Value Proposition of MOL in ammonia supply chain

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MOL Group Corporate Mission

From the blue oceans, we sustain people's lives and ensure a prosperous future.

MOL at glance

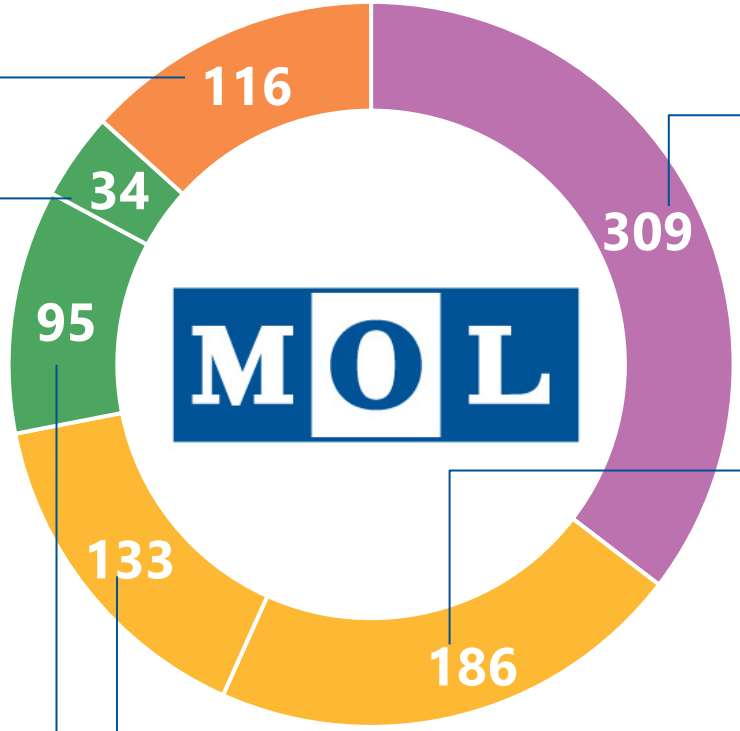
Operates and owns over 800 ships and has connections with various industries around the world

MPP・Ferries・Cruise ships

Bulkers

Container ships

Tankers



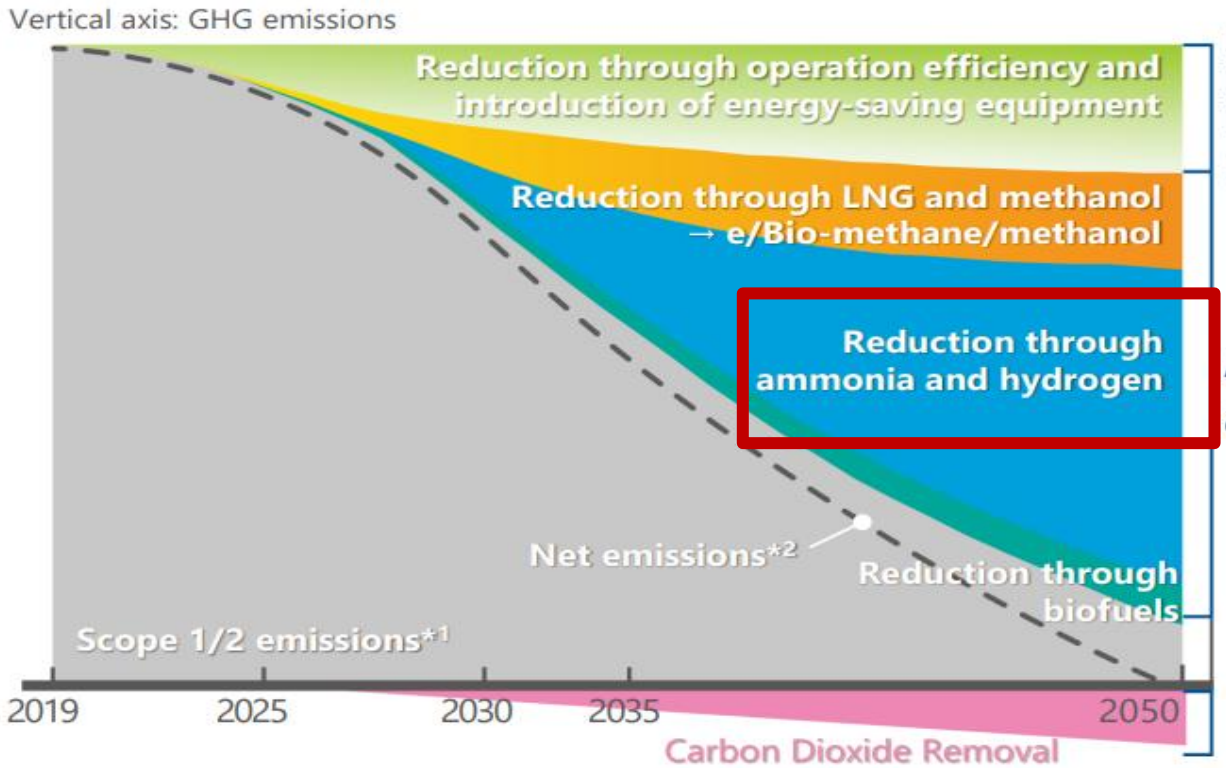
Pure Car Carriers

LNG carriers/FSRUs

Data：MOL HP(March 2024)

“Environmental Vision 2.2” - Alternative Fuels -

- Based on the premise that the optimal fuel differs depending on the type of vessel and shipping route, we have begun considering adopting a variety of fuels.
- **In the short term, LNG / Methanol is realistic fuel, but Ammonia will be main fuel in the long term**. We have a plan to offset remained emissions as of 2050 by using carbon credit.



