

# TCFD-Based Information Disclosure

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September 2024



## Environmental Initiatives and Response to the TCFD

The “K” LINE Group endorsed the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) in 2018 and adopted information disclosure activities based on the TCFD framework in 2019.

In June 2020, we reviewed our “K” LINE Environmental Vision 2050, and performed a scenario analysis as proposed by TCFD. In light of the results of this analysis, we 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. However, conditions are always changing, so to reflect the latest circumstances, we have recently reviewed our scenario analysis and also expanded our disclosures, with a focus on the analysis of financial impacts.

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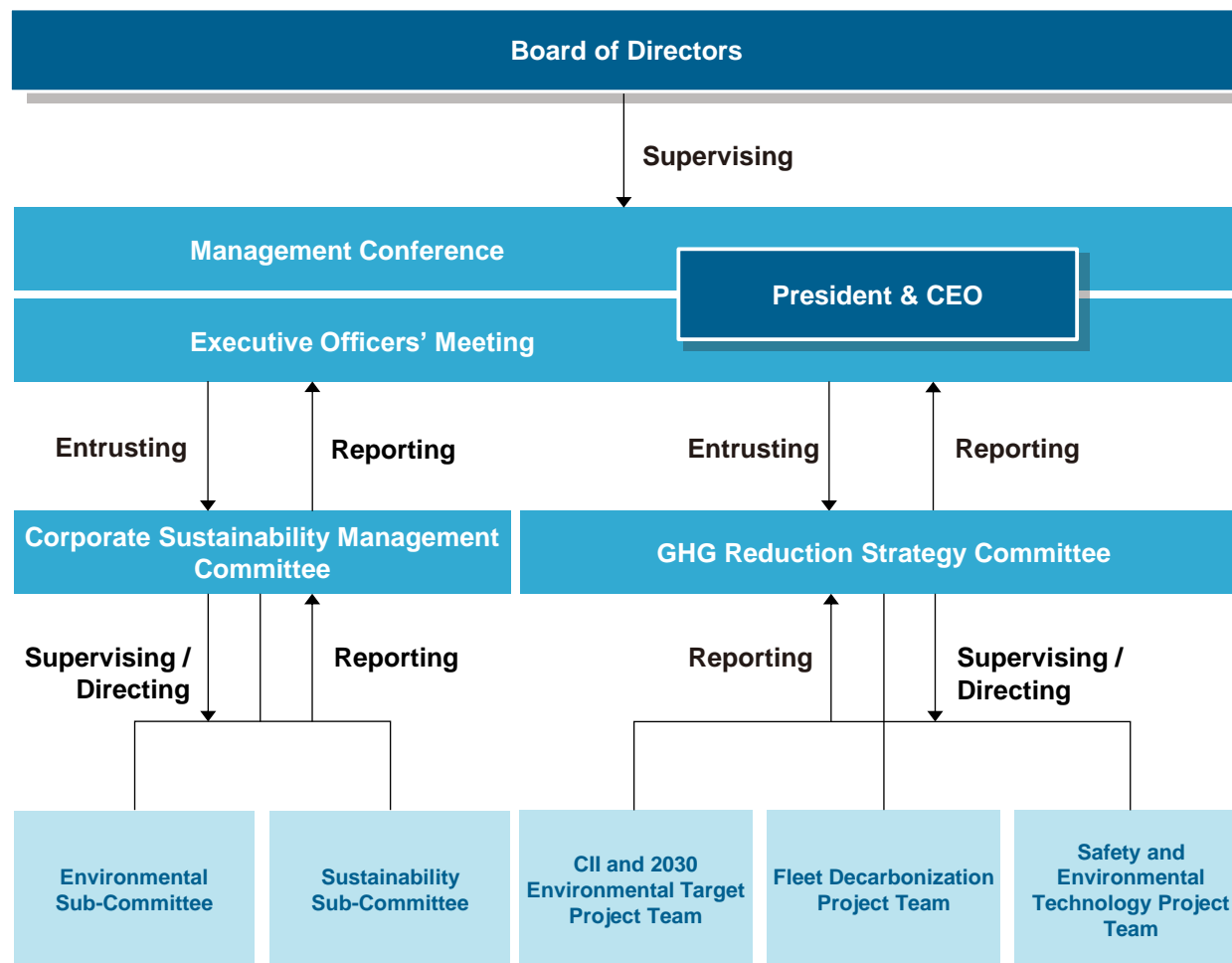


# Governance

Amid global changes in values and behavior, as well as increasing awareness of the need to reduce the burden of climate change on the environment, “K” LINE considers sustainability management a priority issue for enhancing corporate value over the medium to long term and discusses the issue as necessary at Board of Directors’ meetings.

## ► Governance System for Environmental Risks and Opportunities

- In April 2021, we 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, meets approximately once every two months, and works to enhance corporate value by evaluating and refining the system for promoting the Group’s sustainability management. Another function of the committee is to identify climate-related risks and opportunities and monitor the progress of responses to them.
- 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 environment-related activities.
- Additionally, in October 2021, we established the 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, the Corporate Sustainability Management Committee and the GHG Reduction Strategy Committee, functions as a forum for strategic discussions.





# Overview of Strategy

## ▶ Developing the “K” LINE Group’s Climate Change Strategy

Based on the TCFD recommendations, our company has identified climate change risks and opportunities using multiple climate scenarios, estimated their financial impacts, and considered responses to these risks and opportunities.

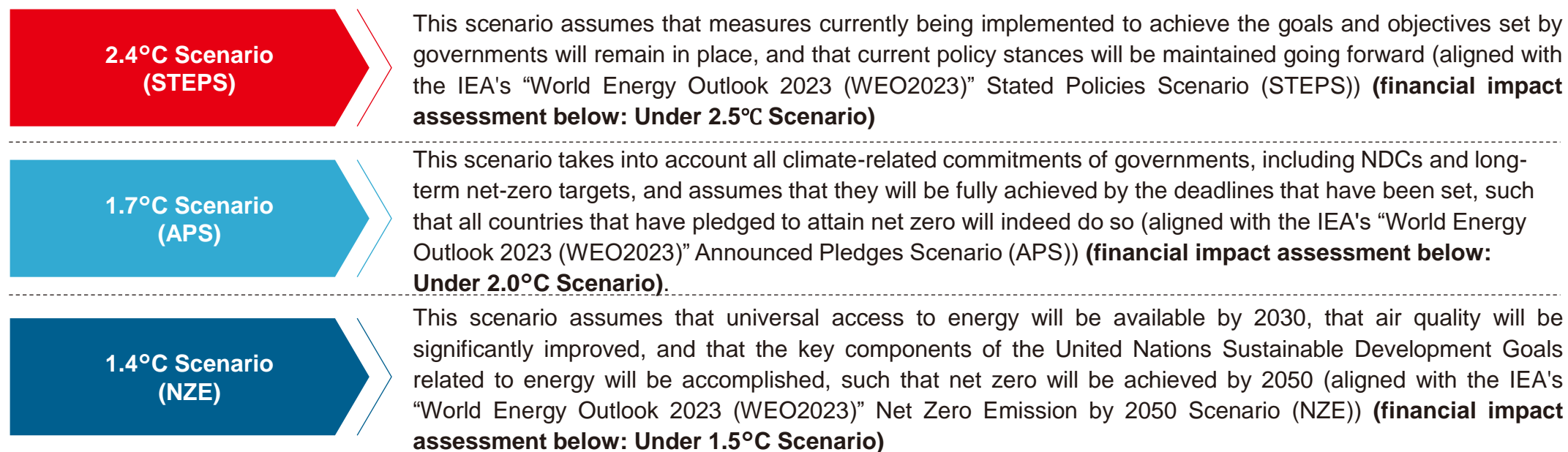
By responding to the significant risks and opportunities identified through this scenario analysis, we maintain resilience for our business operations.

## ▶ Summary of scenario analysis

Broad categories	Narrow categories
<b>1 Assumptions for scenario analysis</b>	-
<b>2 Identification of risks and opportunities</b>	Specification of risks and opportunities
	List of risks and opportunities by degree of importance (likelihood, timing of occurrence, and financial impact assessment)
<b>3 Financial impact assessment</b>	Results of financial impact assessment for each scenario
	Assumptions/conditions for financial impact calculation
<b>4 Responses to risks and opportunities</b>	List of responses
	Specific examples
	Future strategies/policies

To assess the sustainability and resilience of our management strategy with respect to the long-term and uncertain issue of climate change, we consider three scenarios: 2.4°C Scenario, 1.7°C Scenario, and 1.4°C Scenario. We assess the quantitative financial impacts of risks and opportunities stemming from climate change in the event that they should actually materialize, and consider responses to them. Additionally, for physical risks, we analyze them under a scenario with an even higher temperature rise than 2.4°C (3.0°C or more, equivalent to RCP8.0).

