

# MOL Group Environmental Vision 2.1

**Aiming for Net Zero by 2050**

# From the Blue Oceans, We Sustain People's Lives and Ensure a Prosperous Future

As one of the world's leaders in marine transport, the MOL Group will tackle climate change with the utmost urgency. MOL Group Environmental Vision 2.1 is an upgraded version of MOL Group Environmental Vision 2.0, which was formulated last year. As well as providing a more concrete roadmap for long-term emissions reductions, our new vision sets even higher quantitative targets.

The vision also reflects the impact that the WAKASHIO incident in 2020 has had on us. This incident, in which the vessel ran aground off Mauritius and spilled oil, has made it essential to sincerely reexamine our social responsibility as a company. In addition to improving its safety levels, the MOL Group is now even more committed to meeting the expectations of a wide range of stakeholders. Accordingly, we will strengthen measures aimed at addressing environmental issues and contributing to the Sustainable Development Goals (SDGs).

Our goal is to become a company trusted by stakeholders around the world by conducting activities in line with the new MOL Group Corporate Mission, providing safe and reliable services, and contributing to society. Our efforts to address environmental issues based on MOL Group Environmental Vision 2.1 will play a central role in achieving this goal.

To provide a roadmap for the vision, we have set out five initiatives focused on climate change. As well as reducing greenhouse gas (GHG) emissions from the Group, these initiatives will promote environmental businesses that help lower society's GHG emissions. Furthermore, we will step up our activities to protect biodiversity and preserve the marine environment. By concentrating its collective strengths on implementing these initiatives, the MOL Group will help enrich the lives of coming generations.



**Takeshi Hashimoto**

President  
Representative Director



**Toshiaki Tanaka**

Chief Environment and  
Sustainability Officer (CESO)  
Senior Managing Executive Officer

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# **Section 1** Background of the Vision

# Formulation of MOL Group Environmental Vision 2.1

Today, as society and its values undergo dramatic changes—including the rapid development of information and communications technology (ICT) and heightened environmental awareness in relation to such issues as climate change—the way society expects companies to manage their businesses is also changing significantly. Aiming to meet these expectations and enhance the sustainability of its business, the MOL Group has identified five Sustainability Issues and is advancing initiatives to address them. As we are engaged in marine transport, we have identified shifting to new sources of energy and reducing environmental impact as particularly urgent and important issues. To step up the pace of initiatives aimed at addressing such issues, we have upgraded and updated MOL Group Environmental Vision 2.0, announced in June last year, and launched MOL Group Environmental Vision 2.1



## Emerging Social Issues



Identifying Issues of Importance to the MOL Group

### The MOL Group's Sustainability Issues (Materiality)

Value-Added Transport Services

Marine and Global Environmental Preservation

Innovation for Development in Marine Technology

Human Resource Cultivation and Community Development

Governance and Compliance to Support Businesses



MOL Group  
Environmental Vision 2.0  
(Announced in June 2020)

↓

Upgraded

**MOL Group  
Environmental Vision 2.1**

7 エネルギーをみんなに  
そしてクリーンに

9 産業と技術革新の  
基盤をつくらう

12 つくる責任  
つかう責任

13 気候変動に  
具体的な対策を

14 海の豊かさを  
守ろう

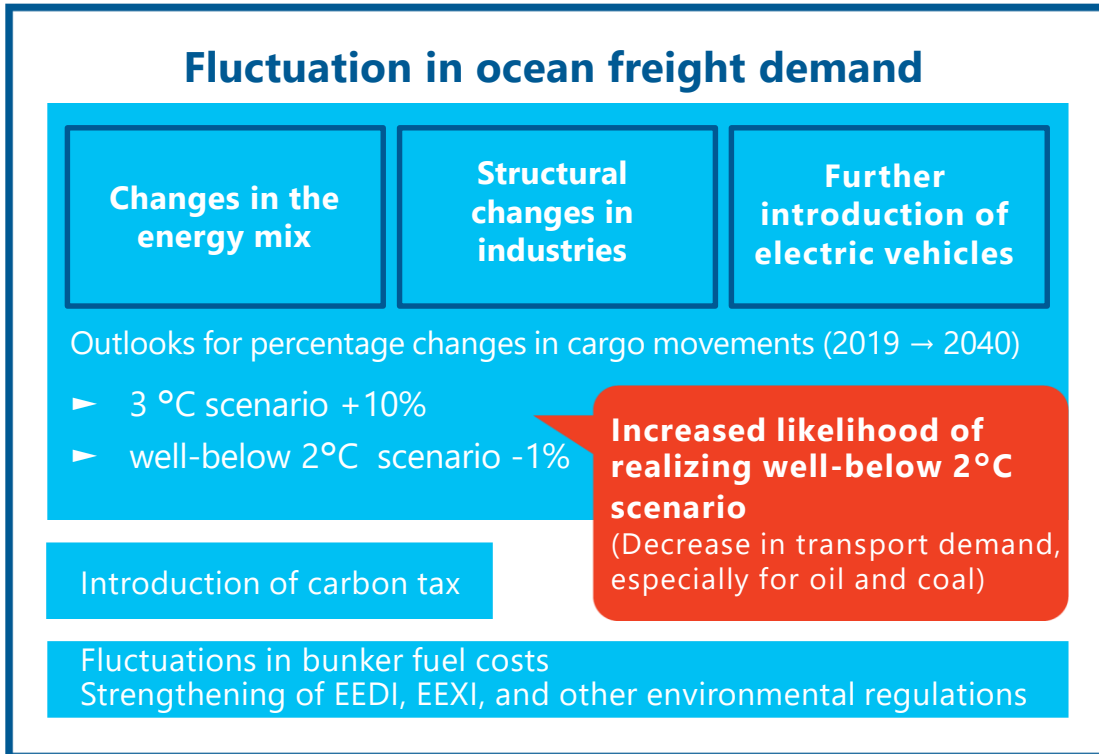
15 陸の豊かさも  
守ろう

17 パートナーシップで  
目標を達成しよう

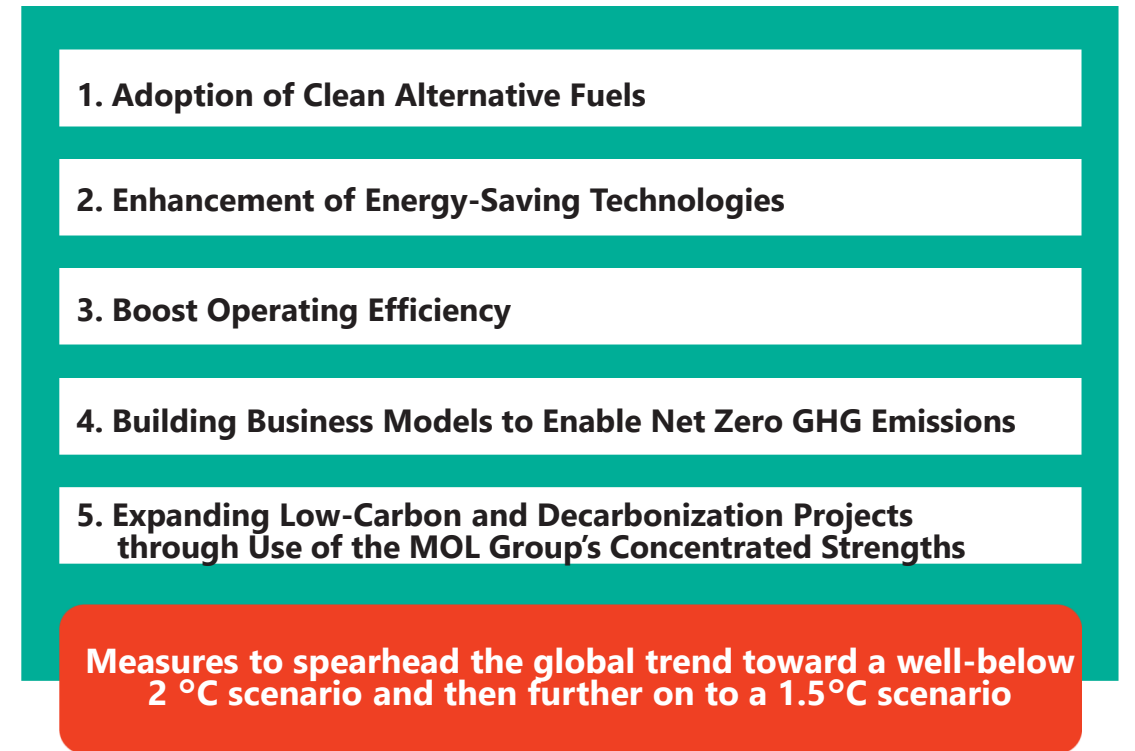
# Risks and Opportunities Related to Climate Change

Using the Task Force on Climate-related Financial Disclosures (TCFD) framework, MOL conducts scenario analysis to understand the various risks and opportunities that may arise from climate change. Under MOL Group Environmental Vision 2.1, we are taking measures in response to the risks and opportunities envisioned based on the results of the latest scenario analysis. The Environment & Sustainability Committee regularly monitors the progress of the Company's measures in response to climate change risks and opportunities and checks the long-term effect of these risks and opportunities on in-house businesses.