Efficiency improvements mainly focused on wind propulsion:
approx. 20%

Adoption of clean energy:
approx. 70%

Less than 10% residual
Neutralization through carbon dioxide removal

Introduction of alternative fuels
Milestones

- **2030 Ratio of zero-emission fuel used: 5%**
- **2030 No. of LNG/methanol-fueled ocean-going vessels: 90**
- **2035 No. of net zero emissions ocean-going vessels: 130**

MOL position in ammonia supply chain

Energy Production | **Transportation** | **FSRU, fuel purchase and utilization, bunkering business, etc.**

Investment in Producing Project

Clean Ammonia Production Project

- Participation in the investment for the project in USA, undertaken by CHW.

Development and Operation of Dual Fuel Ships

Ammonia Dual Fuel ships

- Obtaining Approval in Principle for large-scale ammonia DF ships.

Shipping

Ammonia Carrier

- Leveraging our operational experience with ammonia carriers, we are participating in transportation study for Japan with JERA.

Ammonia-FSRU

Ammonia FSRU

- Challenges leveraging the unique operational experience of one of the largest FSRU owner and operators.

Ammonia-Bunkering

Ammonia bunkering vessel

- Obtained the first Approval in Principle for an ammonia bunkering vessel.
- Participating in study in Singapore.

Clean Hydrogen Works
Creating a Cleaner Future

Value Proposition of MOL

Value Proposition

Building a comprehensive value chain with expertise in safe marine transportation & Project management skills cultivated over 140 years and a diverse lineup of services

	Barriers on the ammonia supply chain	Our Strengths
Upstream	Infrastructure of port, Lack of off-takers	**Contribution on production projects as an off-taker and shipping partner**
Midstream	Securing vessels and safe and efficient transportation are issues	**Track record of ammonia transportation**
	Enormous ammonia transportation	**Fleets expansion and development of larger vessels (J-Flex) to meet future demand with DF engines for future**
Downstream	Establishment of domestic supply chain	**Establishment of large receiving terminals and fleets expansion of domestic vessels and domestic coastal feeders**
	High costs for building onshore storage facilities	**Development of Ammonia-FSRU**


MOL
商船三井

2 “Environmental Vision 2.2” - Pathway To Net-Zero Emission -

Medium- to long-term targets

In the 2020s
Deploy net zero emissions ocean-going vessels

By 2035
Reduce GHG emissions intensity by 45%
In addition to Scope 1, part of Scope 3 covered (international marine transport operated by MOL)

By 2050
With the concerted effort throughout the Group, achieve net zero GHG emissions
All of Scope 1, 2, and 3 covered (MOL + consolidated subsidiaries)

Five actions to achieve medium- to long-term targets

- ACTION 01 Adopt clean energy
- ACTION 02 Further adopt energy-saving technologies
- ACTION 03 Efficient operations
- ACTION 04 Build business models that enable net zero emissions
- ACTION 05 Expand low-carbon / decarbonized business by leveraging the Group’s collective strengths

KPI & milestones measuring action progress

Environmental Vision 2.2 Overall
- Amount of environmental investment: ¥650.0 billion (Cumulative from FY2023) [2025]
- Total amount of GHG emissions : 23% reduction (compared to 2019) [2030]

- No. of LNG/methanol-fueled ocean-going vessels : 90
- Ratio of zero-emission fuel used : 5%
- Ratio of power from renewable energy for Scope 2 : 100% [2030 for the above]
- No. of net zero emissions ocean-going vessels : 130 [2035]

- No. of vessels equipped with Wind Challenger : 25 [2030]
- No. of vessels equipped with Wind Challenger : 80 [2035]

- Improve fuel efficiency by 5% (compared to 2019) [2025]

- Amount removal type carbon credits used : 2.20 million t-CO2e (cumulative) [2030]

Study of Ammonia Transportation with JERA

- Developing ammonia carriers “J-Flex” suitable for domestic power plants and receiving terminals
- **“J-Flex”** as a large-scale ammonia carrier, which has larger capacity than conventional VLGCs
- Planning to use ammonia as marine fuel with DF engines
- Targeting commercial operation of ammonia co-fired at Hekinan Power Plant in 2020s

Large receiving terminal in Japan

Development of Ammonia receiving terminal in Soma area, Fukushima Prefecture in Japan

- We work on study of new building of **Ammonia receiving terminal in Soma area, Fukushima Prefecture in Japan** to meet local demand with below partners.

- The project was adopted as “Subsidy for Measures to Promote Introduction of Non-Fossil Energy (**Hydrogen Supply Infrastructure Improvement Project**)” from the Consortium for Resilient Omni-energy supply System (“CROS”) for the survey for establish an ammonia supply on May 30, 2024.

Concept study of Ammonia FSRU

- Obtained design approval for **Ammonia FSRU** from Class NK.

- FSRU could be the solution for coal-fired power plant with no extra ground available for ammonia related facilities. We can offer our expertise developed in LNG FSRU business.