## ▶ Assumptions for scenario analysis



In addition, for physical risk analysis, we assume RCP8.0

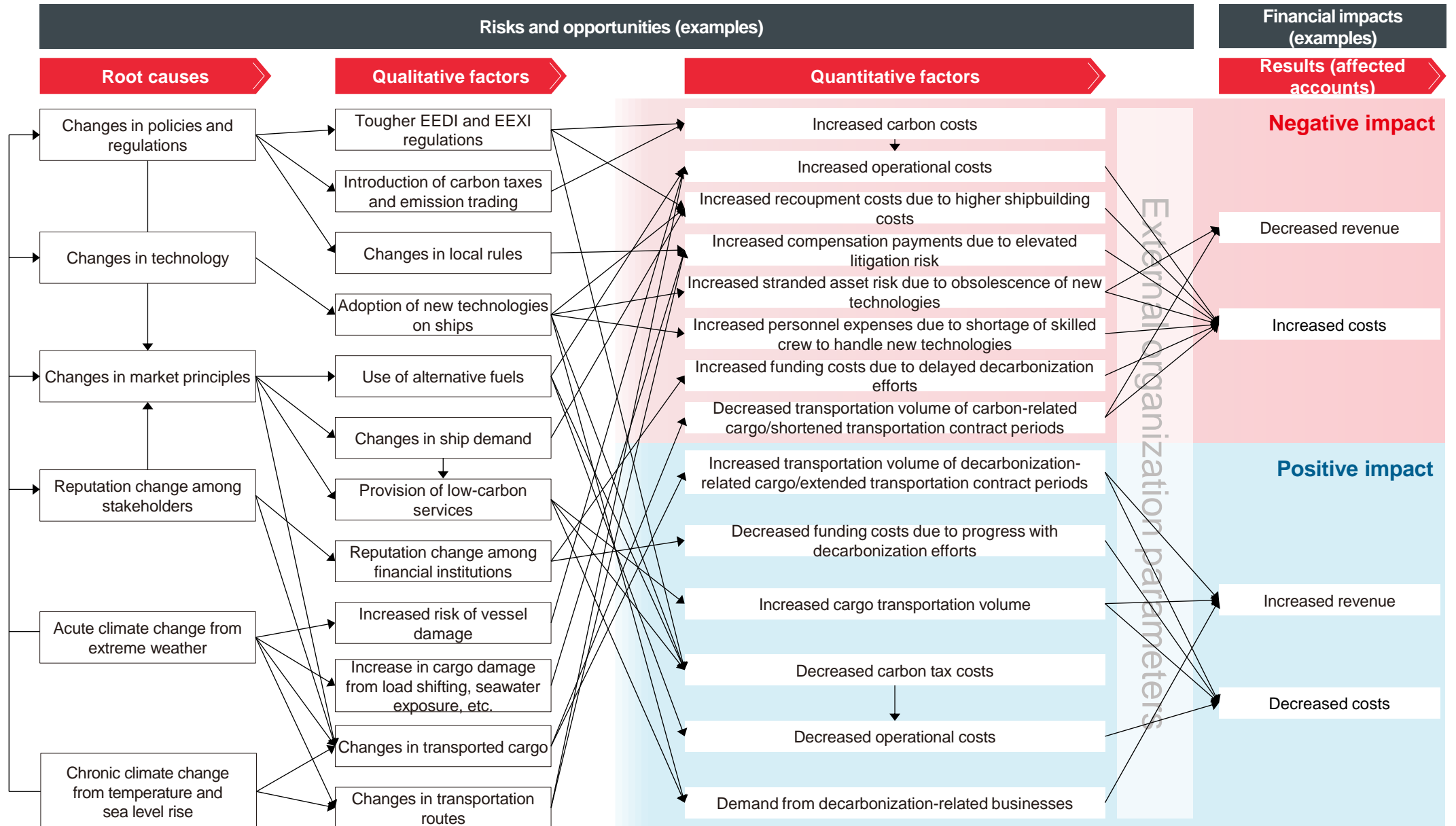
Based on this, in Japan, the Sustainability Standards Board of Japan (SSBJ) is examining Japan's sustainability disclosure standards, with an exposure draft released in March 2024, to be followed by finalized standards by March 2025.

Our company plans to prepare for information disclosure in line with the IFRS approach, while taking into account progress with the development of Japanese standards, which are expected to become applicable in the future.

<p>Scope</p>	<p>Region: All areas including overseas                  Business scope: Mainly international shipping business                  Company scope: Companies included in consolidated financial statements</p>	<p>Timing of occurrence</p>	<p>Up to 2030 defined as short to medium term and up to 2050 defined as long term</p>
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Through internal surveys and interviews with relevant departments, we specify the risks and opportunities related to climate change and organize the causes/effects and financial impacts of each, and thereby strive to comprehensively ascertain their implications for our business.



Through internal surveys and interviews with relevant departments, we organized the likelihood, time of occurrence, and financial impact of risks and opportunities related to climate change, and analyzed their degree of importance for our business. After that, we identified the main businesses affected by each risk and opportunity, considered the implications for the businesses, and determined responses.

► List of Responses to Risks and Opportunities

Risks and opportunities arising from changes in policies and regulations, reputation change among stakeholders, and changes in technology			Implications for business					
Types (root causes)	Events (qualitative factors)	Specific examples (quantitative factors)	Likelihood	Timing of occurrence	Financial impacts	Degree of importance for our business	Main businesses affected	Consideration of implications for business and responses (examples)
Changes in policies and regulations	Tougher EEDI and EEXI regulations	<b>Transition Risks</b> <ul style="list-style-type: none"> <li>Increased carbon tax costs</li> <li>Increased operational costs</li> <li>Increased shipbuilding costs</li> </ul>	High	Short to medium term	Medium	High	All	<ul style="list-style-type: none"> <li>Aim to secure environmental superiority by enhancing operational efficiency through digital transformation (DX), expanding the use of LNG-fueled vessels and marine biofuels, and exploring the deployment of alternative fuel vessels using ammonia, methanol, hydrogen, etc.</li> <li>For customers who are highly conscious of environmental regulations, disclose CO<sub>2</sub> emissions during ship operations</li> <li>Consider accounting for the costs of carbon taxes and investments in alternative fuel vessels in revenue</li> </ul>
	Introduction of carbon taxes and emission trading							
Reputation change among stakeholders	Reputation change among financial institutions	<b>Transition Risks / opportunities</b> <ul style="list-style-type: none"> <li>Increased/decreased funding costs due to delayed decarbonization efforts</li> </ul>	Medium	Long term	Low	Medium	All	<ul style="list-style-type: none"> <li>Engage with financial institutions to identify optimal funding methods and timings for dealing with climate change</li> <li>Monitor future developments on an ongoing basis as rising shipbuilding costs are an important factor when seeking financing</li> </ul>
	Reputation among customers	<b>Transition Risks / opportunities</b> <ul style="list-style-type: none"> <li>Reputation change due to delayed decarbonization efforts</li> </ul>	Medium	Short to medium term	High	High	All	<ul style="list-style-type: none"> <li>Disclose our various advanced environmental initiatives, including efforts to reduce GHG emissions, in a timely manner in our Integrated Report and on our website to showcase our low-carbon and decarbonization efforts</li> </ul>
Changes in technology	Adoption of new technologies on ships	<b>Transition Risks</b> <ul style="list-style-type: none"> <li>Increased shipbuilding costs</li> <li>Increased recoupment costs</li> </ul>	High	Short to medium term	Medium	High	All	<ul style="list-style-type: none"> <li>Communicate closely with customers about the costs of investing in alternative fuel vessels to take advantage of new technologies, and consider accounting for these costs in revenue</li> </ul>
		<b>Transition Risks</b> <ul style="list-style-type: none"> <li>Stranded assets due to obsolescence of technologies</li> </ul>	Low	Long term	High	Medium	Coal and iron ore carriers	<ul style="list-style-type: none"> <li>Expect to see a shift in demand from iron ore to reduced iron over the medium to long term</li> <li>Due to the extreme sensitivity of reduced iron cargo, it will be necessary to establish safe methods of transporting it and ensure that hulls are equipped to hold it safely</li> <li>Consider accounting for the costs of building ships that can transport reduced iron appropriately in revenue in an appropriate manner</li> </ul>
							All	<ul style="list-style-type: none"> <li>Endeavor to reduce the risk of stranded assets by closely communicating with customers and properly gauging demand</li> <li>In the coal and iron ore carrier business, in particular, respond to demand for reduced iron and scrap by providing transport and port handling know-how and engaging in joint research with customers to cater to their needs throughout the supply chain, and thereby reduce stranded asset risks (Case Study (1): Strengthening Collaboration for Decarbonization)</li> </ul>

Through internal surveys and interviews with relevant departments, we organized the likelihood, time of occurrence, and financial impact of risks and opportunities related to climate change, and analyzed their degree of importance for our business. After that, we identified the main businesses affected by each risk and opportunity, considered the implications for the businesses, and determined responses.

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Changes in technology	Adoption of new technologies on ships	<b>Transition Risks</b> <ul style="list-style-type: none"> <li>Shortage of skilled crew to handle new technologies</li> <li>Increased personnel expenses</li> </ul>	High	Short to medium term	Low	High	<ul style="list-style-type: none"> <li>Alternative fuel vessels</li> <li>Offshore wind power generation support vessel business</li> <li>LCO<sub>2</sub> transportation</li> </ul>	<ul style="list-style-type: none"> <li>By centralizing the core departments of operational technology responsible for safe navigation at a single location, we have created a one-stop system that concentrates information and expertise, allowing for unified actions across all ship types</li> <li>To secure personnel who are qualified to operate alternative fuel vessels, we are double-manning such ships to give crew opportunities to build up experience</li> <li>We will continue to be attentive in providing care to each crewmember through our in-house ship management company</li> </ul>
		<b>Opportunities</b> <ul style="list-style-type: none"> <li>Demand from decarbonization-related businesses</li> </ul>	High	Short to medium term	Medium	High	Seawing development  Reconstruction and promotion of utilization of K-IMS	<ul style="list-style-type: none"> <li>In January 2024, we established OCEANICWING S.A.S. in France. This company, which has taken over the business of Airseas following its spinoff from Airbus, is focused on further enhancing and accelerating the development and commercialization of Seawing technology.</li> <li>Seawing is a new technology that can be installed on any type of vessel, including retrofitting existing ships, and we are considering deploying it on every kind of vessel.</li> <li>It is projected to reduce CO<sub>2</sub> emissions by around 20%, though the exact figure will vary depending on the route and vessel speed, and when installed on LNG-fueled vessels, the synergistic effect could cut emissions by 45 to 50% (Case Study (2): Seawing Development)</li> <li>We gather real-time data on the ship's operations such as its fuel consumption, engine output, and speed. To advance ship operation management, we employ an optimal navigation support system that recommends the safest and most fuel-efficient route. AI-driven data analytics technology visualizes performance degradation and external disturbances for each ship, allowing operational efficiency to be maintained and enhanced</li> <li>The optimal route selection delivered by Kawasaki Integrated Maritime Solutions/NAVI results in an approximate 3 to 5% reduction in CO<sub>2</sub> emissions</li> <li>Moving forward, various business divisions will be working together to integrate even more operational data, with the aim of making navigation even more efficient (Case study (3): Kawasaki Integrated Maritime Solutions Development)</li> </ul>