## Major Risks and Opportunities Identified through Scenario Analysis (Items expected to have particularly large impacts)



## Five Initiatives in MOL Group Environmental Vision 2.1



- The TCFD advocates the disclosure of climate change-related risks and opportunities.
- The EEDI (Energy Efficiency Design Index) is an index of the CO2 emissions of new vessels at their design and construction stages and shows the fuel economy performance of different vessels. A reduction percentage versus a standard is established and must be met when building new vessels.
- The EEXI (Energy Efficiency Existing Ship Index) is an international system for the imposition of limitations on engine output and other factors to maintain the stipulated fuel economy performance of vessels that have already commenced service. With a view to enforcement around 2023, the IMO is conducting deliberations.

# Current Environmental Impact and Organizational Structure for Promotion

FY2019  
CO2 emissions (Scope 1 + 2 + 3)\*1  
**14,309 thousand tons**

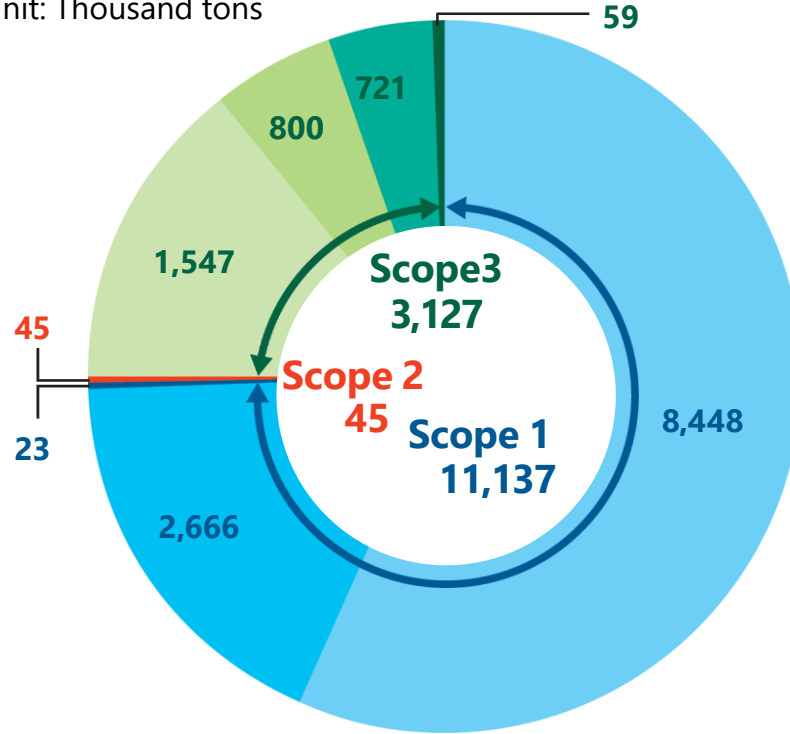
FY2019  
GHG emissions intensity\*2  
**10.86g CO2e/ton-mile**

\*1 This does not include emissions from Ocean Network Express Pte. Ltd. (ONE), a containership business in which three Japanese shipping companies have ownership interests.

\*2 This is GHG emissions per unit load (ton-mile) and includes not only emissions from the combustion process of fuels used by vessels but also emissions from the production processes of said fuels (in accordance with SBT standards, an international initiative aimed at reducing GHG emissions).

## The MOL Group's CO2 Emissions (FY2019 )

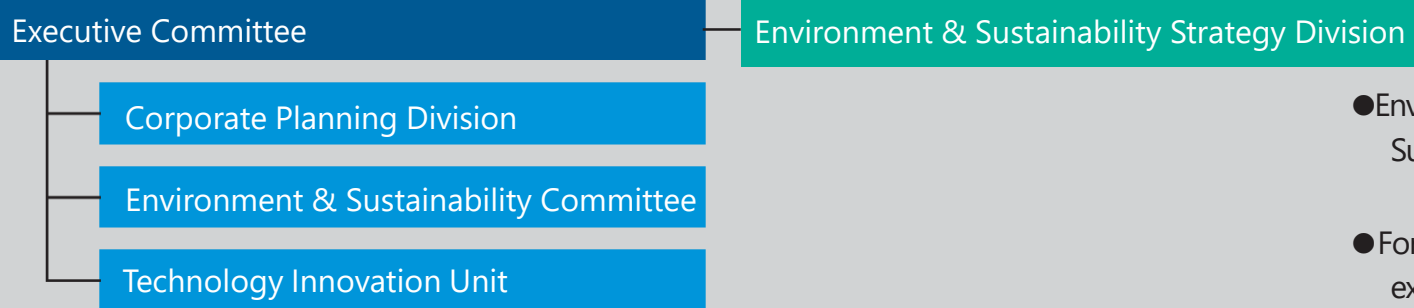
Unit: Thousand tons



- Scope 1–MOL vessels
- Scope 1–Group company vessels
- Scope 1–Others
- SCOPE 2
- Scope 3–Cat. 3
- Scope 3–Cat. 11
- Scope 3–Cat. 2
- Scope 3–Others

- Scope 3–Cat. 3  
Emissions from the production of fuel consumed
- Scope 3–Cat. 11  
Emissions from fuels sold by the Group
- Scope 3–Cat. 2  
Emissions from the building of MOL's owned vessels
- Scope 3–Others  
Total of Cat. 1, 5, 6, and 7

## Organizational Structure for Promotion



- Environment & Sustainability Committee and Environment & Sustainability Strategy Division established in 2021
- Formed in-house cross-divisional project teams to promote expansion of low-carbon and decarbonization projects

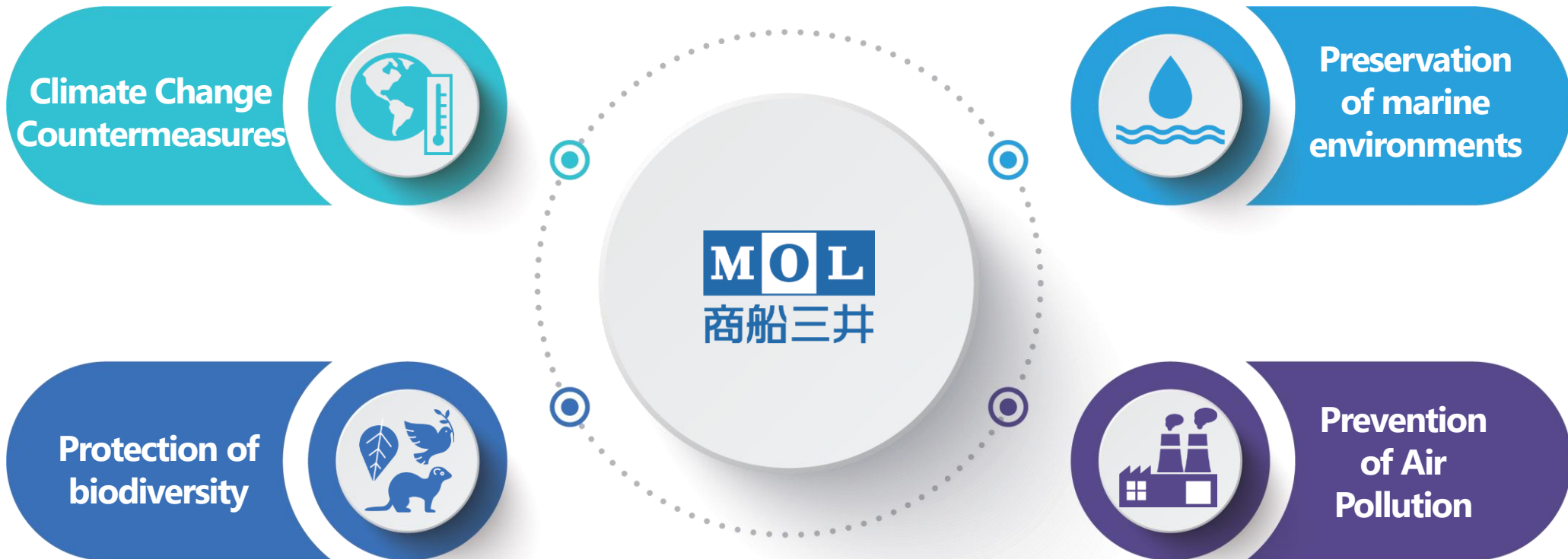


## **Section 2** Overview of MOL Group Environmental Vision 2.1



# MOL Group Environmental Vision 2.1

For the next generation on board this planet, the MOL Group will work collaboratively with our partners and stakeholders with creativity to resolve environmental issues. We will continue to provide solutions for issues of high importance such as the preservation of the marine environment, protection of biodiversity and prevention of air pollution, and in order to tackle climate change with utmost urgency, the MOL Group will make a concerted effort to achieve net zero GHG emissions by 2050. With these contributions for the sustainable development of our society and the preservation of nature, from the blue oceans, we sustain people's lives and ensure a prosperous future.



