, the maintenance of the smooth and safe handling of shipping and supporting the future-resilience of the port of Rotterdam.

For more information, please visit https://www.portofrotterdam.com/

About Singapore Maritime Week 2024

SMW is an annual gathering of the international maritime community to advance key industry issues and exchange ideas to bring the sector forward. Driven by MPA, in collaboration with industry stakeholders and research and educational institutions, SMW brings together key opinion leaders and industry leaders through conferences, dialogues and forums.

The range of activities and events organised by MPA, industry stakeholders and research and educational institutions, as well as the cosmopolitan profile of

participants, reflect the vibrancy and diversity of Singapore as a global hub port and leading international maritime centre.

For media enquiries, please contact:
Jotham Teo
MPA Corporate Communications
Email: jotham_teo@mpa.gov.sg

Mandy Ros
Spokesperson Port of Rotterdam regarding energy transition
Email: mj.ros@portofrotterdam.com

ANNEX A: LIST OF SINGAPORE-ROTTERDAM GDSC PARTNERS

Name	Nature of Operations
Maritime and Port Authority of Singapore [Convenor]	Port Authority
Port of Rotterdam Authority [Convenor]	Port Authority
PSA International	Port Operator
A.P. Moller Maersk A/S	Shipping Line
CMA CGM	Shipping Line
Hapag-Lloyd	Shipping Line
MSC	Shipping Line
Ocean Network Express	Shipping Line
BP	Fuel Supplier
Shell	Fuel Supplier
Yara Clean Ammonia	Fuel Supplier
Citi	Finance/Investment-related Institution
Clifford Capital	Finance/Investment-related Institution
Digital Container Shipping Association	Industry Coalition
Methanol Institute	Industry Coalition
SEA-LNG	Industry Coalition
A*STAR's Centre for Maritime Digitalisation (A*STAR's C4MD)	Knowledge Partner
The Centre for Maritime Studies of the National University of Singapore	Knowledge Partner
The Global Centre for Maritime Decarbonisation	Knowledge Partner
The Global Maritime Forum	Knowledge Partner
The Mærsk Mc-Kinney Møller Center for Zero-Carbon Shipping	Knowledge Partner

RMI	Knowledge Partner
Nanyang Technological University Maritime Energy and Sustainable Development Centre of Excellence	Knowledge Partner
University of Oxford	Knowledge Partner

Please be aware that the Annex does not include all Singapore-Rotterdam GDSC Partners, as certain partners have opted for anonymity.