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Changes in market principles	Use of alternative fuels	<b>Transition Risks</b> <ul style="list-style-type: none"> <li>Increased operational costs</li> </ul> <b>Opportunities</b> <ul style="list-style-type: none"> <li>Decreased carbon tax costs</li> </ul>	High	Short to medium term	High	High	All	<ul style="list-style-type: none"> <li>Form partnerships with stakeholders and respond to customers' requests to expand the deployment of alternative fuel vessels, including LNG-fueled ships</li> <li>Collaborate with other companies to develop an alternative fuel supply system for ammonia/methanol-fueled vessels</li> <li>Consider accounting for the costs of investments in alternative fuel vessels in revenue in an appropriate manner (Case Study (4): Use of Alternative Fuels)</li> </ul>
							All	<ul style="list-style-type: none"> <li>Operate vessels using marine biofuels</li> <li>Promote fuel conversion in collaboration with customers, while keeping an eye on market trends</li> </ul>
Changes in market principles	Provision of low-carbon services	<b>Opportunities</b> <ul style="list-style-type: none"> <li>Demand from decarbonization-related businesses</li> <li>Increased cargo transportation volume</li> </ul>	High	Short to medium term	High	High	Offshore wind power generation support vessel business	<ul style="list-style-type: none"> <li>Establish "K" Line Wind Service, Ltd. (KWS) jointly with Kawasaki Kinkai Kisen Kaisha, Ltd. to participate in the offshore wind power generation vessel/carrier business</li> <li>Starting collaboration with Penta-Ocean Construction Co., Ltd. in vessel management for the construction and maintenance of offshore wind power facilities</li> <li>Evaluate services our company can provide in projects within promotion zones under the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities (Case study (5): Offshore Wind Power Generation Support Vessel Business)</li> </ul>
							LCO <sub>2</sub> transportation business	<ul style="list-style-type: none"> <li>We are taking part in a pilot project in Norway (contract for three vessels for Northern Lights), and two of the vessels are scheduled to participate in the world's first full-scale carbon capture and storage (CCS) value chain project from 2024. (Case Study (6): LCO<sub>2</sub> Transportation Business)</li> </ul>

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Changes in market principles	Changes in transported cargo	<b>Transition Risks</b> <ul style="list-style-type: none"> <li>Decreased transportation volume of carbon-related cargo</li> <li>Shortened transportation contract periods</li> </ul>	High	Long term	Medium	Medium	Car carriers	<ul style="list-style-type: none"> <li>Prepare infrastructure for EV car transportation</li> <li>Develop route networks tailored to customer requirements for EV car transport</li> <li>Maintain flexibility in our own fleet to adapt to sporadic cargo movements and economic fluctuations</li> </ul>
							Coal and iron ore carriers	<ul style="list-style-type: none"> <li>Despite potential medium- to long-term decline in raw coal transportation, demand for shipping coal to India and the Middle East is increasing. Also focus on transporting alternative iron sources for which there is new demand, such as reduced iron</li> </ul>
							Other	<ul style="list-style-type: none"> <li>Consider transitioning to versatile vessels</li> </ul>
		<b>Opportunities</b> <ul style="list-style-type: none"> <li>Increased transportation volume of decarbonization-related cargo</li> <li>Extended transportation contract periods</li> </ul>	High	Long term	Medium	Medium	LNG carriers	<ul style="list-style-type: none"> <li>Recognizing that high demand for LNG vessels will be sustained until at least 2030, and that it is important to tap demand in Asia, particularly from China, Southeast Asia, and India</li> <li>Potential increase in LNG usage due to expansion in CCS</li> <li>Enhance the quality of vessel management and secure long-term contracts through customer-centric service provision</li> </ul>
Ammonia, methanol, hydrogen	<ul style="list-style-type: none"> <li>Collaborate with other companies to pursue research and pilot projects</li> </ul>							
							Coal and iron ore carriers	<ul style="list-style-type: none"> <li>We are anticipating an increase of overall cargo movements despite the potential shortening of transportation distances as reduced-iron shipping demand rises over the medium to long term, because transportation volume could increase due to the shift from raw materials to intermediate products (reduced iron) and finished goods.</li> <li>Accumulate know-how in reduced-iron transportation</li> </ul>

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Types (root causes)	Events (qualitative factors)	Specific examples (quantitative factors)	Likelihood	Timing of occurrence	Financial impacts	Degree of importance for our business	Main businesses affected	Consideration of implications for business and responses (examples)
Chronic or acute climate change including temperature rise, sea level rise, and extreme weather	Disruption of transportation routes Changes in transportation routes Load shifting or seawater exposure of cargo	<b>Physical Risks</b> <ul style="list-style-type: none"> <li>Increased risk of vessel damage</li> <li>Increased operational costs</li> <li>Elevated litigation risk, increased compensation payments</li> </ul>	Low	Long term	Low	Low	All	<ul style="list-style-type: none"> <li>Reduce risk of entering high-wave areas, ship rolling, and load shifting by using Kawasaki Integrated Maritime Solutions/NAVI to select the optimal route based on weather and sea-condition forecasts</li> <li>Currently deploying an app for predicting specific rolling motions that could cause load shifting on container ships</li> <li>Introduce a fleet monitoring system to enhance management for safe operations, such as avoidance of encounters with extreme weather</li> </ul>
							Car carriers	<ul style="list-style-type: none"> <li>Increased possibility of supply chain disruption/turmoil due to transportation network disruptions or flooding of plants producing goods for transportation in the U.S. and Asia</li> </ul>
							Dry bulk/coal and iron ore carriers	<ul style="list-style-type: none"> <li>While supply chain disruptions could have short-term effects, no significant impact on business continuity is expected</li> </ul>

▶ Summary of Results of Financial Impact Assessment for Each Scenario

**Key points from  
assessment results**

**POINT.1**

**Regardless of the temperature scenario, if no action is taken to reduce and eliminate carbon use, negative impacts will occur over the long term**

**POINT.2**

**Recognition of the need to get society as a whole to bear the increased costs of low-carbon and decarbonization measures that cannot be covered through in-house efforts alone**

**POINT.3**

**In scenarios where low carbon and decarbonization progress further (Under 1.5°C and 2.0°C Scenarios), the expansion of decarbonization-related business will ultimately result in higher profit levels**

The results of our estimation of financial impacts reiterated to us that regardless of the temperature scenario, if no action is taken to reduce and eliminate carbon use, negative impacts on our company will continuously occur over the long term. They also led us to recognize the quantitative impact of increased costs associated with low-carbon and decarbonization measures that we will incur under every scenario, and we realized that if we are to continue to develop the company's business and contribute to making people's lives more comfortable, we will need to get society as a whole to bear the increased costs of low-carbon and decarbonization measures that cannot be covered through in-house efforts alone by accounting for them in revenue.

Note that based on our long-term vision, we have declared a growth strategy centered on low carbon and decarbonization, and therefore, scenarios where decarbonization progresses further (Under 1.5°C and 2.0°C Scenarios) will ultimately result in higher profit levels.

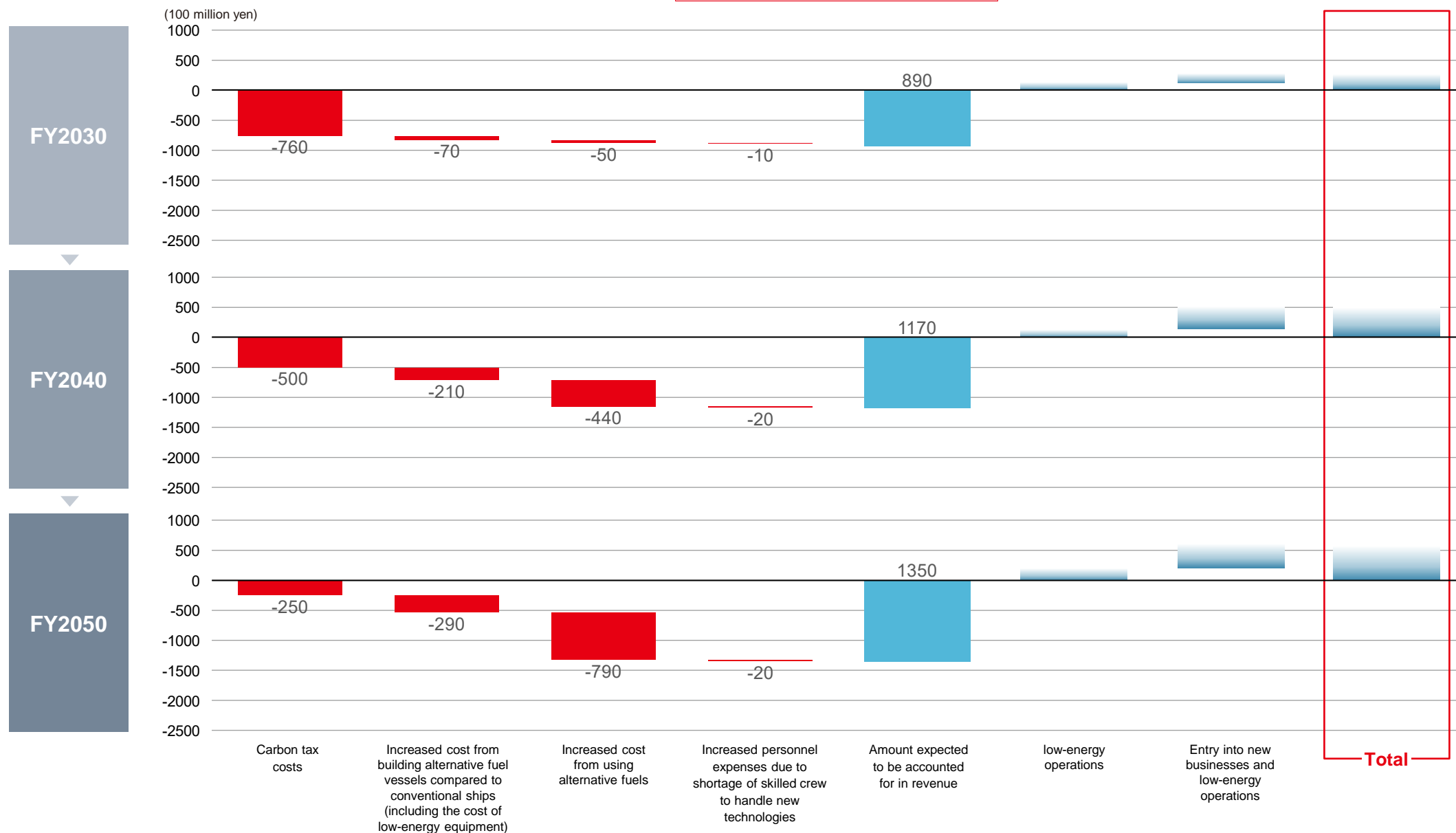
# Overview of Strategy | Financial impact assessment |

## Results of financial impact assessment for each scenario (2/4)

These financial impact estimates are based on the scenario that assumes that universal access to energy will be available by 2030, that air quality will be significantly improved, and that the key components of the UN's SDGs related to energy will be accomplished, such that net zero will be achieved by 2050.