# Climate Change Countermeasures

## —Medium- to Long-Term GHG Reduction Targets and the Pathway to Net Zero Emissions By 2050

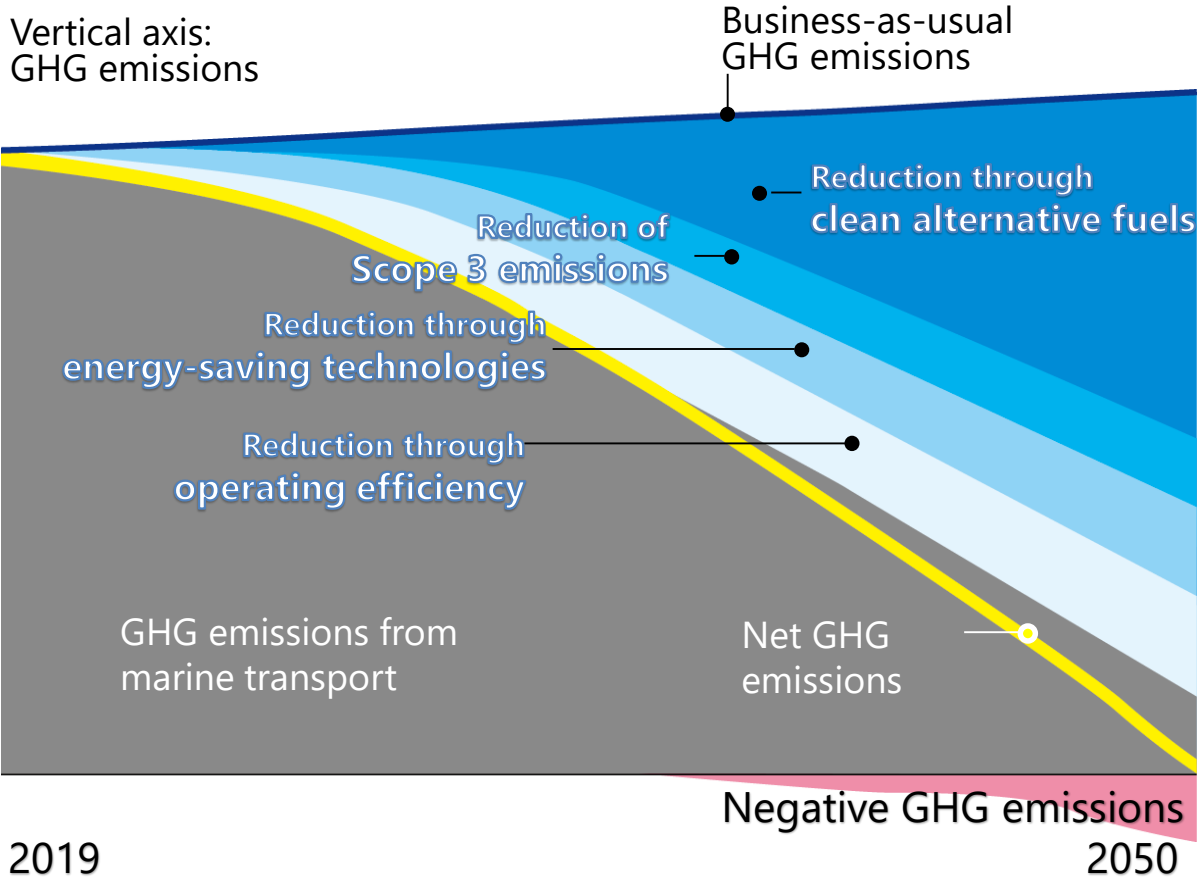
Under MOL Group Environmental Vision 2.1, we will tackle climate change countermeasures as central tasks. For the countermeasures, we have set three medium- to long-term targets with the aim of achieving net zero emissions by 2050. Also, we have established a specific pathway for realizing these targets.

### Medium- to long-term targets

1. Deploy net zero emissions ocean-going vessels in the 2020s
2. Reduce GHG emissions intensity by approximately 45% by 2035 (versus 2019\*)
3. With the concerted effort throughout the Group, achieve net zero GHG emissions by 2050

\* Intend to acquire certification in compliance with SBT guidance for marine transport  
 \* 2035 target: In addition to Scope 1, part of Scope 3 covered (international marine transport operated by MOL)  
 Plan to establish a separate target for Scope 2  
 2050 target: All of Scope 1, 2, and 3 covered (MOL + consolidated subsidiaries)

### The MOL Group's Pathway to Net Zero GHG Emissions



# Improvements on MOL Group Environmental Vision 2.0

In response to accelerating global trends and the MOL Group's progress in addressing environmental issues, the Group has upgraded the previous MOL Group Environmental Vision 2.0 to set higher quantitative targets and accelerate efforts to address environmental issues.

## Main improvements

### Brought forward the target year for beginning deployment of a zero emissions ocean-going vessel

In response to progress in technological development and other changes in the external environment, we aim to begin the deployment of vessels at an earlier stage.

### Set new medium-term intensity reduction targets

In line with SBT\* guidance for marine transport, we have established new targets for intensity reduction based on scientific evidence.

### Brought forward the target year for achieving net zero GHG emissions to 2050

To achieve the 1.5°C target, we aim to achieve net zero GHG emissions for the entire Group by 2050.

### Set a net zero GHG emissions target that includes emissions in supply chains

We have extended the coverage of the net zero GHG emissions target from the previous Scope 1 to include Scope 2 and Scope 3.

## MOL Group Environmental Vision 2.0 (Announced in June 2020)

### Medium- to long-term targets

1. Deploy commercial Net Zero GHG Emissions deep sea vessels by 2030
2. Reduce total annual GHG emissions from the ships by 50% in 2050 compared to 2008
3. Achieve Net Zero GHG emissions within this century, pursuing early realization

## MOL Group Environmental Vision 2.1

### ■ Medium- to long-term targets

1. Deploy net zero emissions ocean-going vessels in the 2020s
2. Reduce GHG emissions intensity by approximately 45% by 2035 (versus 2019)
3. With the concerted effort throughout the Group, achieve net zero GHG emissions for the entire Group by 2050

### ■ Five initiatives to achieve the targets

1. Adoption of Clean Alternative Fuels
2. Enhancement of Energy-Saving Technologies
3. Boost Operating Efficiency
4. Building Business Models to Enable Net Zero GHG Emissions
5. Expanding Low-Carbon and Decarbonization Projects through Use of the MOL Group's Concentrated Strengths

\* SBT: Science Based Targets, corporate GHG emission reduction targets consistent with the Paris Agreement

# Interconnection with the Management Plan

We have positioned environmental strategies as the most important issue in our management plan and strengthened measures from an environmental perspective in portfolio strategies as well as business strategies.



## Introduction of Internal Carbon Pricing (ICP)

To promote in-house decarbonization projects and to prepare for the introduction of systemic carbon pricing, we will introduce ICP.

With a view to introduce in FY 2021, we are currently conducting a detailed study of an effective system.

Invest approximately **¥200 billion** in the low-carbon and decarbonization fields over the three years from 2021 to 2023

Unit: Billion yen

	Investment	Expected return (Contribution to FY2027 ordinary profit)
<b>Investment in the low-carbon and decarbonization fields</b>	<b>205</b>	<b>21</b>
(1) Reduction of the Group's GHG emissions	91	—
(2) Contribution to the reduction of society's GHG emissions	114	—

### Examples of initiatives to Reduce the Group's GHG emissions

- Promotion of LNG fuel vessels
- Equipping of vessels with Wind Challenger systems
- Adoption of clean alternative fuels for vessels
  - Biodiesel
  - Ammonia
  - Hydrogen
  - Synthetic methane

### Examples of initiatives to reduce society's GHG emissions

- LNG-related projects in emerging countries
- Projects related to offshore wind power farms
- Supply, storage, and transport of clean alternative fuels
  - Biomass fuel
  - Ammonia
  - Hydrogen
- Development of negative GHG emissions projects

## Section 3 Initiatives to Realize the Vision

14. Initiatives to Realize MOL Group Environmental Vision 2.1

### 15. Initiatives to Reduce Our GHG Emissions

1. Adoption of Clean Alternative Fuels Emissions
2. Adoption of Energy-Saving Technologies
3. Boost Operating Efficiency
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### 21. Contribution to the Reduction of Society's GHG Emissions

