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Response to Climate Change

Approach

Environmental Initiatives and Response to the TCFD

Climate change is expected to expose humankind to major physical risks, such as serious natural disasters.

In June 2020, we reviewed our "K" LINE Environmental Vision 2050, and based on the results of the scenario analysis proposed by the Task Force on Climate-related Financial Disclosures (TCFD), identified issues to be addressed and revised some targets.

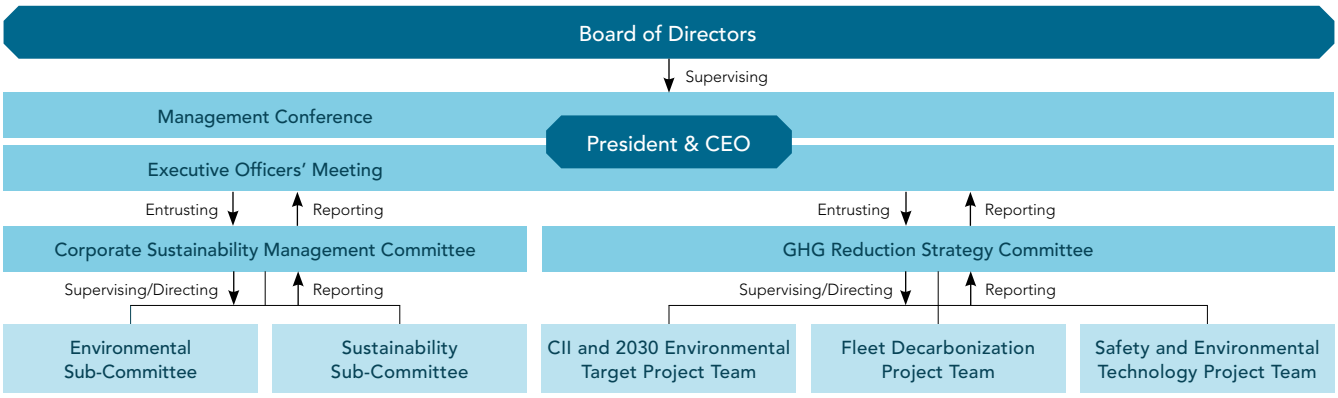
Furthermore, in November 2021, we recognized global climate change countermeasures as an issue that must be strengthened by the entire international community, and we therefore set a higher challenge of net-zero GHG emissions by 2050.

In addition, as a long-term vision in our medium-term management plan announced in May 2022, we are committed to smoothly switching to other forms of energy for our company and society. We will promote the realization to a low-carbon and carbon-free society.

Environmental Governance

Governance System for Environmental Risks and Opportunities

In April 2021, the "K" LINE Group restructured the existing organization and reformed the promotion system for sustainability to ensure it is a key management objective. The Corporate Sustainability Management Committee, chaired by the president & CEO, is enhancing corporate value by reviewing and formulating a promotion system for the "K" LINE Group's sustainability management. Additionally, in October 2021, we established the new GHG Reduction Strategy Committee by integrating the Alternative Fuel Project Committee, which is in charge of accelerating initiatives for conventional vessels fueled by liquefied natural gas (LNG) and the LNG fuel supply business and examining next-generation fuel and new technologies, with the Environment/Technology Committee, which formulates measures for compliance with environmental regulations, including technical aspects. Each of these two committees functions as a forum for strategic discussions. The Environmental Sub-Committee, a subcommittee under the Corporate Sustainability Management Committee, is responsible for operating the environmental management system (EMS) formulated in accordance with the "K" LINE Group Environmental Policy and the standards of the International Organization for Standardization (ISO). The subcommittee is also responsible for promoting other environmental activities.



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Risks and Opportunities

Implementing Scenario Analysis

The Paris Agreement sets out a long-term target to pursue efforts to limit the average global temperature rise to 1.5°C, well below 2°C, compared to preindustrial levels.

In the spirit of the Paris Agreement, the International Maritime Organization (IMO), a specialized United Nations agency for maritime issues, has set targets and measures for international shipping activities. We are working to reduce the GHG emissions from our business activities in line with the IMO's policies, but we recognize that efforts to reduce GHG emissions may be insufficient, and that the 4°C warming scenario and the intensification of physical risk is a possibility. The Group must build the resilience to adapt to those conditions to ensure that its business operations will continue. We have formulated road maps for how the Group should prepare for the anticipated negative (risks) and positive (opportunities) aspects of both the below 2°C warming scenario and the 4°C warming scenario.