(Aligned with the IEA's "World Energy Outlook 2023 (WEO2023)" Net Zero Emission by 2050 Scenario (NZE))

### Under 1.5°C Scenario





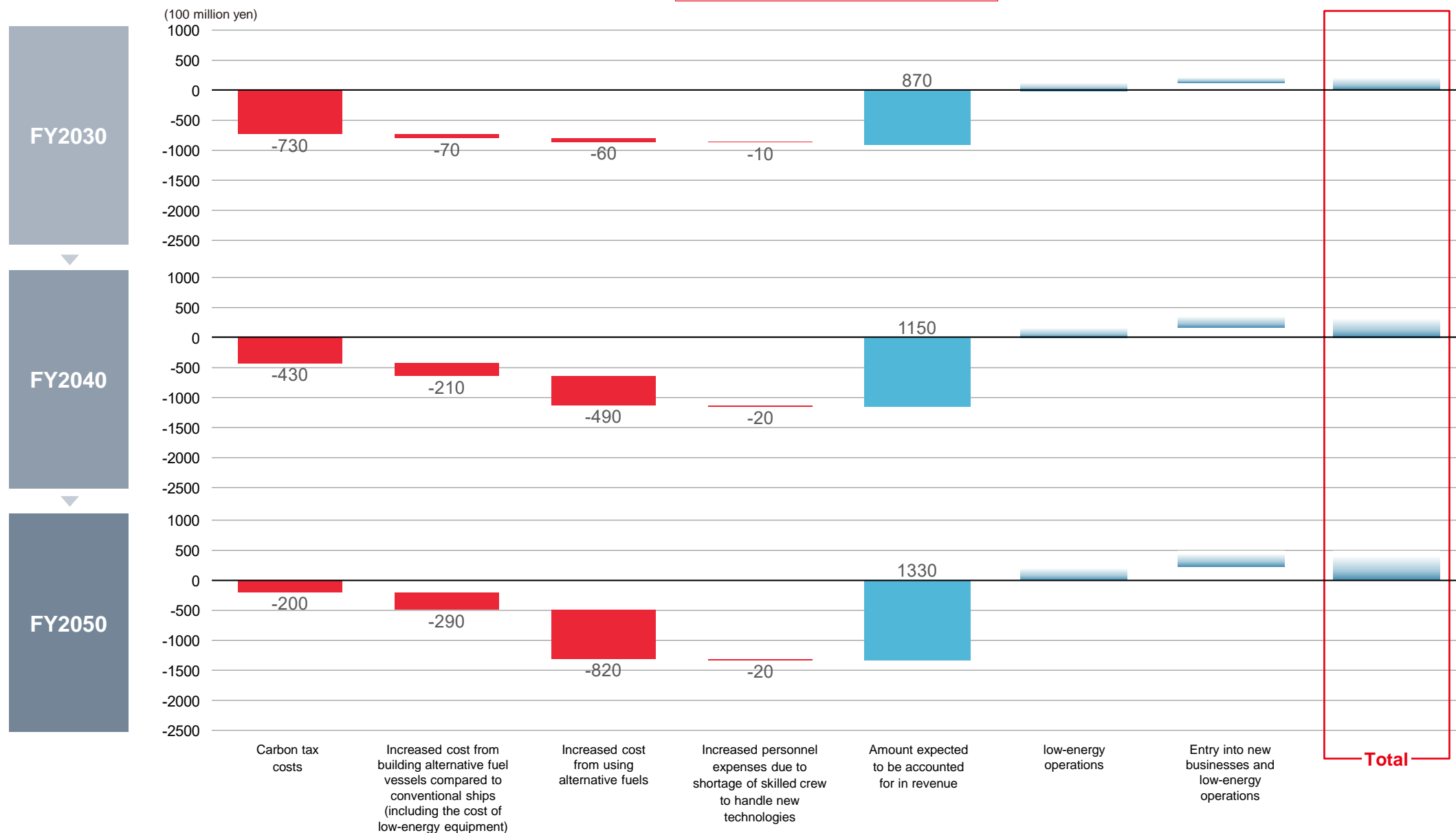
# Overview of Strategy | Financial impact assessment |

## Results of financial impact assessment for each scenario (3/4)

These financial impact estimates are based on the scenario that takes into account all climate-related commitments of governments, including NDCs and long-term net-zero targets, and assumes that they will be fully achieved by the deadlines that have been set, such that all countries that have pledged to attain net zero will indeed do so.

(Aligned with the IEA's "World Energy Outlook 2023 (WEO2023)" Announced Pledges Scenario (APS))

### Under 2.0°C Scenario

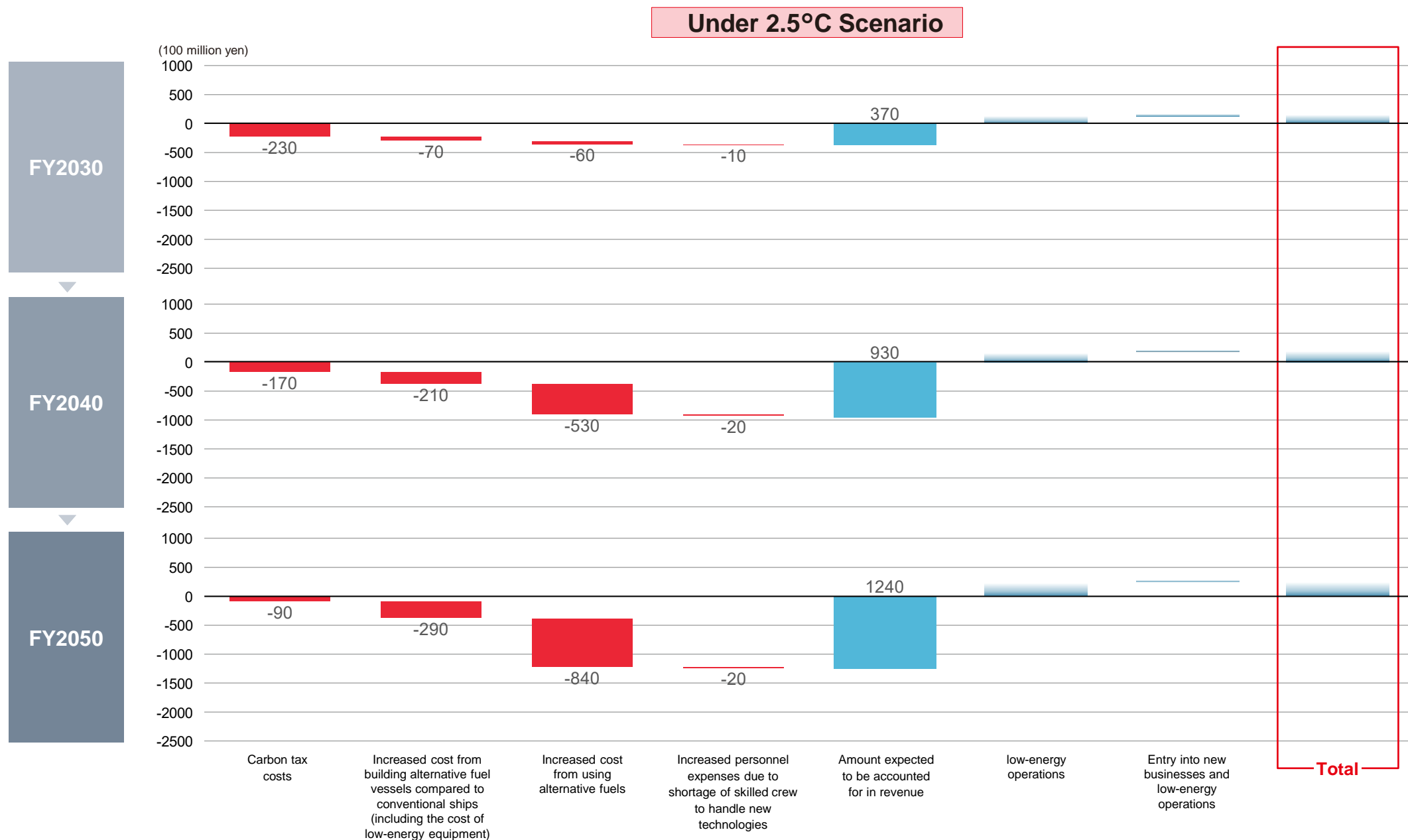


# Overview of Strategy | Financial impact assessment |

## Results of financial impact assessment for each scenario (4/4)

These financial impact estimates are based on the scenario that assumes that measures currently being implemented to achieve the goals and objectives set by governments will remain in place, and that current policy stances will be maintained going forward.

(Aligned with the IEA's "World Energy Outlook 2023 (WEO2023)" Stated Policies Scenario (STEPS))



Financial impact calculations are based on the IEA’s “World Energy Outlook 2023 (WEO2023),” and where data was inadequate, assumptions have been made with reference to data from external information providers.

▶ Assumptions/conditions for financial impact calculation

## Assumptions (examples)

### Carbon price for each scenario

	Scenario	Unit	FY2030	FY2040	FY2050
Carbon price for each scenario	1.4°C(NZE)	USD/tCO <sub>2</sub>	140	205	250
	1.7°C(APS)	USD/tCO <sub>2</sub>	135	175	175
	2.4°C(STEPS)	USD/tCO <sub>2</sub>	42	67	67

Source: IEA World Energy Outlook 2023

**Exchange rate** → To eliminate the impact of currency fluctuations across different decades and scenarios, a uniform exchange rate of 1 USD = 120 JPY was used

**Fleet plan transition** → Our policy is to shift to alternative fuel vessels regardless of the scenario, thus fleet transition is the same for each scenario.

