Singapore Safety @ Sea 2024 – Panel discussion on ammonia bunkering

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The context

- In July 2023, IMO adopted revised GHG strategy

Revised 2023 IMO GHG Strategy

International shipping GHG emissions reduction targets (compared to 2008):

- 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

- 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 CO_2 emissions per transport work by at least 40% by 2030, compared to 2008.

IMO
INTERNATIONAL MARITIME ORGANIZATION

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Enabling a multi-fuel transition: Ammonia

Joint Industry Projects (JIP)

Standards Development

- Drafting Technical Reference for ammonia bunkering.

Request for Proposal (RFP) to develop ammonia power generation & bunkering solutions

- MPA and the Energy Market Authority (EMA) have shortlisted two consortiums to proceed with a pre-Front End Engineering Design (pre-FEED) study. A lead developer is aimed to be selected by Q1 2025.

Request for Information (RFI) to quote shipping and insurance cost of ammonia

- Identify ammonia demand hubs between source country and Singapore, demand aggregation to reap economies of scale

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

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”.

Key milestones of the ammonia fuel trial

- **World's First Use of Ammonia as a Marine Fuel in a Dual-Fuelled Ammonia-Power Vessel:** Conducted on board the Singapore-flagged *Fortescue Green Pioneer*
- **Safety preparations:** HAZID and HAZOP workshops to identify potential risks during fuel transfer and engine trials. Onboard drills and training conducted to assess operational readiness and preparedness of crew during an incident.
- **Plume modelling:** Ammonia plume model developed by research institutes*.
- **Safety Measures:** Safety zone established, response vessels positioned, monitoring via drone. First fuel trial (3 tonnes of ammonia in combination with diesel) took place over 7 weeks, second fuel trial (4.4 tonnes of ammonia in combination with HVO) over 10 days.

**Agency for Science, Technology and Research's Institute of High Performance Computing (A*STAR's IHPC)*
**Nanyang Technological University's Maritime Energy and Sustainable Development Centre of Excellence (MESD)*
**Technology Centre for Offshore and Marine, Singapore (TCOMS)*
**National University of Singapore's Tropical Marine Science Institute (TMSI)*

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Maritime Energy Training Facility (METF)

- MPA will establish an industry-supported facility for the training of the global maritime workforce in handling and operating vessels using clean marine fuels.
- Around 10,000 seafarers and other maritime personnel are expected to be trained at METF from now to the 2030s, as the facilities are progressively developed by 2026.

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THANK YOU