



# CCUS and Low Carbon Fuels

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## Development of a Synthetic Fuel Value chain from a Shipping Perspective

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Carbon Solution Development Unit

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# Agenda

- 1. Overview of MOL**
- 2. MOL's Overall Strategy**
- 3. MOL's Value Proposition**

# 1. Overview of MOL

**Our  
Business**

**Supporting and  
Changing the World  
from the Blue Oceans**





Establish  
**Year of 1884**  
140<sup>th</sup> history

# of MOL  
Group Employee  
**9,795**

# of Countries MOL  
Group Bases  
**31**  
(as of Aug. 2024)

Revenues  
**JPY 1,627**  
billion

MOL Group Fleets  
**873**  
vessels

# of Group  
Companies  
**545**

The year of net-zero  
emission  
**2050**

Ordinary profit  
**JPY 258.9** billion

Others



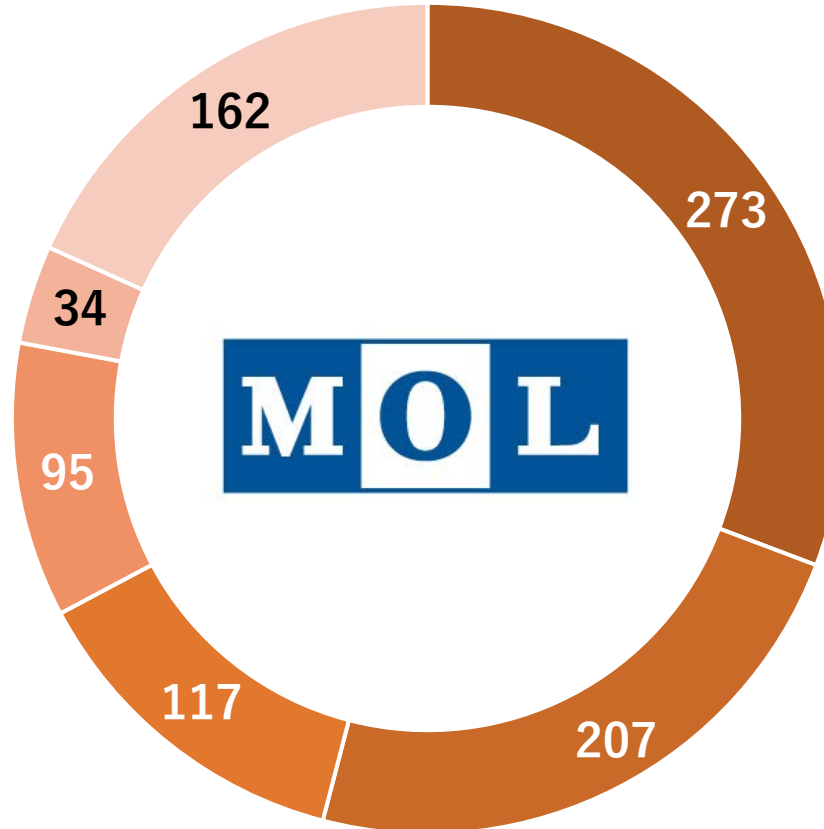
CONTAINER SHIPS(\*)



CAR CARRIERS (PCC)



Operating **over 800 vessels**, with connections to various industries around the world.



(\*)Japanese three shipping companies including MOL integrated their container service under Ocean Network Express(ONE) brand in July 2017.