	Vessel type by fuel type	Unit	FY2030	FY2040	FY2050
Fleet plan transition	FO	Vessel	187	71	4
	LNG	Vessel	35	35	10
	NH3	Vessel	14	133	234

The “K” LINE Group is taking steps to reduce GHG emissions in order to achieve low-carbon and carbon-free itself and throughout society and will invest a total of ¥380 billion by 2026 to establish competitive advantages while meeting needs for low-carbon and carbon-free operations.

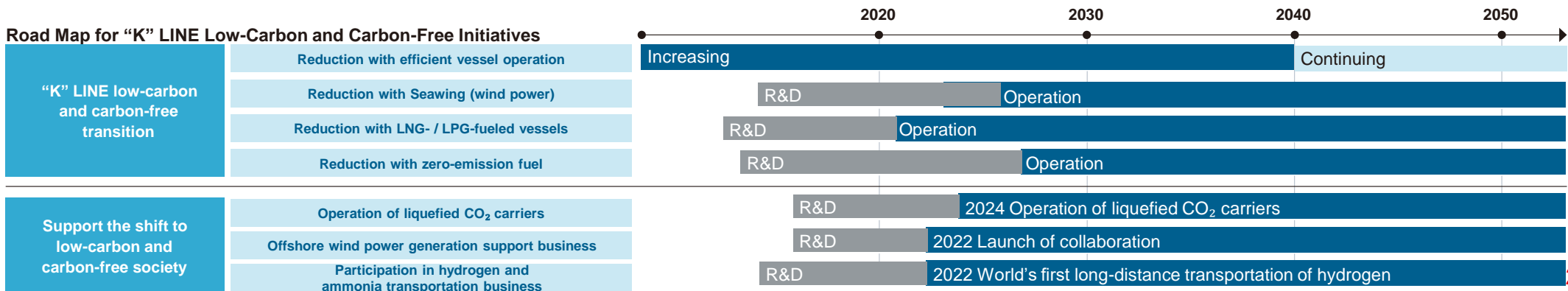
## ► Summary of low-carbon and carbon-free initiatives

			Investment amount (2022–2026)	GHG emissions reduction effect	KPI for measuring progress
“K” LINE low-carbon and carbon-free transition	Fuel conversion (use of clean energy)	LNG- / LPG-fueled vessels	¥267.5 billion	20–30% reduction vs. previous vessels	Number of LNG- / LPG-fueled vessels
		Zero-emission vessels		Zero emission	Number of zero-emission vessels
	Environmentally friendly equipment (use of wind power, etc.)	Seawing, etc.	¥21.0 billion	Up to 20% reduction vs. previous vessels (depending on the route, ship speed and weather condition)	Number of ships with Seawing (–50 ships, 2030)
				Installation of Kawasaki Integrated Maritime Solutions (operation efficiency)	3–5% reduction vs. previous vessels
Development and demonstration of environmental technology	Hybrid EV tugboats, etc.	¥5.5 billion	–		

Support the shift to low-carbon and carbon-free society	New business that promotes low-carbon achievement	Liquefied CO <sub>2</sub> transport	¥72.0 billion	–	Consider based on business characteristics (three liquefied CO <sub>2</sub> vessels are scheduled to begin operations as of May 2024)
Other environmental investments		Support for wind power generation installations, etc.			

\*1 Kawasaki Integrated Maritime Solutions will be installed as standard on newly built vessels, and has already been installed on vessels we own that are currently in operation. By the end of fiscal 2024, installation of Kawasaki Integrated Maritime Solutions will be completed on all medium to long-term chartered vessels for which installation is planned (excluding short-term chartered vessels). To expand our fleet of vessels equipped with the system, we will continue, on an ad hoc basis, to add more ships to the list of vessels on which the system is to be installed.

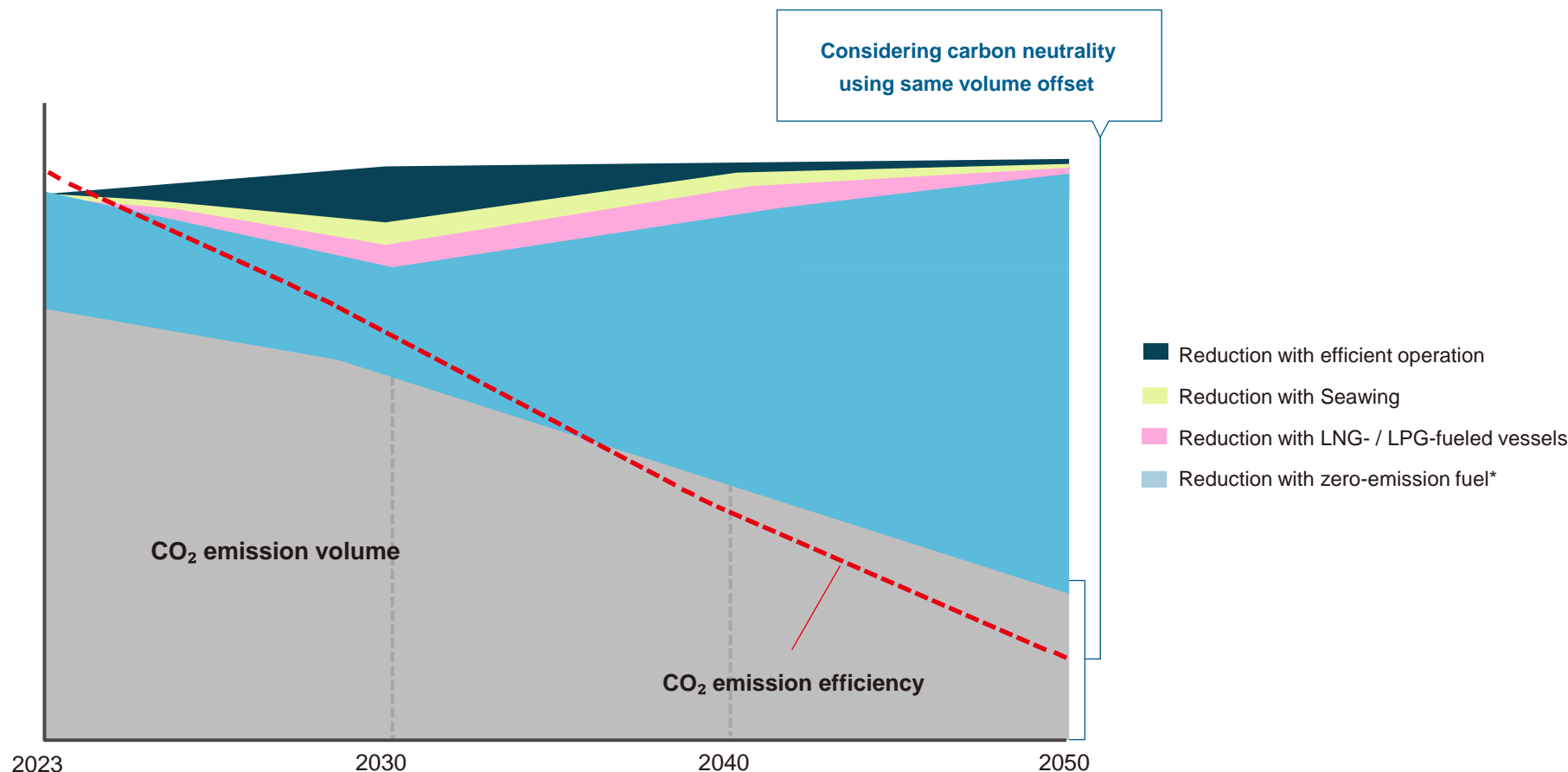
Note: KPIs are based on “K” LINE’s assumption on the development of related technology and infrastructure, related regulation, and economics as of today and are subject to change depending on future trends.



We are examining specific issues, such as vessel fleet management, with an eye on 2050, as we take on the challenge of achieving net-zero GHG emissions by that year.

In addition, we will determine KPIs (Key Performance Indicators) and milestones to measure progress with action related to GHG emission reduction.

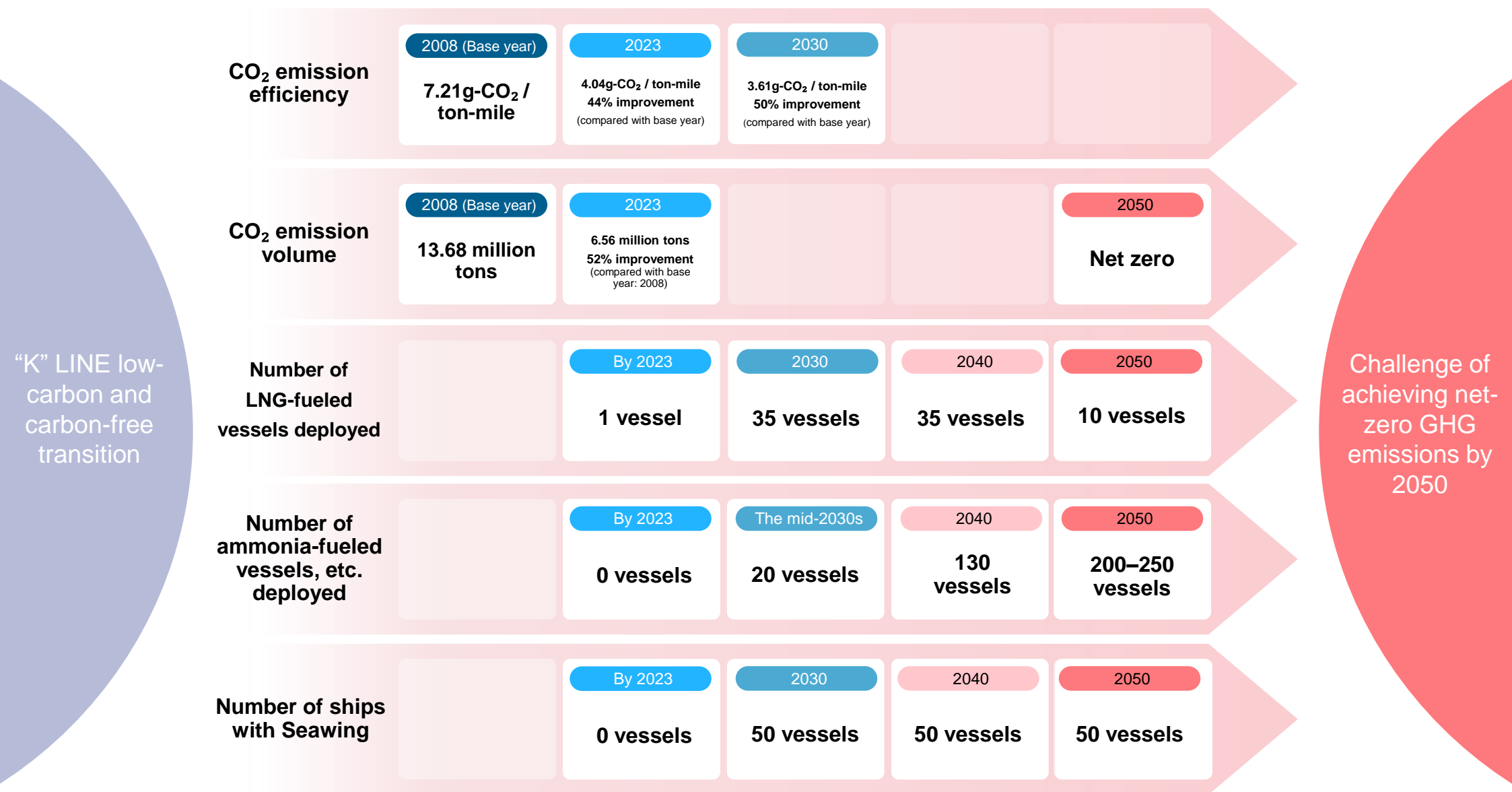
“K” Line CO<sub>2</sub> emission  
(Scope 1 + 2)



\*1 Ammonia, hydrogen, methanol, and bio-fuel, etc.