Scenario 1 Mainly transition risks related to the shift to a carbon-free society

- Stricter regulations, such as a carbon tax
- Customer actions to realize low or zero-carbon emissions
- Carbon capture and reuse, hydrogen, and other technologies enabling low-carbon and carbon-free energy
- Need for new low-carbon and carbon-free energy supply and transportation

Scenario 2 Mainly physical risks due to climate change

Natural disasters (acute risk)

- More typhoons and cyclones
- Intensifying natural disasters

Changes in the natural environment (chronic risk)

- Rising sea levels
- Changes in the land environment
- Changes in the ocean environment

What We Must Do

Hardware

- Install energy-saving equipment to improve ship operating efficiency
- Launch ships with low-carbon or zero-emissions new fuels and propulsion technologies
- Make ships physically stronger

Software

- Enhance digital and automation technologies to make operations safer and more efficient
- Raise employee awareness and provide training in new technologies
- Construct a corporate structure capable of flexibly responding to needs, such as for reconstruction assistance

Business activities

- Develop and enter new energy supply and transportation businesses
- Prepare fleet for new transportation technologies
- Increase capability for green ship recycling
- Participate in collection and study of marine plastic pollution
- Increase dialogue with administrators involved in improving port facilities, roads, and other infrastructure
- Increase involvement in policy-making with governments, the United Nations, and NGOs

Indicators and Targets

Aim for Net-Zero GHG Emissions

We will steadily promote an action plan for achieving the interim milestones for 2030 that have been set out in our "K" LINE Environmental Vision 2050.

We will take on the new challenge of achieving net-zero GHG emissions as a target for 2050. We will aim to help enrich the lives of people by also promoting support for the shift to a carbon-free society.

2030 Interim Milestones

"K" LINE low-carbon transition:
Improve CO_2 emissions efficiency by 50% compared with 2008 levels

Support development of a low-carbon society:
Transport and supply new energy for a low-carbon society

2050 Targets

"K" LINE decarbonization:
The challenge of net-zero GHG emissions

Support the shift to a carbon-free society:
Be the transporter and supplier of new energy

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Strategies and Initiatives

"K" LINE Low-Carbon and Carbon-Free Transition

While taking on the challenge of achieving net-zero GHG emissions in 2050, we will first work toward achieving the 2030 interim milestones set out in the "K" LINE Environmental Vision 2050 by making the shift toward ships fueled by LNG, ships fueled by liquefied petroleum gas (LPG), and ships that use new zero-emission fuels such as ammonia and hydrogen, from the perspective of achieving low-carbon and carbon-free transition at "K" LINE. Additionally, we will promote initiatives for reducing CO_2 emissions, such as using the Seawing automated kite system (wind propulsion) and Kawasaki Integrated Maritime Solutions (integrated vessel operation and performance management system).

1. New Fuels (Fuel Conversion)

Expand introduction of LNG-fueled ships

- Expanding introduction of LNG-fueled ships in the 2020s, investing in approximately 40 vessels by 2030
  - Delivered "K" LINE's first LNG-fueled car carrier, *CENTURY HIGHWAY GREEN*, in March 2021
  - Plan to deliver "K" LINE's first LNG-fueled cape-size bulk carrier in 2024
  - Decided to invest in a further eight LNG-fueled car carriers by 2025

Approximately 25% to 30% reduction in CO_2 emissions compared with heavy-oil fueled vessels

CENTURY HIGHWAY GREEN

Introduce LPG-fueled ships

- A very large gas carrier (VLGC), which is mainly fueled by LPG and capable of carrying LPG or ammonia, with a view to transporting ammonia in the future (planned delivery in 2023)

Approximately 20% reduction in CO_2 emissions compared with heavy-oil fueled vessels

Photograph provided by Kawasaki Heavy Industries, Ltd.

Introduce zero-emission vessels that use new fuels such as ammonia and hydrogen

- Considering the introduction of zero-emission fuels, such as ammonia and hydrogen, and carbon-neutral fuels, such as bio-LNG and synthetic fuel
- Implementing trial voyages using biofuels for vessels
- Participating in a joint study framework for researching the use of ammonia as a maritime fuel that crosses industrial boundaries, such as those between shipping companies, trading companies, shippers, and manufacturers, with the aim of using ammonia-fueled vessels
- Considering the target of commercialization and the introduction of zero-emission vessels in the second half of the 2020s
- Launching collaborative research on decarbonization with JSW STEEL
- Launching collaborative research on decarbonization with Emirates Global Aluminium
- Confirming construction of hybrid EV tugboats equipped with large-capacity lithium-ion batteries and generators

Zero CO_2 emissions

Photographs provided by the Japan Ship Technology Research Association

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2. Seawing Automated Kite System That Utilizes Wind Power Propulsion