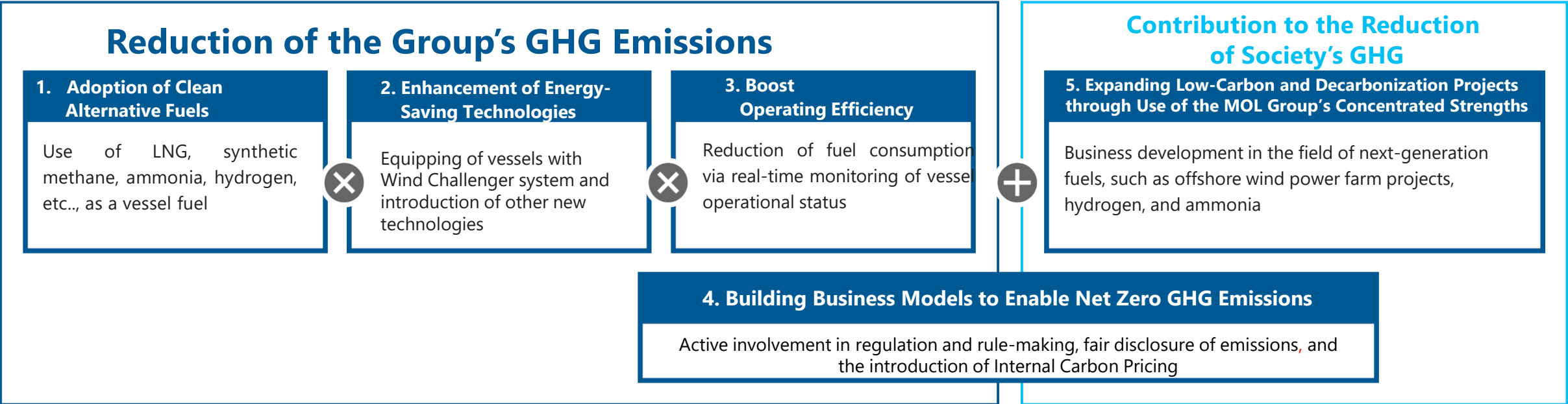
5. Expanding Low-Carbon and Decarbonization Projects through Use of the MOL Group's Concentrated Strengths

# Initiatives to Realize MOL Group Environmental Vision 2.1

We will pursue five initiatives to achieve our medium- to long-term goals.

Through the five initiatives, we will work with industry leaders to reduce our own and society's GHG emissions.

■ Five initiatives to achieve the targets



**Becoming a Corporate Group That Provides New Value and Is the First Choice of All Stakeholders**

**MOL will accelerate the introduction of clean alternative fuels which play a major role to reduce our GHG emissions.**

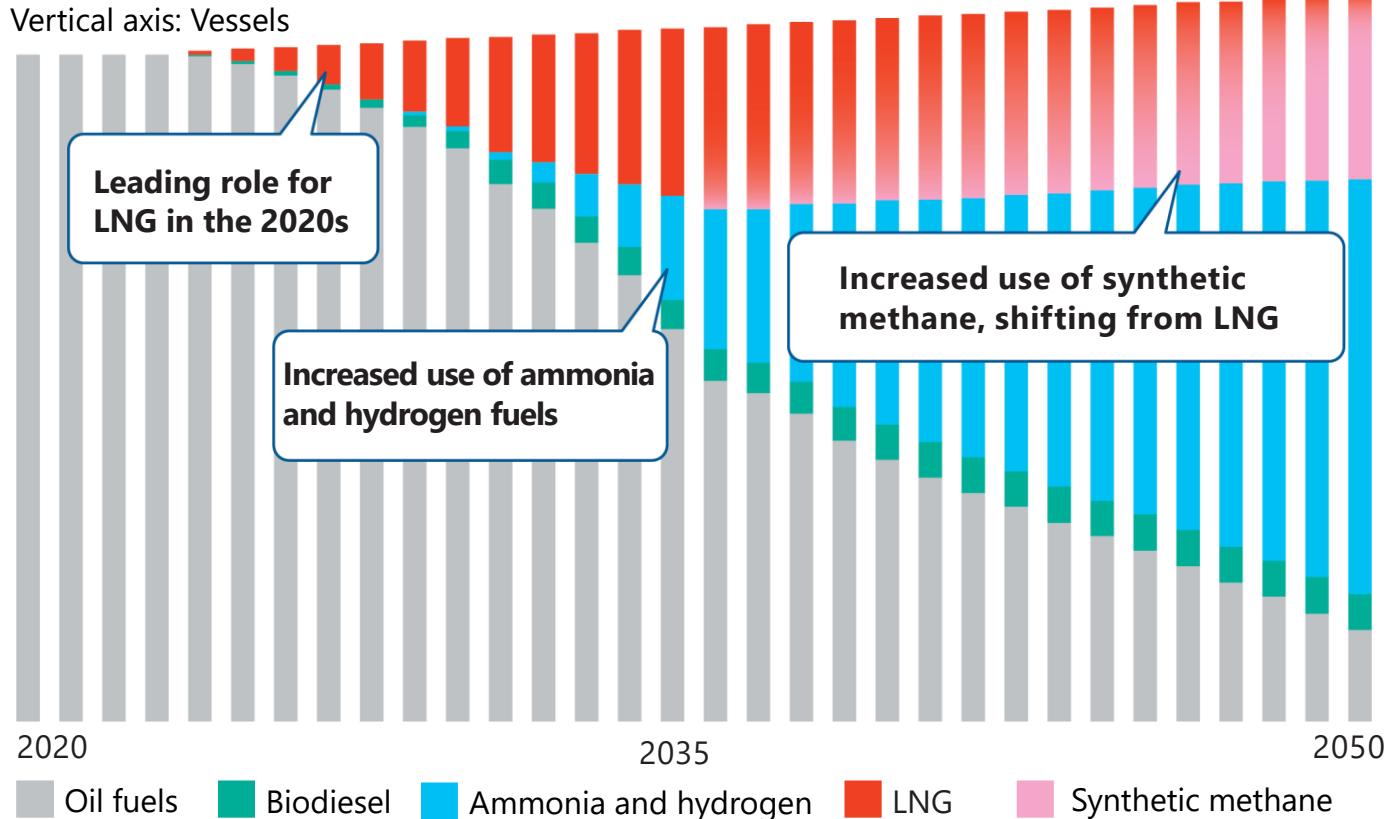
Like solar power and wind power, there are multiple clean renewable energy widely available on shore side.

On other hand, on marine side, net zero emission fuels for a large ocean-going vessel are under development so not available yet.

We aim to deploy net zero emissions ocean-going vessels in the late 2020s whilst MOL Group plans to deliver the first pure battery coastal ship in 2022.

In addition, we set a target to reduce GHG emissions intensity by approximately 45% by 2035 (versus 2019\*) accelerating various initiatives and expanding the number of our net zero emissions ocean-going vessels to about 110. In the meantime, MOL will make sure to achieve our target adopting immediately available fuels such as LNG and biodiesel without waiting for next generation candidate fuels like ammonia becomes available.

### Composition the MOL Ocean-Going Fleet by Fuel Type Going Forward\*1



### Milestones

During the 2020s

**Deploy net zero emissions ocean-going vessels**

2030

**Approximately 90 LNG-fueled vessels\*2**

2035

**Approximately 45% reduction in emissions intensity**  
(Versus 2019, plan to acquire SBT certification)  
**Approximately 110 net zero emissions ocean-going vessels**  
(Use of synthetic methane, ammonia, hydrogen fuel, biodiesel, etc.)

\*1 Only includes vessels operated by MOL that fall under Scope 1 emissions

\*2 Excluding LNG carriers

In addition to taking immediate measures for fuels that are already available, such as LNG, starting now MOL will tackle measures for multiple next-generation candidate fuels, such as ammonia, with the aim of achieving its targets.