Note: The road map is based on “K” LINE’s assumption on the development of related technology and infrastructure, related regulation, and economics as of today and is subject to change depending on future trends.

\*2 CO<sub>2</sub> emission efficiency: CO<sub>2</sub> Emissions per Deadweight Ton-Mile (g-CO<sub>2</sub> / ton-mile)



“K” LINE low-carbon and carbon-free transition

Challenge of achieving net-zero GHG emissions by 2050

With a focus on the coal and iron ore business, we aim to achieve sustainable revenue growth by expanding our stable revenue base and improving transportation efficiency through strengthened collaboration for decarbonization with Indian and Middle Eastern mill operators, as well as major resource companies.

## ▶ Case Study (1): Strengthening Collaboration for Decarbonization

- We have initiated joint research on decarbonization with JSW Steel in India.
- In July 2022, we established a council for joint decarbonization research with Emirates Global Aluminium in the UAE
- In March 2023, we signed a memorandum of understanding to establish a council for joint research for decarbonization with Anglo American
- Construction of an LNG-fueled Capesize bulk carrier, "Cape Hayate," for JFE Steel Corporation was completed in May 2024
- We will maintain our commitment to ensuring safe operations and improving our transportation services and continue to grow through close relationships with customers and an organization-wide approach to sales efforts we strive to work with customers to reduce environmental burden
- We will also safeguard the relationships of trust we have built with shipowners and shipyards throughout our long history, as well as quality in the areas of safe navigation, operation management, and ship management. Even amid a changing business environment, we will continue to leverage our unique technical strengths and our ability to offer solutions to meet the needs of the new era, particularly with respect to the environment



(Indian mill operator)



(Middle Eastern mill operator)



(Major resource company)



It is projected to reduce CO<sub>2</sub> emissions by up to 20%, though the exact figure will vary depending on the route, vessel speed and weather condition, and when installed on LNG-fueled vessels, the synergistic effect could cut emissions by 45 to 50%.

### ► Case Study (2): Seawing Development

- In January 2024, we established OCEANICWING S.A.S. in France. This company, which has taken over the business of Airseas following its spinoff from Airbus, is focused on further enhancing and accelerating the development and commercialization of Seawing technology.
- Seawing is a new technology that can be installed on any type of vessel, including retrofitting existing ships, and we are considering deploying it on every kind of vessel.
- One of the features of Seawing is that it is a fully automatic system, with automation of everything from kite deployment to flight control and storage after use. The additional workload for crew members from kite operation is minimal, as the system can be controlled with simple button operations from the bridge. Another notable feature is its versatility, as it can be used with any type of ship, and can also be retrofitted onto existing vessels.
- For large bulk carriers, depending on the route, ship speed and weather condition, it can be expected to offer a reduction of up to 20% in GHG emissions compared to operations using conventional heavy oil as fuel.
- Looking ahead, it is expected that use of alternative fuels in place of heavy oil will expand. The prices of these fuels are anticipated to be higher compared to heavy oil, but Seawing will demonstrate energy-saving effects even with these expensive fuels. Seawing installation thus offers value from the twin perspectives of energy conservation and fuel cost reduction.

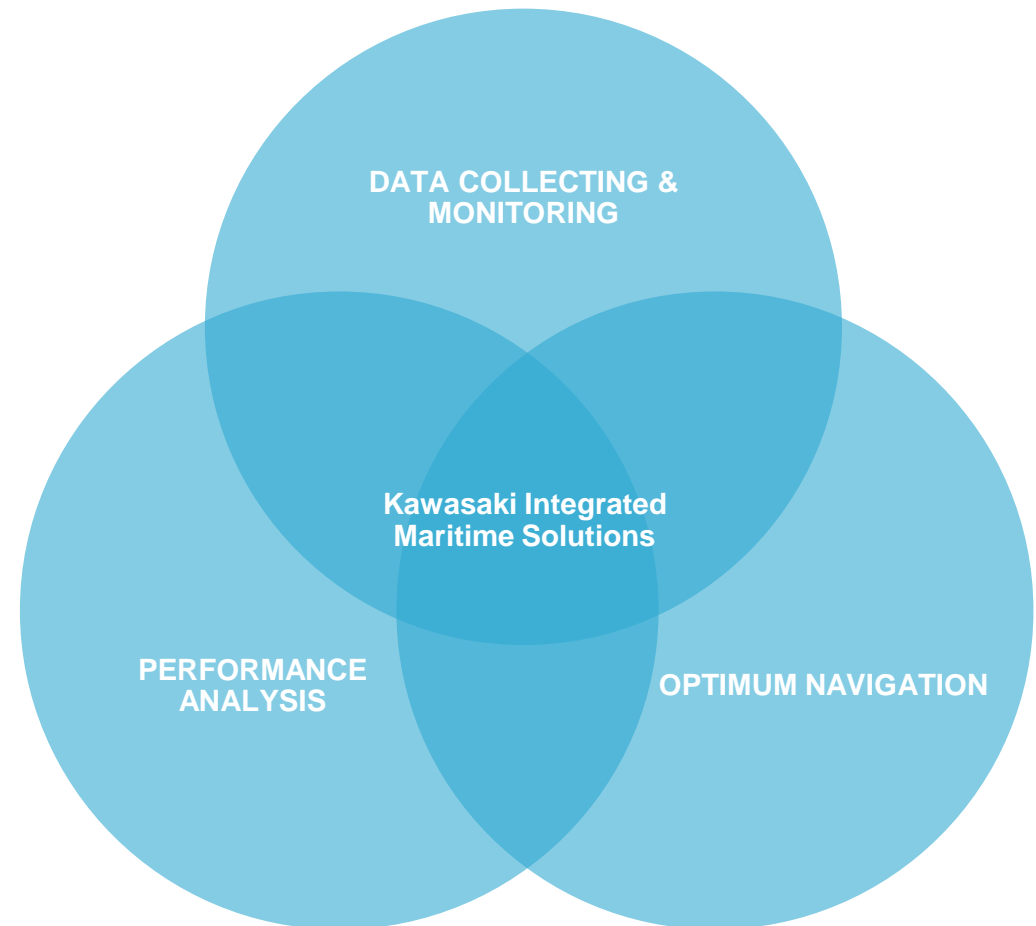




Kawasaki Integrated Maritime Solutions is our integrated vessel operation and performance management system. It gathers navigation data from each vessel as big data that is analyzed by AI to improve fuel economy and reduce greenhouse gas emissions. It also features functions that assist with ship navigation optimization based on data about weather and maritime conditions and performance analysis models for each vessel. In this way, it supports the safe and economical operation of ships.

▶ **Case Study (3): Kawasaki Integrated Maritime Solutions Development**

- Kawasaki Integrated Maritime Solutions gathers real-time data on each ship's operations such as its fuel consumption, engine output, and speed. To advance ship operation management, it employs an optimal navigation support system that recommends the safest and most fuel-efficient route
- Recently, AI-driven data analytics technology has visualized performance degradation and external disturbances for each ship, allowing operational efficiency to be maintained and enhanced
- Kawasaki Integrated Maritime Solutions delivers an estimated reduction in CO<sub>2</sub> emissions of approximately 3 to 5%



To augment our efforts to reduce and eliminate carbon usage, we will be transitioning to zero-carbon-emission vessels that run on new types of fuel, e.g., LNG-fueled ships, LPG-fueled ships, and ammonia/hydrogen-fueled ships.

### ► Case Study (4): Use of Alternative Fuels

#### Expanded introduction of LNG/LPG-fueled vessels

- During the 2020s, we are expanding the introduction of LNG/LPG-fueled ships, and are planning to have approximately 35 such vessels deployed by 2030

#### Introduction of LNG-fueled vessels

- In March 2021, our first LNG-fueled car carrier, named CENTURY HIGHWAY GREEN, was completed
- In 2024, construction of our first LNG-fueled large bulk carrier was completed
- We have decided to add thirteen LNG-fueled car carriers to our fleet deployed by 2026
- LNG vessels have a CO<sub>2</sub> emission reduction effect of approximately 25 to 30% compared to conventional heavy oil vessels

#### Introduction of LPG-fueled vessels

- In 2023, a large LPG carrier capable of transporting both LPG and ammonia, with LPG as the main fuel but with future ammonia transportation in mind, was completed
- LPG vessels have a CO<sub>2</sub> emission reduction effect of approximately 20% compared to conventional heavy oil vessels

#### Introduction of zero-emission vessels, including ammonia-fueled vessels, and carbon-neutral fuels such as biofuels

- Planning to have approximately 20 such vessels deployed by the mid-2030s
- Currently considering the introduction of zero-carbon-emission fuels such as ammonia/hydrogen as well as synthetic and other carbon-neutral fuels
- Operated pilot voyage using B100 biofuel (marine biofuel made of 100% biodiesel) in May 2024

- In 2022, Kawasaki Kisen Kaisha, Ltd. (“K” LINE), together with ITOCHU Corporation, Nihon Shipyard Co., Ltd., MITSUI E&S Co., Ltd., and NS United Kaiun Kaisha, Ltd., obtained an Approval in Principle (AIP) from Nippon Kaiji Kyokai (ClassNK) for the design of an ammonia-fueled vessel (200,000 deadweight ton class bulk carrier)  
The acquisition of the AIP is an important milestone for the social implementation of ammonia-fueled vessels, a new challenge for the maritime industry, and also an important step toward the further promotion of the integrated project being advanced by partner companies to develop ammonia-fueled vessels and create a global ammonia supply chain
- “K” LINE and partners aim to take delivery of the vessel and begin its social implementation in 2026
- Currently working to develop and deploy practical zero-carbon-emission vessels during the late 2020s
- Initiated joint research on decarbonization with JSW Steel
- Initiated joint research on decarbonization with Emirates Global Aluminium
- Decided to build a hybrid EV tugboat equipped with large-capacity lithium-ion batteries and a generator
- Initiated joint research on decarbonization with Anglo American



In the field of offshore wind power support vessels, Group company “K” Line Wind Service, Ltd. (KWS), has begun to collaborate with major customers and is engaging in some international projects in addition to wind power projects across Japan, which will ramp up in the late 2020s.