- Developed in collaboration with French company Airseas, a spin-off from Airbus
- Considering expanding the use of this new technology, which can be installed on any type of vessel, including existing ones, to all vessels
  - Installation on a cape-size bulk carrier scheduled to begin in fiscal 2022

Expecting a reduction in CO_2 emissions of more than 20%
Pursuing a 45% to 50% reduction in CO_2 emissions through the synergistic effect of installation on LNG-fueled vessels

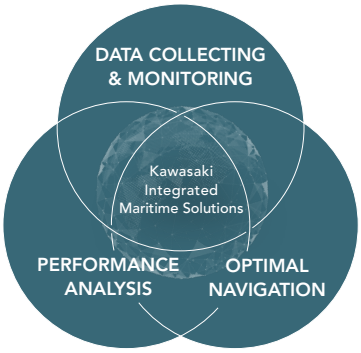
LNG-fueled cape-size bulker

3. Improvement of Operational Efficiency

Kawasaki Integrated Maritime Solutions (Integrated vessel operation and performance management system)

- Collects vessel operation data in real time, including fuel consumption, output power, and ship speed, and pursues the improved operational management of the vessel by using an optimal navigation system that calculates safe and fuel-efficient recommended routes
- Recently achieved visualization of performance degradation and impact of external disruption for each individual vessel using AI data analysis technology to further maintain and improve operational efficiency

Approximately 3% to 5% reduction in CO_2 emissions through installation of Kawasaki Integrated Maritime Solutions

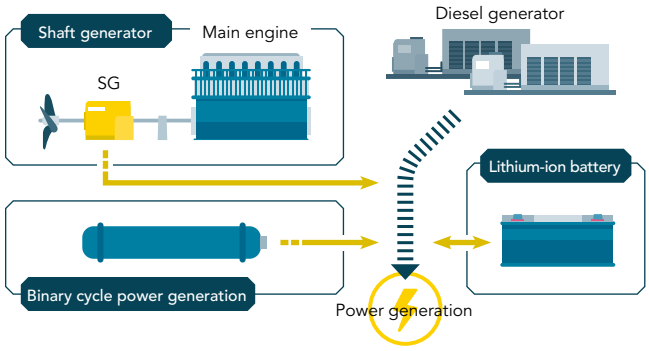


4. Other Energy-Efficient and Decarbonization Technology and Equipment

Hybrid propulsion system

- Considering a hybrid propulsion system that combines a shaft generator, binary cycle power generation,* and lithium-ion batteries

* A method of generating electricity by heating and evaporating a working fluid with a low boiling point through low-level heat sources, such as warm water, low-pressure steam, or air, and using the steam to turn a turbine



CO_2 capture plant on a vessel

- World's first CO_2 capture plant on a vessel installed on coal carrier *CORONA UTILITY* as part of demonstration projects for Carbon Capture on the Ocean (CC-OCEAN), an offshore CO_2 capture and storage plant, together with Mitsubishi Shipbuilding Co., Ltd., and Nippon Kaiji Kyokai (ClassNK)
- CC-OCEAN project wins Marine Engineering of the Year (Doko Memorial Award) 2021

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5. Raising Funds through Climate Transition

- Raised funds through Japan's first climate transition loan (purpose specified finance) for the LNG-fueled car carrier, *CENTURY HIGHWAY GREEN*, in March 2021
- Raised approximately ¥110 billion through Japan's first transition-linked loan (TLL) (purpose unspecified finance) in September 2021. Funds to be used to finance a range of environmental countermeasures aimed at decarbonization

6. Launch of Internal Carbon Pricing

- Full-scale internal launch of operation in April 2021. From fiscal 2022, this has been calculated with reference to an economic index that takes into account a future earnings contribution of ¥7,000 per ton of CO_2
- Promote low-carbon transition and decarbonization projects by using them as an indicator for the evaluation of investment projects

Supporting the Development of a Low-Carbon and Carbon-Free Society

We will promote initiatives, such as supporting the offshore wind power business, participating in and creating a fuel supply network for the hydrogen and ammonia transportation business, and participating in the CO_2 transportation business, as a target for supporting the development of a low-carbon and carbon-free society set out in the "K" LINE Environmental Vision 2050, which aims to achieve net-zero GHG emissions by 2050.