BULK CARRIERS



TANKERS



LNG CARRIERS/FSRU/FSU



# MOL's Regional Offices

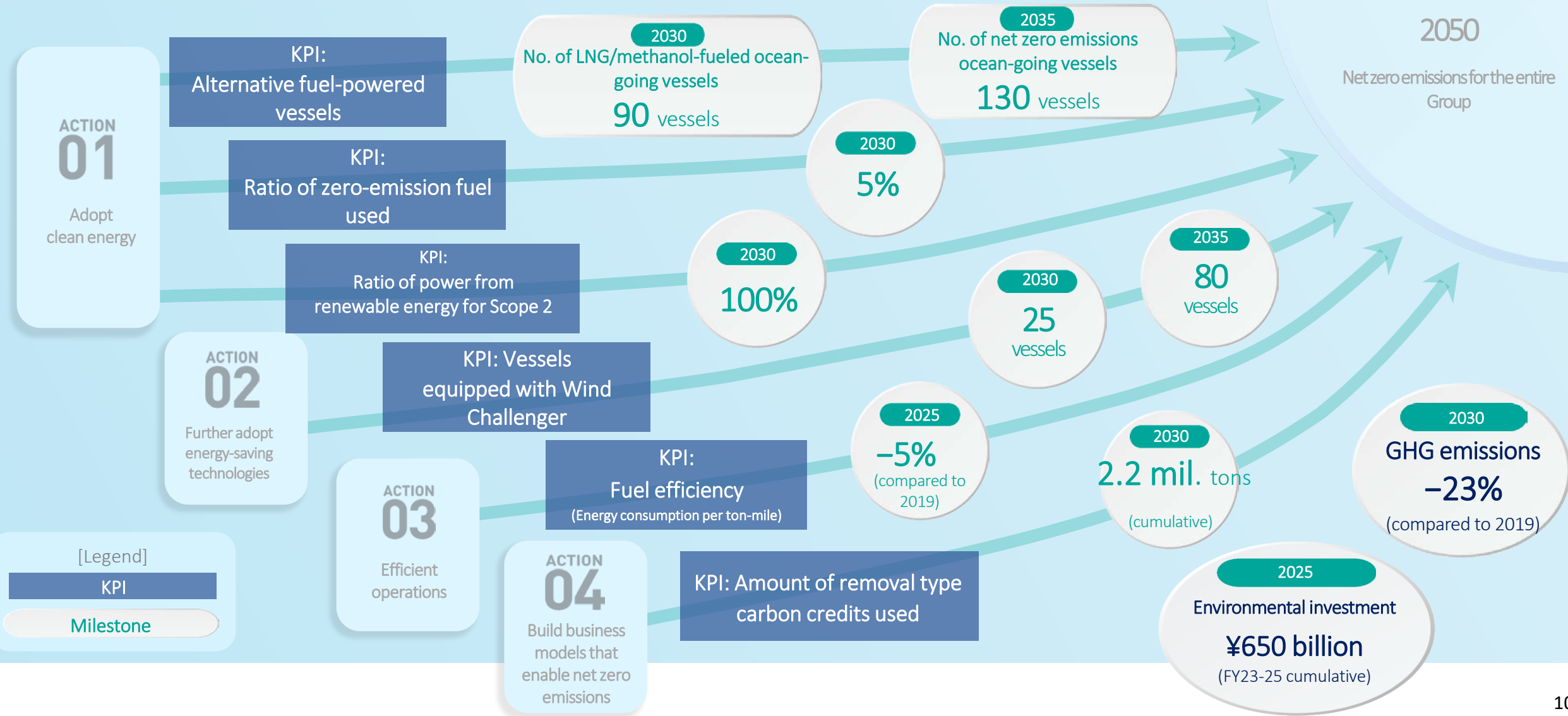


★ Regional headquarters  
● Lead Country/Regional Representative Country

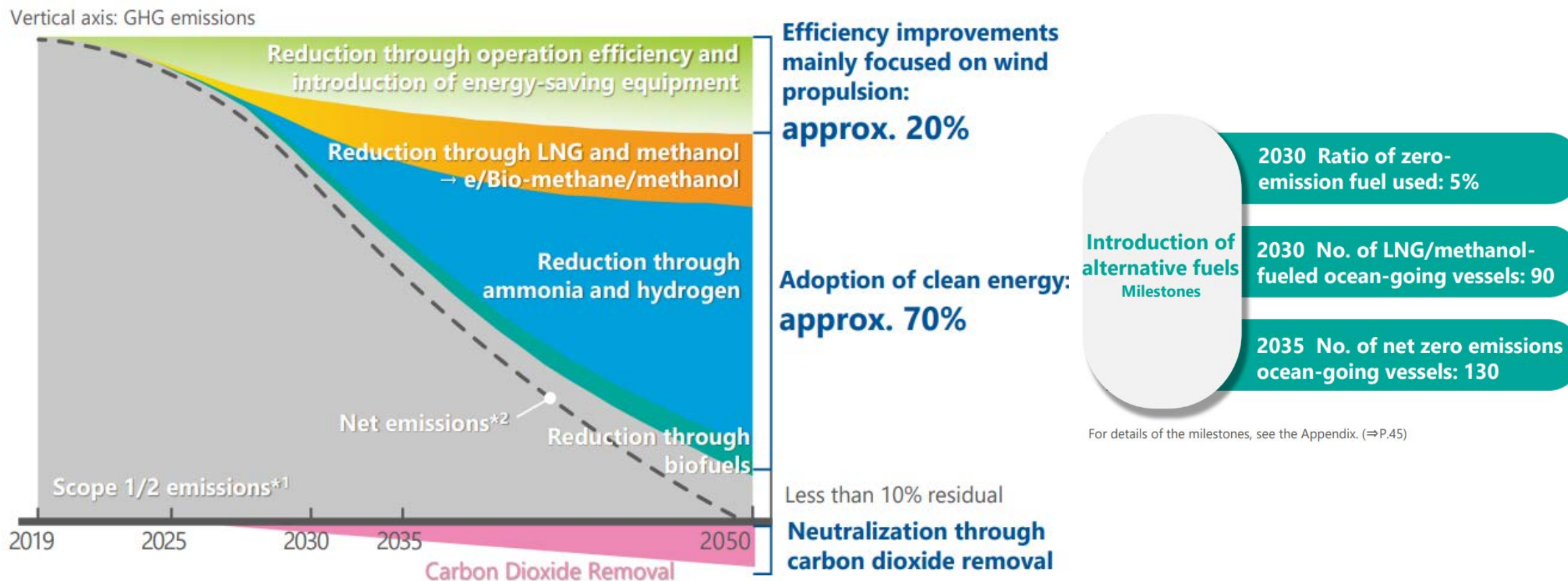


## 2. MOL's Overall Strategy



# Medium- to Long-Term Targets for Net Zero Emission



- We diversify the portfolio of marine fuels (e.g. LNG, methanol, ammonia, etc...) to be **optimized to each vessel's type and voyage area.**





- We aim to **realize a decarbonized society** for our company, our customers and society as a whole, while also **expanding our business** beyond traditional maritime transportation.



Purpose	
 <b>Realize decarbonized society</b>	 <b>Expand Our Business</b>
<ul style="list-style-type: none"> <li> <b>Reduce GHG emissions for customers and our company</b> <div style="display: flex; justify-content: flex-end; gap: 5px;"> <div style="background-color: #ccc; padding: 2px 5px;">upstream</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">midstream</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">downstream</div> </div> </li> <li> <b>Promote energy transition for society as a whole</b> <div style="display: flex; justify-content: flex-end; gap: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">upstream</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">midstream</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">downstream</div> </div> </li> </ul>	<ul style="list-style-type: none"> <li> <b>Enter into new business area</b> <div style="display: flex; justify-content: flex-end; gap: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">upstream</div> <div style="background-color: #ccc; padding: 2px 5px;">midstream</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">downstream</div> </div> </li> <li> <b>Seize opportunities and enhance competitiveness in existing businesses</b> <div style="display: flex; justify-content: flex-end; gap: 5px;"> <div style="background-color: #ccc; padding: 2px 5px;">upstream</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">midstream</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px;">downstream</div> </div> </li> </ul>