### ▶ Case Study (5): Offshore Wind Power Generation Support Vessel Business

**Establishment of an offshore wind power generation support vessel business company by Kawasaki Kisen and Kawasaki Kinkai Kisen**

- Established “K” Line Wind Service, Ltd. (KWS) in 2021 to participate in the offshore wind power generation vessel/carrier business
- Signed a memorandum of understanding with Penta-Ocean Construction Co., Ltd. in vessel management for the construction and maintenance of offshore wind power facilities
- Obtained ISO 9001:2015 certification. Established a unique quality management system to evaluate and provide guidance on improvements to work support services for shipowners and ship management companies for offshore support vessels
- Signed a joint research agreement with J-Power, TEPCO Holdings, Chubu Electric Power, and Albatross Technology for the Offshore Small-scale Demonstration Research of Next-generation (Floating Axis) Wind Turbines project

**Received AiP certification from Nippon Kaiji Kentei Kyokai for a concept for a dedicated vessel for floating offshore wind turbines**

- As part of the Development of Low-Cost Construction Technology (for Installation of Floating Wind Turbines) initiative of the 2024 Green Innovation Fund, we began promoting the basic design for dedicated floating offshore wind turbine vessels in cooperation with Japan Marine United and Japan Shipyards with funding from NEDO
- The main purpose of these vessels is to efficiently perform work required for mooring, including mooring system transportation, mooring system seabed installation and extension, and anchor grip force testing, and to meet a variety of needs for offshore wind farm process, from development to operation, including surveying, transportation, construction, and maintenance. (Patent pending)



Image of a dedicated vessel for floating offshore wind turbines

In the LCO<sub>2</sub> transportation business, we entered into long-term contracts with Northern Lights for three liquefied CO<sub>2</sub> vessels for the world's first full-scale CCS project. We are also moving forward with construction of the NEDO demonstration vessel for liquefied CO<sub>2</sub> transportation and feasibility studies for CCS projects with key customers and partners.

## ▶ Case Study (6): Liquefied CO<sub>2</sub> Transportation Business

### Entered into a contract with Northern Lights for liquefied CO<sub>2</sub> vessels

- In the field of liquefied CO<sub>2</sub> carriers involved in carbon dioxide capture and storage (CCS)—a concept for capturing and storing CO<sub>2</sub> emitted during the use of hydrocarbons excavated from under the ground—"K" LINE has signed a long-term charter contract for the world's first full-scale commercial transport for CCS that is launching in Europe (the Northern Lights project).
- Northern Lights has ordered a fleet of four vessels, three of which will be managed by The "K" LINE Group.

Northern Lights is dedicated to systematizing its know-how for medium-temperature, medium-pressure transportation.



### The finished Excool demonstration test ship for liquefied CO<sub>2</sub> transportation from NEDO

- The "K" LINE Group participates in the CCUS R&D and Demonstration Related Project / Large-scale CCUS Demonstration in Tomakomai / Demonstration Project on CO<sub>2</sub> Transportation, which NEDO opened to applications in fiscal 2021. Construction of the Excool demonstration test ship—which will be used in the project—was completed, and the ship was put into operation.
- Using our expertise in safe navigation and cargo handling, and experience in the demonstration testing of liquefied hydrogen transportation ships, we carried out a safety assessment of transportation and loading for the liquefied CO<sub>2</sub> demonstration test ship and have prepared an operation manual. Looking ahead, we will analyze the test data to contribute to the development of technology for the safe operation of ships carrying liquefied CO<sub>2</sub>.

NEDO's demonstration tests are designed to systematize the know-how for low-temperature, low-pressure transportation.

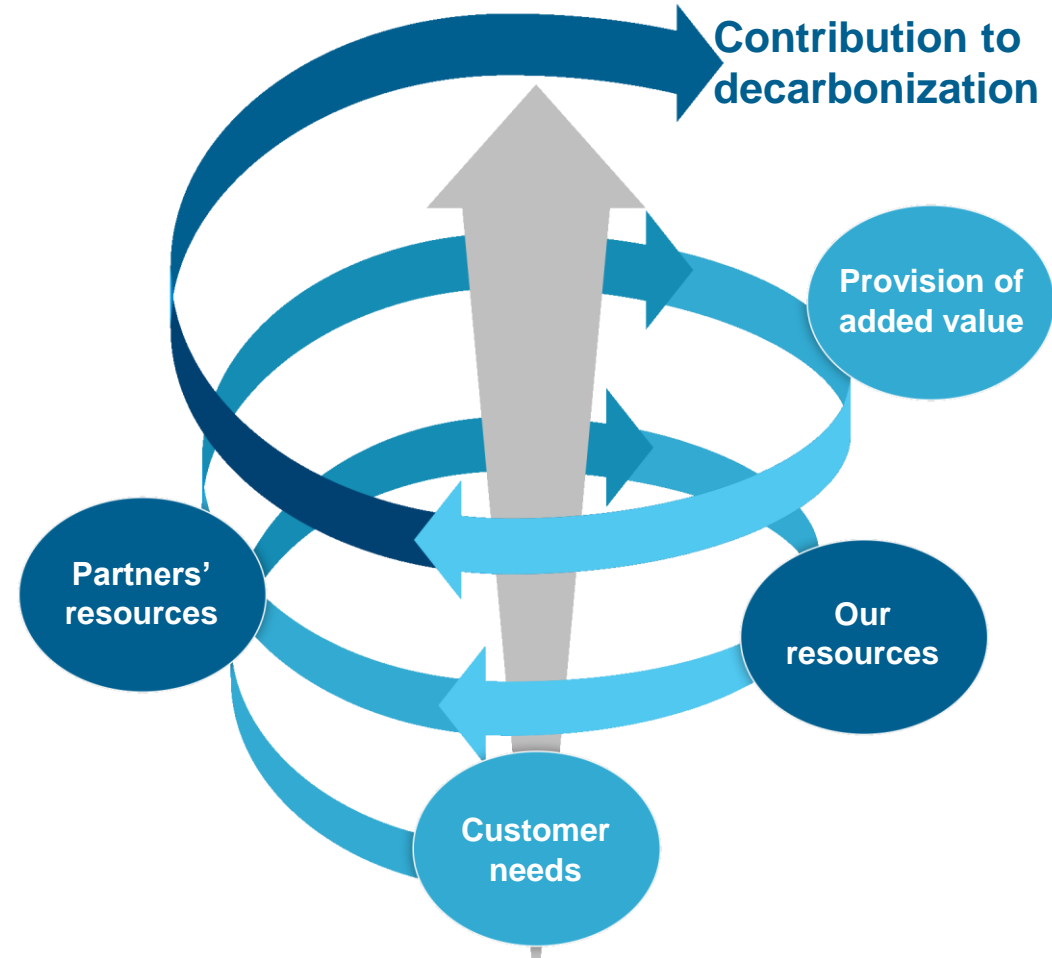
### Conducted studies for constructing CCS value chains with leading domestic and international companies

- Signed a basic agreement with PETRONAS for studying CCS commercialization in Malaysia
- Feasibility study toward the realization of the Setouchi-Shikoku CO<sub>2</sub> Hub Concept
- Joint study with Tokyo Gas on liquefied CO<sub>2</sub> vessel transportation for CCS
- Signed a business consignment contract with Kansai Electric Power Company for designing liquefied CO<sub>2</sub> vessels, etc.
- Participated in a research consortium on unloading liquefied CO<sub>2</sub> from onboard CO<sub>2</sub> collection equipment

To contribute to decarbonization, we will be bringing in new technologies and resources and working with partners to provide added value.

▶ Approach to Engagement with External Parties for Decarbonization

- We continuously gather information on regulations, market conditions, technological trends, and customer needs to address current challenges as they arise. Society and our customers' business environments are changing at increasing speeds, and customer needs are also evolving, so the technologies and resources required to meet those needs must change continuously
- We will develop and utilize new technologies and resources, and strive to provide added value by contributing to decarbonization in the marine transportation industry
- To that end, we seek partners who can utilize our extensive customer contact points and resources to pursue decarbonization alongside us





# Risk Management

We recognize the impact of external changes and the various risks our operations are exposed to, and we have established a risk management system that will enable us to fulfill our corporate social responsibilities even when risks materialize.

## ► Risk Management Policy

- We classify major risks into four categories: risks associated with ship operations, disaster risks, compliance-related risks, and other business-related risks, and we set up committees to address the risks in each category.