1. Support Offshore Wind Power Business

- Establishment of "K" Line Wind Service, Ltd., together with Kawasaki Kinkai Kisen Kaisha, Ltd., and provision of offshore support vessels and transport vessels for offshore wind farm businesses
- Supporting of target set by the Japanese government for the introduction of offshore wind power generation of 30 gigawatts to 45 gigawatts by 2040 from an operational and transportation perspective
- Launching of collaboration with Penta-Ocean Construction Co., Ltd., on ship management and other activities in the field of offshore wind power construction and maintenance

Offshore support vessel

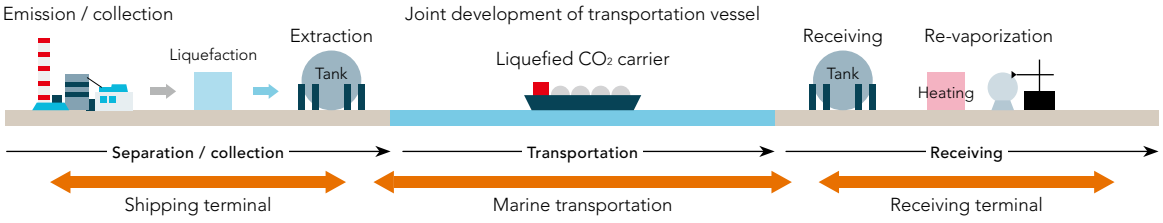
2. Participate in Transportation of Hydrogen and Ammonia, and Create Fuel Supply Network

- Participation in CO_2-free Hydrogen Energy Supply-chain Technology Research Association (HySTRA) with the aim of creating an international supply chain for the transportation to Japan of CO_2-free hydrogen made from Australian brown coal. Implemented the world's first verification tests for long-distance marine transportation in February 2022
- Considering re-entry into the ammonia transportation business
- Considering participation in the project to create a supply network for hydrogen and ammonia at all sites

Photograph provided by Kawasaki Heavy Industries, Ltd.

3. Participate in CO_2 Transportation Business

- Participation in R&D and demonstration project for CO_2 marine transportation together with the Engineering Advancement Association of Japan, Nippon Gas Line Co., Ltd., and Ochanomizu University. Completion of construction for demonstration project vessel scheduled for December 2023



- Entry into long-term contracts with Northern Lights for two liquefied CO_2 vessels.
  The ships will be delivered in 2024 and will contribute to the world's first full-scale carbon capture and storage (CCS) value chain.

4. Other Initiatives

- Collaborate with Chubu Electric Power Co., Inc., on a tidal energy project in Canada (aim to begin operation in 2023)
- Looking into carbon credits, carbon offsets, etc.
- Participate in international think tank Global CCS Institute
- Participate in joint CCS study in Malaysia

Note: The offsetting of carbon emissions may be carried out through an internationally accepted method in the future

Response to Digital Transformation (DX)

Reduction of Environmental Impact by Utilizing DX

1. Enhance Platform for Analyzing Data from Ship Operations and Visualize CO_2 Emissions

Kawasaki Integrated Maritime Solutions (integrated vessel operations and performance management system) gathers, analyzes, and compiles ship operations data from each ship. It monitors in real time not only their propulsion performance and engine plant status but also the real-time visualization and confirmation of various environmental factors, including volume of fuel consumption, CO_2 emissions, and current Carbon Intensity Indicator (CII) rating. Furthermore, we are engaging in modernizing the current system and reinforcing it as a core system that supports DX.

2. Utilize Data Analysis Technology That Employs AI

By integrating the latest AI analysis technology introduced in 2021 with high-quality operational data that "K" LINE has accumulated from vessels over the past 20 years, we have been able to visualize the impact of external disruptions for each individual vessel and accurately evaluate performance without this impact. Additionally, using data on weather and sea conditions, as well as a performance analysis model of each vessel, our optimal ship operations support systems calculate recommended routes for ships, enabling safe and economical ship navigation while reducing the burden on the environment.

Related Data

CO_2 Emissions of "K" LINE Group

(Tons)

Category		2017	2018	2019	2020	2021
Scope 1		13,417,625	12,536,134	10,325,224	9,202,613	6,583,464
Scope 2	Location basis	30,505	27,306	26,397	25,191	13,769
	Market basis	25,019	23,135	26,220	21,780	13,515
Scope 3		1,516,445	1,424,198	1,304,803	1,219,525	4,566,051

Note: The scope of aggregation has been revised from 2021. Vessels not under our operations are excluded for Scope 1 and container vessels are included for Scope 3.

Fuel Oil Consumption

(Tons)

	2017	2018	2019	2020	2021
Fuel oil	4,101,514	3,823,776	3,140,039	2,809,074	1,980,630

Note: The scope of aggregation has been revised from 2021. Vessels not under our operation are excluded.

Greenhouse Gas (GHG) Emissions per Deadweight Ton-Mile*

(g-CO_2/ton-mile)

	2017	2018	2019	2020	2021
All types of vessels	5.36	5.32	4.82	4.49	4.10

* Index for transporting one ton of cargo one nautical mile (1,852 meters), based on deadweight tonnage (DWT).
Note: The scope of aggregation has been revised from 2021. Vessels not under our operation are excluded.