LNG	
<p><b>Advantages :</b> Existing onshore infrastructure usable</p> <p><b>Issues :</b> Methane slip countermeasures Establishment of fuel supply infrastructure</p>	<p><b>MOL's main initiatives</b></p> <ul style="list-style-type: none"> <li>Delivered LNG-fueled tugboat &amp; bunkering vessels</li> <li>Constructing LNG-fueled ferries and LNG-fueled ocean-going vessels</li> </ul>

Liquefied Synthetic Methane (LSM)	
<p><b>Advantages :</b> Existing onshore infrastructure usable</p> <p><b>Issues :</b> Methane slip, Improvement of synthetic methane production method</p>	<p><b>MOL's main initiatives</b></p> <ul style="list-style-type: none"> <li>Active involvement in methanation, CCU, and CCS projects, etc.</li> </ul>

Methanol · Synthetic Methanol	
<p><b>Advantages :</b> Existing onshore infrastructure usable</p> <p><b>Issues :</b> Toxicity countermeasures Improvement of synthetic efficiency</p>	<p><b>MOL's main initiatives</b></p> <ul style="list-style-type: none"> <li>Active involvement in methanol-fueled methanol carriers business</li> </ul>

Biodiesel	
<p><b>Advantages :</b> Already commercialized as vessel fuel Existing facilities can be used</p> <p><b>Issues :</b> Increasing supply, establishment of rules for regular use</p>	<p><b>MOL's main initiatives</b></p> <ul style="list-style-type: none"> <li>Preparing for regular use, including the implementation of trials, etc.</li> </ul>

Batteries	
<p><b>Advantages :</b> Already in practical use on small vessels No onboard CO2 emissions</p> <p><b>Issues :</b> Increasing battery capacities and making batteries lighter</p>	<p><b>MOL's main initiatives</b></p> <ul style="list-style-type: none"> <li>Planning to deliver an electric tanker in 2022</li> <li>Considering development for commercial ocean-going vessels</li> </ul>

Ammonia	
<p><b>Advantages :</b> No onboard CO2 emissions and MOL's proven track record in marine transport of ammonia</p> <p><b>Issues :</b> Establishing fuel supply infrastructure Countermeasures for N2O and toxicity</p>	<p><b>MOL's main initiatives</b></p> <ul style="list-style-type: none"> <li>Participated in the study of fuel supply business in Singapore</li> <li>Considering launching first vessel in the 2020s</li> </ul>

Hydrogen	
<p><b>Advantages :</b> No onboard CO2 emissions</p> <p><b>Issues :</b> Engine development, fuel cell improvement, and measures for ultra-low temperatures Establishment of fuel supply infrastructure</p>	<p><b>MOL's main initiatives</b></p> <ul style="list-style-type: none"> <li>Participated in the study of fuel supply business in Singapore</li> <li>Considering launching first vessel in the 2020s</li> </ul>



# Initiatives to Reduce Our GHG Emissions

## 1. Adoption of Clean Alternative Fuels

**We will deploy net zero emissions deep sea vessels in the 2020s.**

The MOL Group has already realized multiple coastal ships that use clean alternative fuels. We will explore the application of our expertise to a wide variety of ocean-going vessels.

### Already Realized Multiple Coastal Ships That Use Clean Alternative Fuels

### Exploring Application to a Wide Variety of Ocean-Going Vessels

#### LNG-fueled tugboat ISHIN

Delivered in February 2019



#### LNG-fueled ferries

Plan to deliver two ferries in stages between the end of 2022 and the first half of 2023



- Increasing the vessel types targeted for conversion to LNG
- Accelerating study of ammonia-fueled vessel adoption
- Considering hybrid pure car carrier equipped with a hydrogen fuel cell system and large-capacity batteries



#### e5 Project

Aiming to resolve the issues faced by the marine transport industry, we will bring together technical capabilities, know-how, and networks related to electric vessels. We will establish a standard for sustainable marine transport.



#### The world's first electric tanker

In 2022, we plan to deliver the first pure battery tanker, which will be powered by high-capacity lithium-ion batteries. The tanker is scheduled to be used as a bunkering vessel in Tokyo Bay.



#### Concept model of an electric Kamsarmax bulker

We are currently considering applying our knowledge of electric coastal ships to the development of ocean-going vessels.



As well as further advancing the introduction of the environment-friendly technologies we have developed to date, we will boldly tackle the introduction of innovative energy-saving technologies.

Leveraging Heightened Environmental Awareness  
to Tackle Environmental Issues through Sail Power

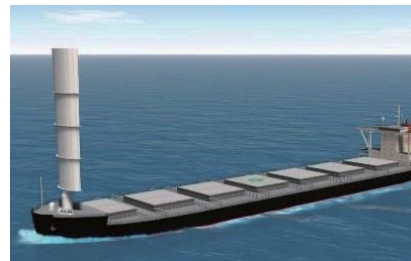


### Wind Challenger Project



We aim to significantly reduce GHG emissions by equipping vessels with hard sail systems. Equipping a vessel with a single hard sail is expected to **reduce GHG emissions** by **approximately 8.0%** on Japan–North American West Coast voyages. Going forward, we aim to equip vessels with multiple hard sails and combine them with other GHG-reduction measures to create powerful solutions.

**In 2022, we plan to begin operating a coal carrier equipped with a hard sail.** At the same time, we are advancing specific studies for the development of hard sails for various other vessel types.



### Opening the Way to the Future of Clean Vessels Propeller Boss Cap Fins

Propeller Boss Cap Fins (PBCFs) improve efficiency by eliminating the hub vortex generated behind the propeller of a vessel. More than 3,500 vessels worldwide have been equipped with our PBCFs since their launch in 1987.

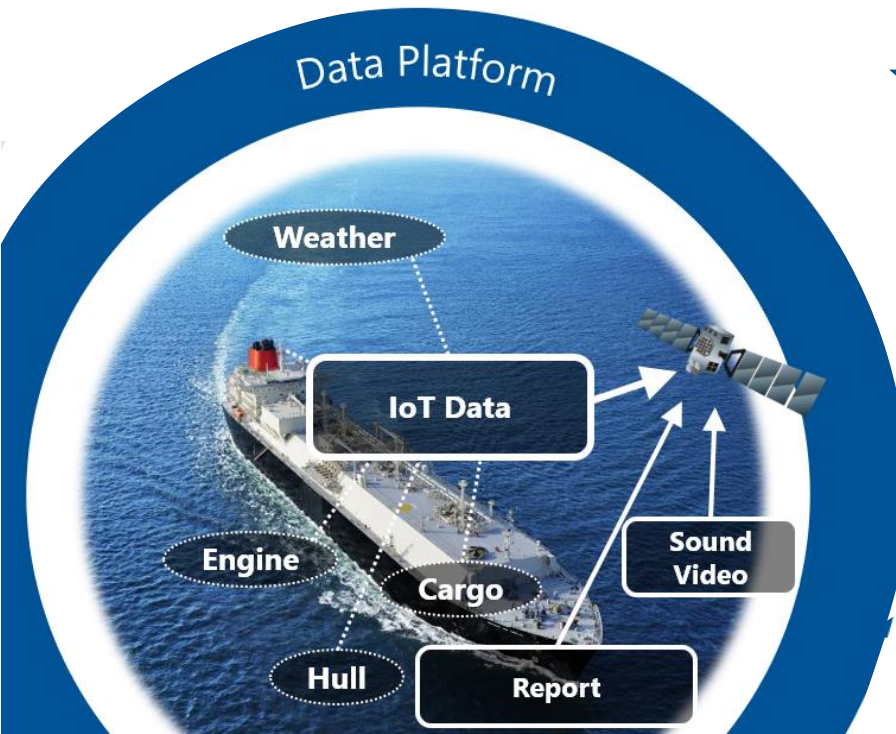


**We are establishing industry-leading levels of big data on vessel operations.**

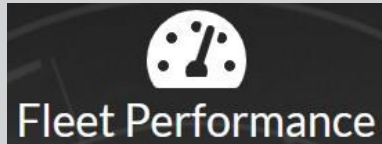
In collaboration with domestic and overseas research institutes, universities, and start-ups, we will use leading-edge fluid analysis and AI analysis to advance the efficiency of vessel operations. We will reduce GHG emissions by reducing the fuel consumption of vessels.

### FOCUS Project

The FOCUS Project acquires IoT data from vessel operations by using the industry's most advanced mesh networks in terms of data quantity and frequency. The networks collect data at one-minute intervals from up to 10,000 points on board each vessel. This enables real-time monitoring and analysis of operations from on shore. Vessel operation and marine technical departments work together closely to improve and optimize operational efficiency by implementing PDCA cycles in daily operations.



Fleet Performance® is an application that reduces environmental impact through precise analysis of vessels' operational performance based on evaluations of the effects of wind and waves encountered by a vessel together with the effects of vessel aging. By optimizing power output and other factors, the application helps reduce GHG emissions.



### Establishment of a Team Tasked with Boosting operating Efficiency

In addition to the establishment of a dedicated team, we have formed a cross-company project team tasked with boosting operating efficiency.

### Reduction of fuel consumption

- Compiling know-how on "eco sailing" and deploying it not only to the Group's owned vessels but also to all managed vessels
- Based on monitoring and analysis, implementing necessary measures, such as the use of environmental impact-reduction devices and hull painting.

### Regulatory compliance and the development of intelligence

- Evaluating effects by using EEXI\*
- Mutual information sharing with the entire marine transport cluster, including participation in the EEXI trial project of the Maritime Bureau of the Ministry of Land, Infrastructure, Transport and Tourism

\* EEXI is an international system that will impose restrictions on engine output and other matters to maintain the fuel efficiency specified for each vessel. It is expected to come into effect around 2023.

# Initiatives to Reduce the GHG Emissions of MOL and of Society

4.

## Building Business Models to Enable Net Zero GHG Emissions

We are building business models to enable net zero GHG emissions by being actively involved in regulation and rule-making through industry associations and related government agencies. Further, we are developing negative emissions projects and examining carbon offset technologies and methodologies.