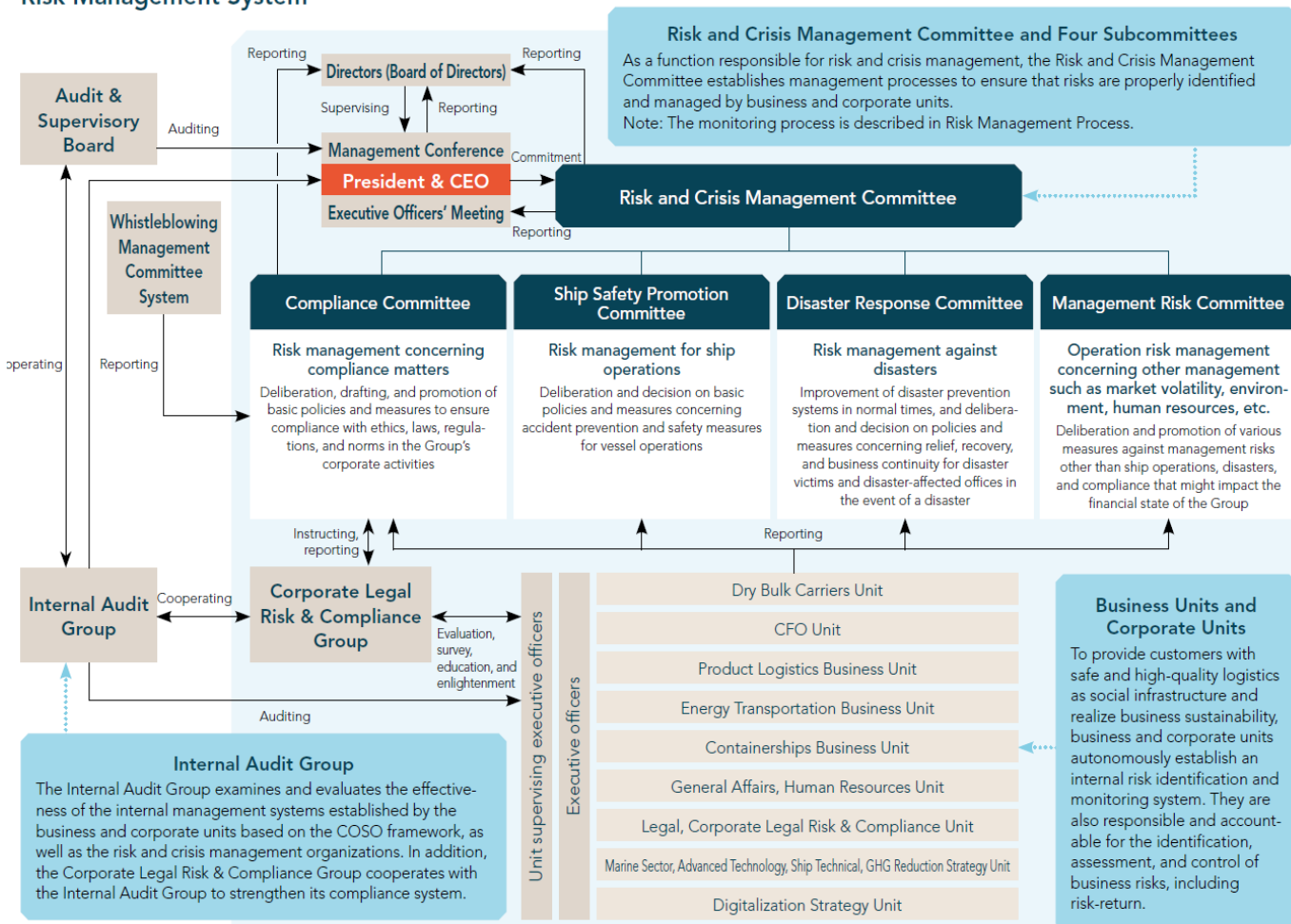


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- Additionally, we have established a Crisis Management Committee as an organization that brings together these four committees and oversees and promotes overall risk management.
- The president serves as the chair of all these committees, with meetings held quarterly even during normal times to strengthen risk management.
- The four committees for major risks provide training for risk management at regular intervals and on an ongoing basis. For example, we build up readiness by organizing large-scale accident drills and having personnel participate in risk management workshops with other companies. Each year, November is designated as Compliance Month, during which the importance of compliance is thoroughly communicated.
- The Group is acutely aware of the importance of sustainability as essential infrastructure that supports people's lives and the economy. To address risks and leverage opportunities related to environmental conservation and climate change, we conduct scenario analysis on climate change and have formulated the "K" LINE Environmental Vision 2050.

## Risk Management System







# Metrics and Targets

As we move closer to 2030, we will be steadily executing an action plan to achieve the medium-term milestone goals set forth in the “K” LINE Environmental Vision 2050. And our new goal for 2050 is to achieve net-zero GHG emissions. At the same time, we will be providing support for the decarbonization of society, with the aim of “contributing to the well-being and prosperous lifestyles of people around the world.”

## ▶ Targets for Action Related to GHG Emission Reduction

### 2030 interim milestones

“K” LINE low-carbon transition: Improve CO<sub>2</sub> emission efficiency by 50% by 2030 (compared with 2008 levels)

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

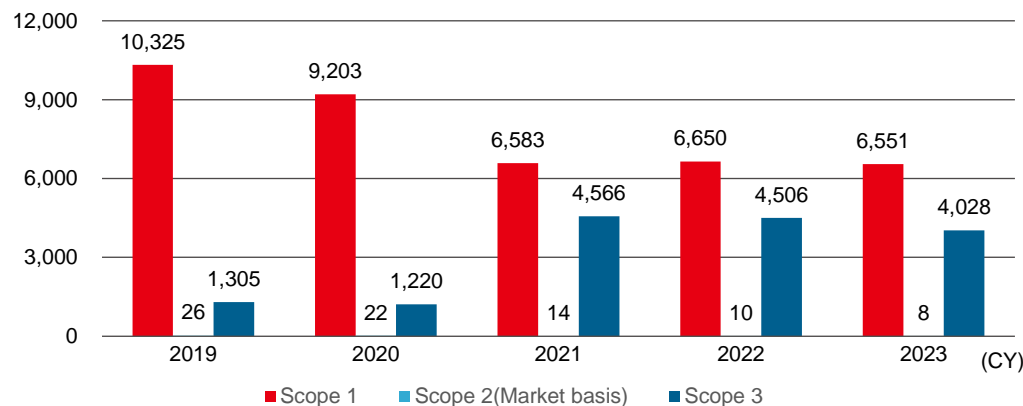
### 2050 targets

“K” LINE decarbonization: Take on the challenge of net-zero GHG emissions

Support the decarbonization of society: Be a transporter and supplier of new energy

### GHG Emission Result

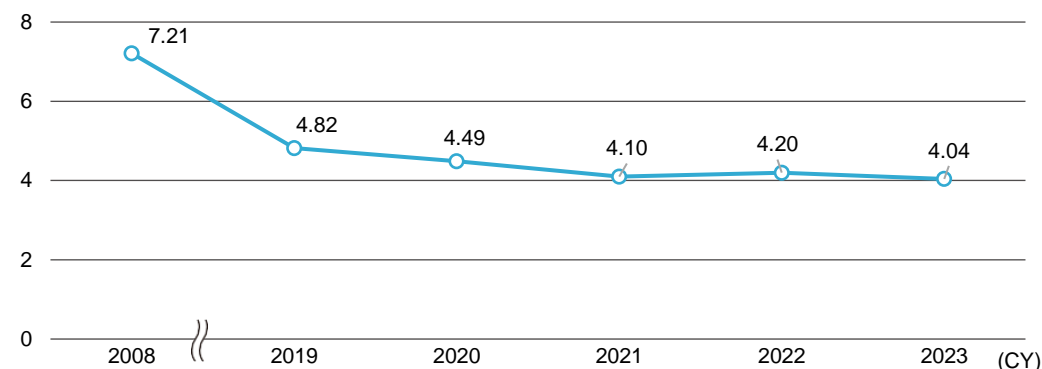
Greenhouse Gas (GHG) Emissions\* (Scopes 1, 2, 3)  
(Thousands of tons)



CO<sub>2</sub> emissions are calculated based on the “K” LINE Group’s fuel and electricity consumption, and third-party certification is obtained for these calculations. 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.

\* The scope of calculation is “K” LINE’s scope of consolidation, which corresponds to almost 100% of sales.

Greenhouse Gas (GHG) Emissions per Deadweight Ton-Mile  
(Annual efficiency ratio\* and g-CO<sub>2</sub> per ton-mile)



In 2020, we formulated a revised version of “K” LINE Environmental Vision 2050. We have aligned our CO<sub>2</sub> emission efficiency indicators with the targets of the International Maritime Organization (IMO) by setting 2008 as a base year and calculating AER\*. The scope of aggregation has been revised from 2021. Vessels not under our operations are excluded. In 2023, our GHG emissions per deadweight ton-mile were 44.0% lower than those of 2008.

\* The average CO<sub>2</sub> emissions from a vessel per deadweight ton-mile (1,852 meters).



# Related Data

## ▶ CO<sub>2</sub> Emissions of “K” LINE Group

(Unit: tons)

Category		2019	2020	2021	2022	2023
Scope 1		10,325,224	9,202,613	6,583,464	6,649,847	6,550,995
Scope 2	Location basis	26,397	25,191	13,769	11,556	9,519
	Market basis	26,220	21,780	13,515	10,472	8,093
Scope 3		1,304,803	1,219,525	4,566,051	4,506,111	4,027,532

Note 1: 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

2: In 2023, we reported 1,783 tons of biogenic CO<sub>2</sub> emissions from biofuel categorized in Outside of Scopes.



Third-party verification statement on greenhouse gas (GHG) emissions data

## ▶ Fuel Oil Consumption

(Unit: tons)

	2019	2020	2021	2022	2023
Fuel oil	3,140,039	2,809,074	1,980,630	1,923,950	1,897,864

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

## ▶ CO<sub>2</sub> Emissions per Deadweight Ton-Mile\*1

(Unit: g-CO<sub>2</sub>/ton-mile)

	2019	2020	2021	2022	2023
All vessel types	4.82	4.49	4.10	4.20	4.04

\*1 The average CO<sub>2</sub> emissions from a vessel per deadweight ton-mile (1,852 meters). Based on the ship's DWT (deadweight tonnage)

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

**Disclaimer**

Information contained in this document is provided solely for informational purposes and is not an offer or a solicitation of an offer to buy or sell securities. You are requested to make investment decisions using your own judgment.

**Scope of Reporting**

This document contains forward-looking statements concerning future plans and forecasts, and these statements are based on information currently available. "K" LINE therefore cautions readers that actual results may differ materially due to changes in economic conditions, supply and demand in the shipping industry, the bunker price, and foreign currency exchange rates.