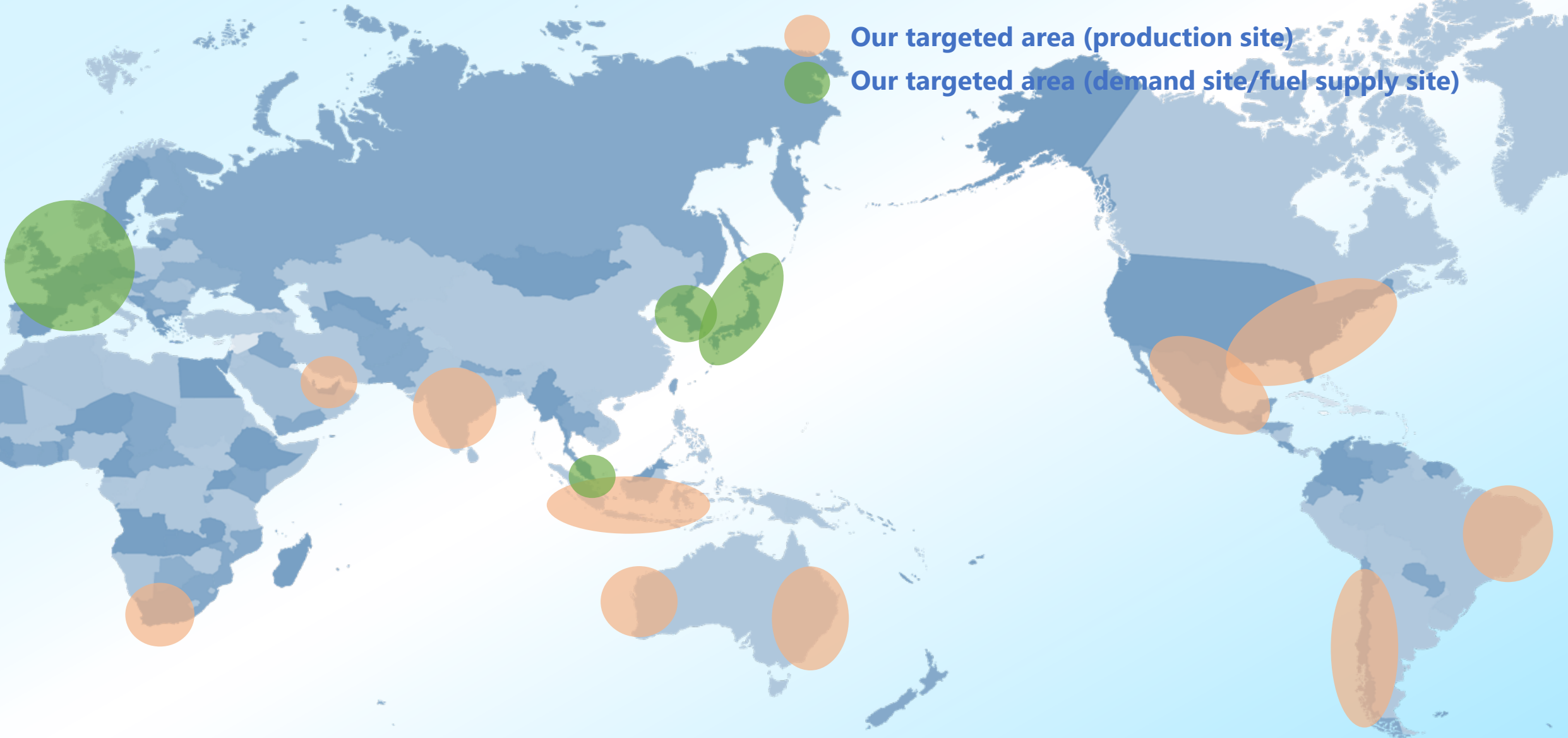
- We focus on the anticipated demand for marine fuels, particularly **clean fuel NH3/H2 and e-/bio-methanol** as key areas. Furthermore, we also target **non-marine fuels with projected transportation needs**.

## Targeted Next-Generation Energy

 <b>Marine Fuels</b> 
<b>Clean fuel NH3/H2</b>
<b>e-/bio-methanol</b>
Bio-diesel
e-/bio-methane (e-/bio-LNG)
:

 <b>Non-Marine Fuels</b> 
e-/bio-SAF (Sustainable Aviation Fuel)
e-/bio-petrol
e-LPG
LOCH (Liquid Organic Hydrogen Carriers) Mainly MCH (Methylcyclohexane)
:

# Targeted Business Area



## 3. MOL's Value Proposition

**Value Proposition**  
**We build a consistent value chain**  
 through over 140 years of **maritime expertise, diverse services, and project management capabilities.**