### Active involvement in regulation and rule-making

Participating in IMO discussions through industry associations  
Establishing business intelligence networks in each country

### Fair disclosure of emissions

Improving customer services by making visible GHG emissions from each type of transport and the extent of reductions



Image Credits: imo.org,  
U.S. Department of State

### Development of negative emissions projects

Developing carbon removal projects  
Supporting afforestation and blue carbon

### Creation of carbon credits

Creating carbon credits through in-house low-carbon and decarbonization projects

### Introduction of Internal Carbon Pricing (ICP)

Introducing ICP to promote in-house decarbonization projects and to prepare for the systemic introduction of carbon pricing  
With a view to introduction in fiscal 2021, conducting a detailed study of an effective system



### Reduction of GHG emissions in supply chains

Taking steps to reduce Scope 3 emissions through proactive engagement with suppliers

#### **【Cat. 2 Capital goods】**

Collecting data from main suppliers, aligning aggregation methods, and requesting disclosure

#### **【Cat. 3 Fuel- and energy-related activities】**

In addition to the lowering of our fuel use, considering procurement of low-emissions fuel from each supplier

#### **【Cat. 11 Use of sold products】**

Will shift to the sale of low-emissions fuels in the future

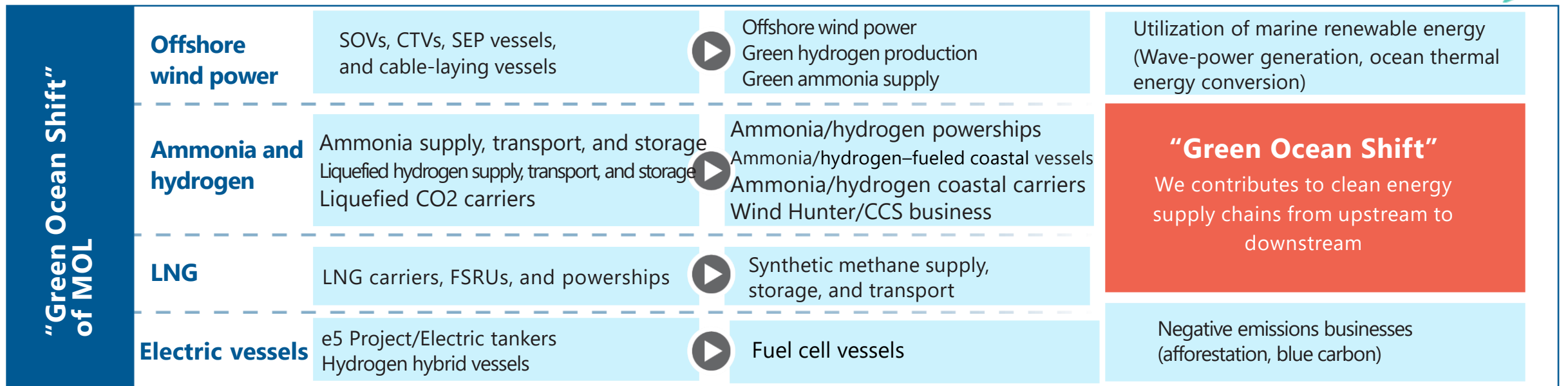


# Contribution to the Reduction of Society's GHG Emissions

5.

Expanding Low-Carbon and Decarbonization Projects through Use of the MOL Group's Concentrated Strengths

Responding to and leveraging the global shift in energy sources, we aim to realize a "Green Ocean Shift" and contribute to clean energy supply chains from upstream to downstream.



## Contribution to the Reduction of Society's GHG Emissions

In recent years, as awareness of environmental issues has risen, we have been contributing to the decarbonization of society as a whole by combining our accumulated knowledge to enhance the value of clean energy supply chains.

### Expertise in Liquefied Gas Transport and Handling



LNG  
transport



LNG fuel supply business



FSRUs

### Business Development Capabilities Project Management Capabilities



First Japanese shipping company to invest in a special-purpose vessels (SEP vessels) project for the installation of offshore wind power generation systems

As a member of the e5 Consortium, working on the development of the world's first electric tanker



### Trust of Customers Earned through Existing Marine Transport



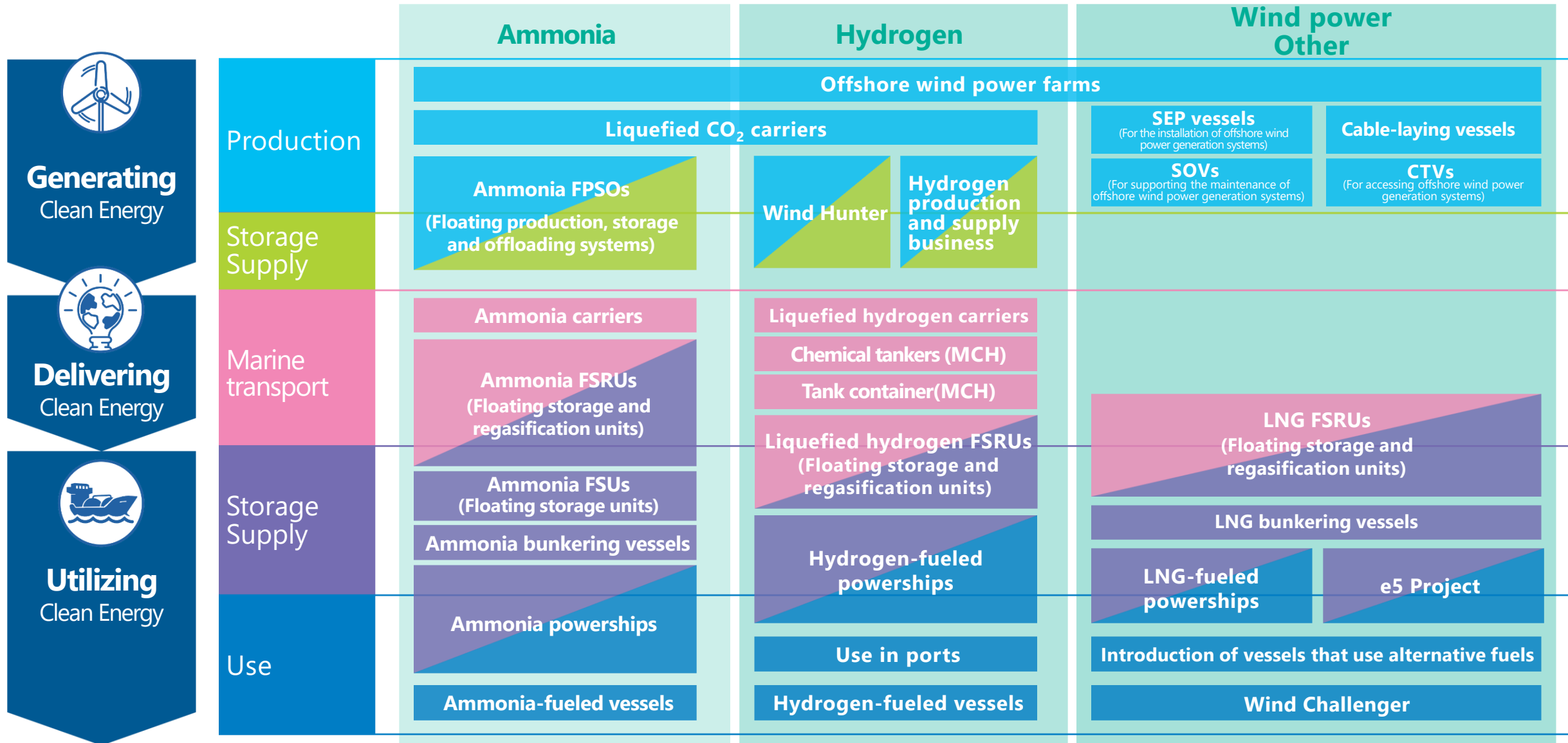
**Leveraging expertise and conducting concrete projects to help advance social implementation  
Enhancing the value of clean energy supply chains and contributing to the decarbonization of society**  
(Going forward, we will establish KPIs and implement progress management of them along with other sustainability KPIs.)

# Contribution to the Reduction of Society's GHG Emissions

5.

Expanding Low-Carbon and Decarbonization Projects through Use of the MOL Group's Concentrated Strengths

MOL will exploit its expertise and experience to help add value to each stage of supply chains.