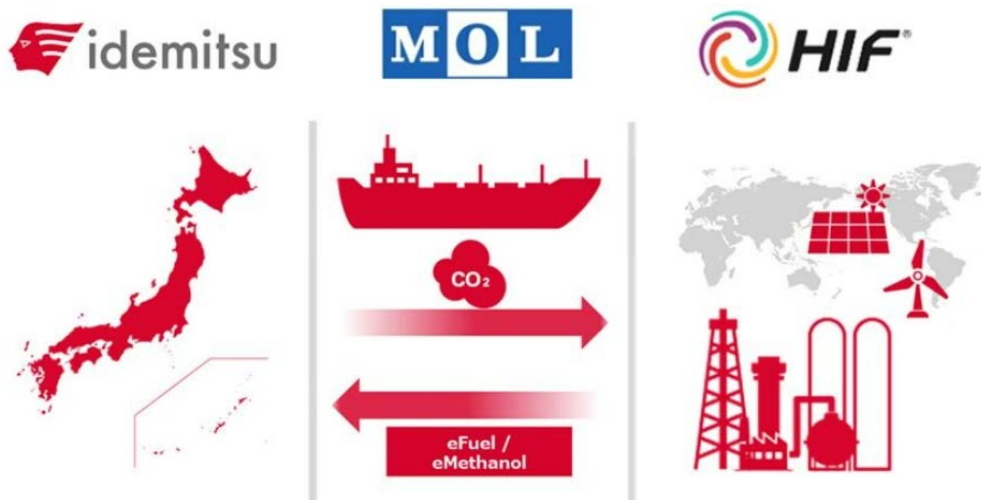
		Challenges	Our Strength
Upstream	<b>Production</b> 	<ul style="list-style-type: none"> <li>• Securing <b>abundant resources</b></li> <li>• <b>Safety verification</b></li> <li>• <b>Cost efficiency</b> for projects' FID</li> </ul>	<b>Contribute to project commercialization through upstream investment and transportation verification.</b>
	<b>Shipping</b> 	<ul style="list-style-type: none"> <li>• <b>Ensuring proper vessels</b></li> <li>• <b>Safe transportation</b></li> </ul>	<b>Offer a diverse vessel lineup to meet customers' various needs and ensure safe and efficient operations backed by extensive operational experience.</b>
Downstream	<b>Sales</b> 	<ul style="list-style-type: none"> <li>• <b>Long-term off-take customers</b></li> </ul>	<b>Execute off-taking primarily for marine fuels.</b>
	<b>Supply</b> 	<ul style="list-style-type: none"> <li>• <b>Establishing energy supply processes</b></li> </ul>	<b>Contribute to the next-generation energy supply chains construction through ownership and operational experience of bunkering vessels.</b>
	<b>Storage</b> 	<ul style="list-style-type: none"> <li>• Storage in <b>areas with no surplus land</b></li> <li>• <b>Cost reduction for</b> infrastructure development</li> </ul>	<b>Leverage extensive LNG FSRU experience to provide expertise and project management capabilities.</b>



## MOL's e-Fuels / e-Methanol Projects invested in 2024

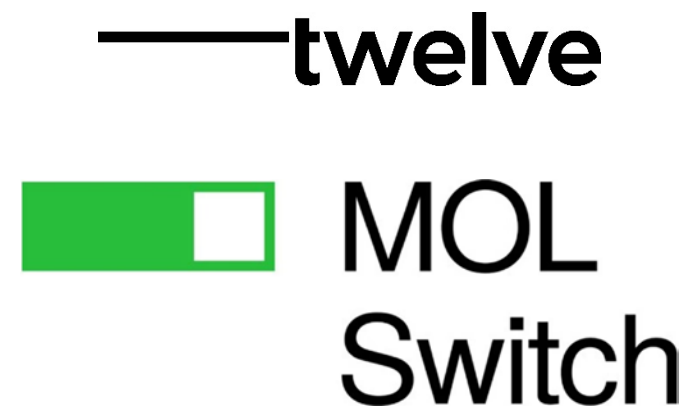
### "HIF Global"

- Signed MOU with Idemitsu and HIF Global for the joint development of **e-Fuels / e-Methanol supply chain**, including **CO2 maritime transport**.
- Invested in **HIF Global** who will produce **4.0 MTPA** (methanol equivalent) of e-fuels and e-methanol in the USA, Chile, Uruguay, and Australia.



### "Twelve"

- MOL's corporate venture capital in the USA "**MOL Switch**" invested in **Twelve** who will produce e-Fuels (e.g. e-SAF, e-Naphtha).
- Twelve utilize their **own core technology that is expected to lower the production cost** by lowering the temperature of syngas and reducing the amount of hydrogen used in its production.



- We offer comprehensive shipping services, capable of handling **various next-generation energies**.

## Our Transport Service

### Diverse Fleet Menu

Ship type	Loaded cargo	Hull form	Loading capacity
LPG/ ammonia ship	<ul style="list-style-type: none"> <li>•Ammonia</li> <li>•LPG</li> </ul>	VLGC	65,000m <sup>3</sup> +
		LGC	65,000 ~ 45,000m <sup>3</sup>
		MGC	45,000 ~ 25,000m <sup>3</sup>
Oil Product ship	<ul style="list-style-type: none"> <li>•SAF (Jet Fuel)</li> <li>•Gasoline</li> <li>•Diesel etc.</li> </ul>	LR1/LR2	105,000 ~ 70,000DWT
		MR	55,000 ~ 45,000DWT
Chemical ship	<ul style="list-style-type: none"> <li>•Methanol</li> <li>•MCH</li> <li>•Other liquid chemicals, etc.</li> </ul>	Methanol ship (Exclusive Ship)	50,000 ~ 30,000DWT
		Stainless ship (Percel Ship)	50,000 ~ 15,000DWT
LNG carrier	<ul style="list-style-type: none"> <li>•LNG</li> <li>•e/bio-methane</li> </ul>	LNG carrier LNG bunkering ship	174,000m <sup>3</sup> 18,600m <sup>3</sup>

Variety of vessel sizes

### Extensive experience and stable operation



40+ years of methanol vessel experience and the world's largest methanol fleet



Seamless ammonia transport leveraging the MOL group's strengths, including MOL Coastal Shipping and MOLMEC\*

\*Maritime consultant



Owns in-house manning and ship management companies

← Capable to transport almost our targeted next-generation energies →

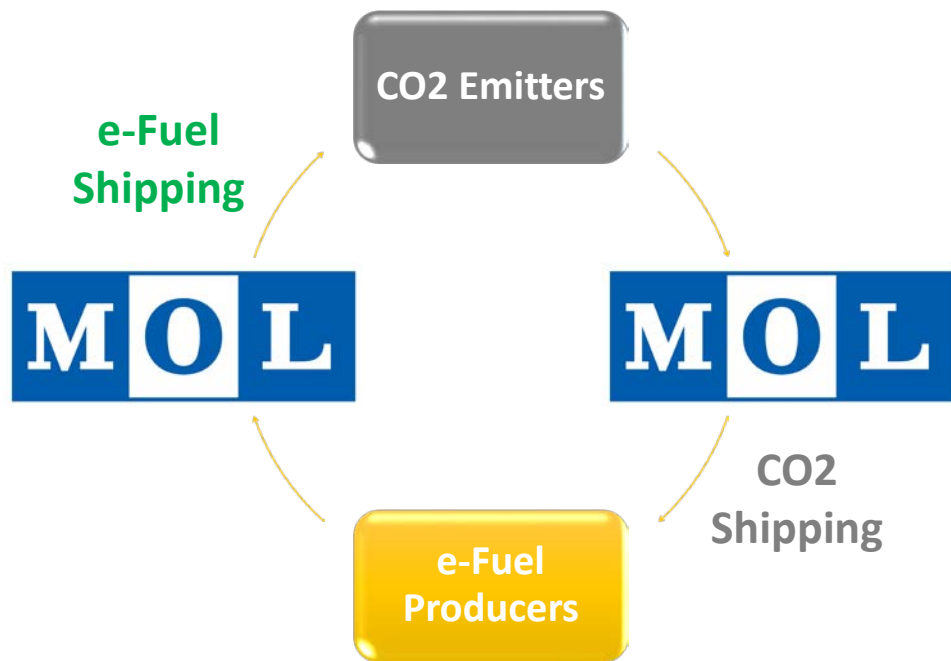
## Lineup of Methanol Tanker and Bulk Carrier with Methanol D/F Engine

- A leading shipping company owning **5 out of 23 methanol carriers with methanol D/F engine.**
- **Accomplished the first-ever Net-Zero Voyage** fueled by bio-methanol with Methanex.
- In 2027, delivery of **a newbuilding bulk carrier with methanol D/F engine** is expected.
- **MOL is willing to contribute to realize the decarbonized society with abundant expertise in methanol marine fuel accumulated since 2016.**



## Expansion of CO2 transportation business

- In 2021, we acquired 25% shares in Larvik Shipping of Norway, and we are working on the study of CO2 transportation for CC(U)S with various projects.
- Shipping CO2 is crucial for the “**cyclic CO2 supply chain**” as well as the “**e-fuel supply chain**”.
- **MOL spares NO effort in contributing to establish both CO2 and e-fuel supply chain.**





## Off-take

- Possible off-take from various suppliers.
- Optimized portfolio of marine fuels to **adjust each vessel's type and voyage area.**

## Terminal Business

- **Jointly studying** new ammonia receiving terminal in Soma, Fukushima.

### 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



Thank you for your attention!  
Please contact us, if you have any questions!

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