## Generating Clean Energy



<b>Projects Related to Offshore Wind Power Farms</b>	<b>Investment in a company that owns SEP vessels</b> Acquisition of a stake in the Seajacks International Limited Group, which owns and operates SEP vessels (for the installation of offshore wind power generation systems)		<b>Integrated land and ocean transport of wind power generation equipment</b> Comprehensive support for onshore, offshore, and air transport; loading, customs clearance, installation, etc.		<b>Training and supply of maintenance personnel for wind power generation</b>  Establishment of a human resources consulting company in cooperation with the Magsaysay Group of the Philippines
	<b>First SOV business in Asia</b> Operation and maintenance of support services for Greater Changhua Wind Farms in Taiwan				
<b>Ammonia and Hydrogen</b>	<b>Green hydrogen production and supply project</b>	<b>Wind energy utilization and hydrogen production offshore (Wind Hunter)</b> Utilization of offshore wind energy for vessel propulsion and onboard hydrogen production, supplying of hydrogen to shore also under consideration			
	<b>For the production of blue ammonia and blue hydrogen, development of CCU and CCS businesses and investment in liquefied CO<sub>2</sub> carriers</b>	<b>Participation in the deepC Store Project</b> Joint study on the development of an offshore carbon capture and storage hub project in Australia	<b>Participation in liquefied CO<sub>2</sub> ocean transport business</b>  Investment in Norway-based Larvik Shipping AS	<b>Liquefied CO<sub>2</sub> export infrastructure and hydrogen production project</b> Joint study on the development of liquefied CO <sub>2</sub> (L CO <sub>2</sub> ) loading facilities and logistics and hydrogen production project at a terminal in Lithuania	
<b>Synthetic Methane</b>	<b>Cross-industry initiatives to establish a synthetic methane supply system</b> Leading a vessel carbon recycling working group in the Carbon Capture & Reuse study group		For details on each project, please visit our website and our service website. <a href="https://www.mol.co.jp/en/index.html">https://www.mol.co.jp/en/index.html</a> <a href="https://www.mol-service.com/download/environment">https://www.mol-service.com/download/environment</a>		



## Delivering and Utilizing Clean Energy



### Ammonia-Related Projects

#### Re-entering the ammonia transport business

Ammonia transport business expected to see significant demand due to the introduction of ammonia as a fuel



#### Participation in the joint development of an ammonia fuel supply chain in Singapore

Development of offshore facilities, such as ammonia bunkering vessels and FSUs (floating storage units), and the establishment of safety guidelines

ITOCHU ENEX Co., Ltd.

Vopak Terminals Singapore Pte Ltd.

ITOCHU Corporation

Total Marine Fuels Pte Ltd.

Pavilion Energy Singapore Pte. Ltd.

### Hydrogen-Related Projects

#### Participation in the joint development of liquefied hydrogen supply infrastructure in Singapore

To supply liquefied hydrogen to the Keppel Group's data center, study of infrastructure development, including marine transport of liquefied hydrogen, import terminal, storage units, and regasification facilities



#### Offshore hydrogen production and supply

##### —SeaEra Project—

Investigating the introduction of coastal ships that can use renewable energy to both produce and supply hydrogen offshore

#### Introduction of zero GHG emissions ports

Studying the introduction of hydrogen fuel port cargo handling machineries at the Kobe International Container Terminal, which is operated by MOL

### LNG-Related Projects

#### LNG transport business

Catering to the demand for alternative energy sources, mainly from emerging countries, through stable LNG transport enabled by one of the world's largest fleets

#### LNG-related businesses in emerging countries

Utilization of FSRUs to enable changeover from coal and oil to LNG

Electric power supply businesses that use LNG powerships





## **Section 4** Initiatives for Environmental Issues Other Than Climate Change

**27. Initiatives for Preservation of the Global Environment  
Other Than Climate Change Initiatives**

**29. Preservation of the Marine Environment and Protection  
of Biodiversity—Response to the WAKASHIO Incident—**

**30. Tasks Going Forward**

# Initiatives for Preservation of the Global Environment Other Than Climate Change Initiatives (1)

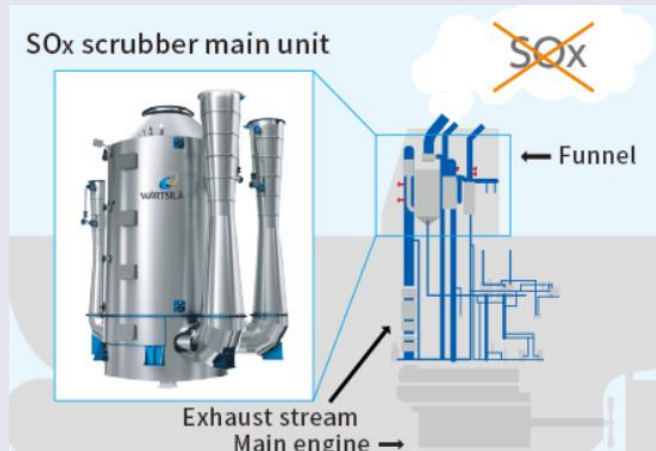
## Prevention of Air Pollution

As well as climate change countermeasures, reducing emissions of such air pollutants as SOx, preserving the marine environment—which provides the basis for marine transport—and protecting the biodiversity of oceans are important environmental issues. Regarding biodiversity, protecting the oceans' organisms is of particular importance. With these issues in mind, MOL is reducing its impact on the global environment in a variety of ways.

## Protection of biodiversity

### SOx emissions countermeasures

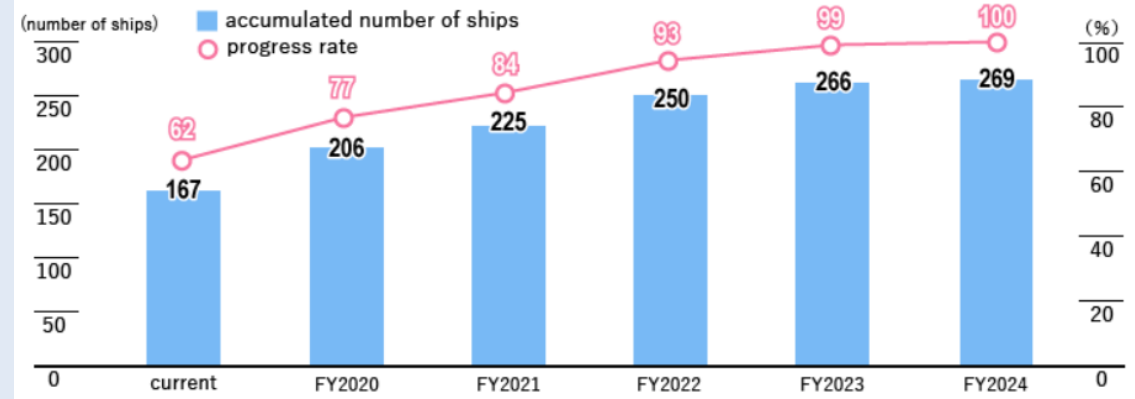
- Utilizing compliant fuel, which has a sulfur content of 0.50% or less
- Equipping vessels with SOx scrubbers
- Switching over to alternative fuels



### Measures in compliance with ballast water regulations

- Development of ballast water management systems in cooperation with manufacturers
- Steadily installing the systems since fiscal 2014, installed onboard 167 of MOL's owned vessels as of April 2020

Ballast Water Management System of Accumulated total installations and progress rate of installation plan (MOL owned vessels)



### NOx emissions countermeasures

- Installing onboard SCR (selective catalytic reduction) systems
- Installing onboard EGR (exhaust gas recirculation) systems

### Management of organisms attached to vessel bottoms

Compliance with guidelines adopted by IMO to prevent the adverse effects on ecosystems of cross-border transfers of organisms attached to vessel bottoms

### Environment-Friendly Buildings

With the concept of "a forest that is good for not only people but also other living things," a MOL group company, Daibiru Corporation, has developed a green space of approximately 3,310 square meters.

# Initiatives for Preservation of the Global Environment Other Than Climate Change Initiatives (2)



## Preservation of marine environments

The MOL Group is working to preserve the marine environment from various aspects, since the ocean is the root of the shipping business.

### Ship Recycling

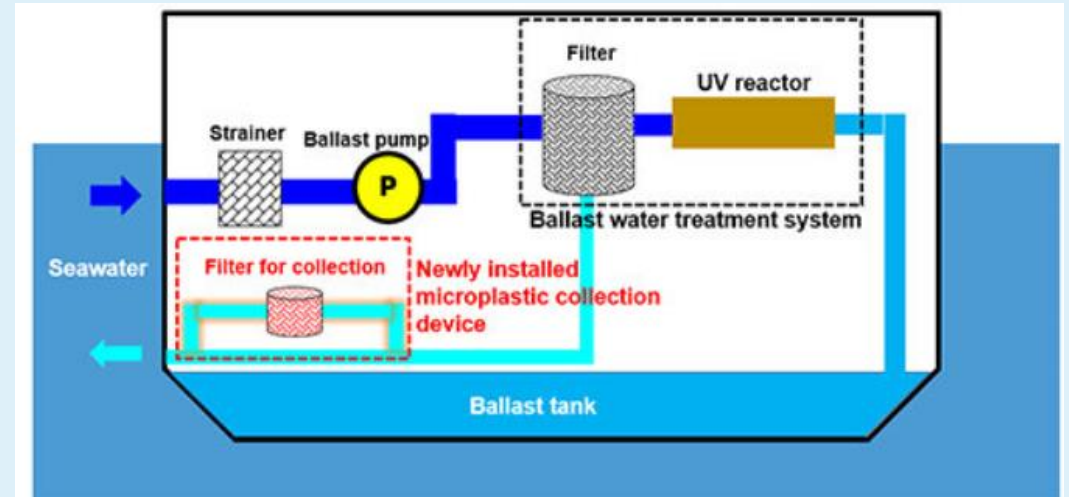
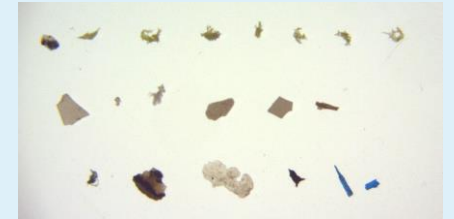
Utilizing recycling yards certified by ClassNK as compliant with the Ship Recycling Convention

### Processing of Onboard Waste, Waste Oil, and Bilge

- Based on the MARPOL Convention, we draw up onboard waste management plans requiring separation, collection, storage and disposal of onboard waste. Food waste and other biodegradable trash are ground into small particles and disposed of in specified areas of the open sea, and plastic waste is disposed of appropriately on land.
- Water and other contaminants in fuel oil are extracted by pre-treatment before it is used. Waste oil containing water and impurities from pre-treatment is heated in a special tank to remove water, and then incinerated in conformity with environmental regulations.
- We categorizes bilge water (waste water containing oil) in three stages by bilge source separation system according to the presence of oil, and collects and disposes of it properly.

### Collection and investigation of marine microplastics

Plan to install microplastic equipment in a new wood chip carrier scheduled for completion in 2022, expect each vessel to collect tens of thousands of pieces of marine microplastic per year



MOL participates in "Plastic Smart" initiatives hosted by the Ministry of the Environment of Japan



# Preservation of the Marine Environment and Protection of Biodiversity—Response to the WAKASHIO Incident—

Since an incident in which the WAKASHIO, a vessel chartered by MOL, ran aground off Mauritius and spilled oil in August 2020, the Company has been making concerted efforts to ensure operational safety and thereby protect the marine environment.

## WAKASHIO Grounding Incident Time Line and the MOL Group's Response

### Time Line

July 25  
Ran aground off Mauritius

August 6  
Bunker oil began to spill

September 11  
Announcement of Initiatives aiming for recovery of Environmental Damage from Wakashio Incident, and to Contribute to the Mauritian Community

September 15  
Dialogue with environmental NGOs and experts

December 18  
Announcement of measures to prevent reoccurrence

January 9  
cleanup by cleaning company completed

### Personnel Contribution

- Establishment of MOL (Mauritius) Ltd.
- Assignment of representative to Mauritius and continuous dispatchment of personnel

### Efforts to Protect and Restore the Natural Environment

- Conducting of an environmental assessment in collaboration with experts—Mangroves, wild birds, coral reefs, and fisheries

### Social Contribution Activities in Partnership with Local NGOs

- Continuous communication with the local community in conducting painstaking activities that support the community while reflecting its customs
- System for cooperation with government authorities, local NGOs, and academic institutions
- Donation of cleaning materials, oil absorbents, reefer containers, etc.

### Measures to Prevent Reoccurrence and Reform of In-House Operational Monitoring System

Having established a dedicated internal organization, we are investing ¥500 million on measures to prevent reoccurrence.

- (1) Addressing the lack of safety awareness
- (2) Addressing the lack of awareness of regulations on safe navigation and insufficient performance
- (3) Enhancement of ship operation quality
- (4) Response on hardware side

For details, please visit our website.

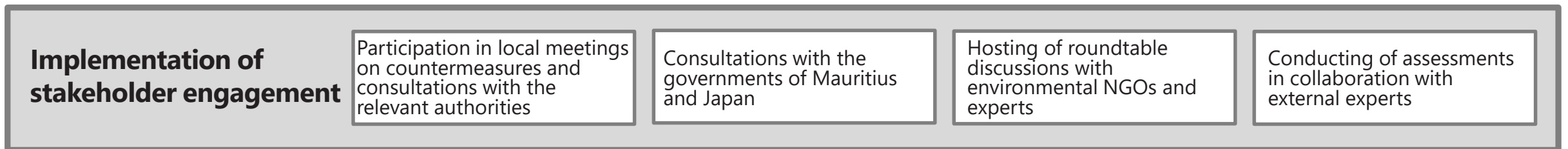
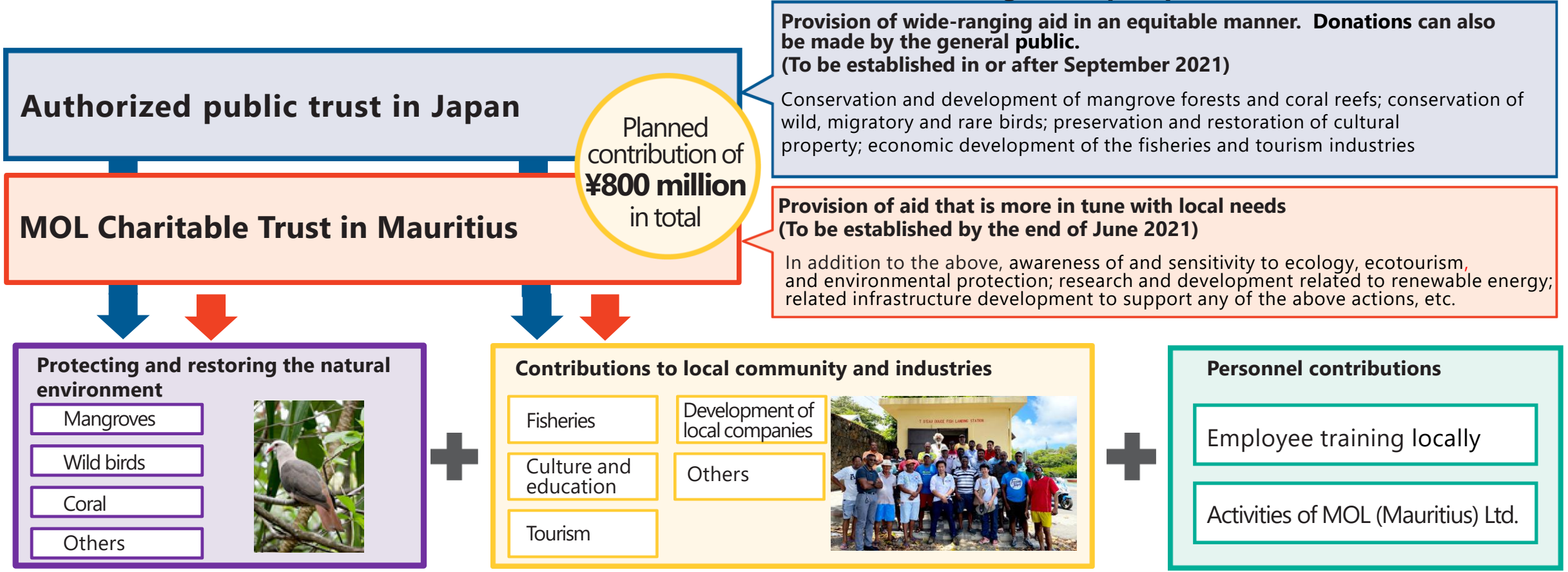
<https://www.mol.co.jp/en/pr/2020/20090.html>

### Development of Grounding Risk Monitoring System

- In cooperation with NAPA Ltd. and ClassNK we have begun development of a grounding risk monitoring system for vessels.
- In addition to enabling accurate fleet monitoring by displaying the information of multiple vessels on a single screen, the system helps prevent grounding incidents by warning crew members and operation managers on shore in real time when a vessel is projected to enter a high-risk area.

# Preservation of the Marine Environment and Protection of Biodiversity—Response to the WAKASHIO Incident—

While conducting dialogues with a wide range of stakeholders, we are working to restore the natural environment of Mauritius and contribute to local communities from a long-term perspective.



## Tasks Going Forward

In conjunction with annual management plans, we will conduct constant reviews of the MOL Group Environmental Vision in light of changes in the external environment. Further, we plan to appropriately disclose the progress of the initiatives below.



### **Biodiversity protection initiatives that are more wide-ranging**

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### **Establishment of intermediate targets and details of initiatives for Scope 2 emissions (mainly the use of electricity and heat on shore)**



### **Establishment of intermediate targets and details of initiatives for Scope 3 emissions (emissions from supply chains)**

### **Examination of the establishment of medium-term reduction targets on a total volume basis**

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### **Promotion of sustainable ship recycling**



### **Setting of more-specific KPIs and the establishment of monitoring systems**



**Mitsui O.S.K. Lines**