Progress Report 2025

NYK Group Decarbonization Story

Decarbonization Group
Sustainability & Transformation Headquarters
NYK Line

November 2025

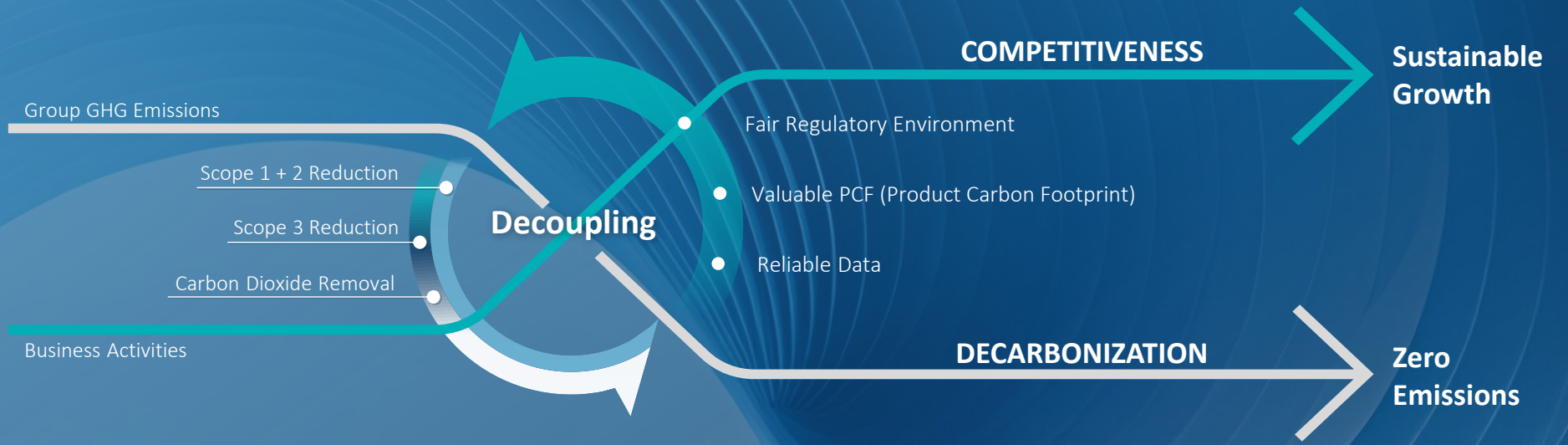
Introduction

Logistics forms the foundation of all business, and its decarbonization is essential for the global economy. Although it is often classified as one of the “hard-to-abate” sectors, where reducing emissions proves to be particularly challenging, we have demonstrated our commitment to responsible action through the NYK Group Decarbonization Story (NDS) and have developed our Decoupling Strategy to simultaneously advance competitiveness and decarbonization.

The pursuit of both decarbonization and sustainable economic growth is now being implemented and standardized through regulatory frameworks. One symbolic development is a policy proposal released in Europe. The “Draghi Report” (September 2024), which advocates for “Decarbonization and Competitiveness,” emphasizes that decarbonization should be regarded not as a cost or obligation but as an opportunity to enhance industrial competitiveness. In response, the European Commission announced the “Competitiveness Compass” in January 2025, a concrete action plan that places this concept at its core and is now being developed into a comprehensive policy package. Another key example is the Net-Zero Framework (GFI Regulation) currently under discussion by the IMO, which is set to define new rules for international shipping.

This is a global regulation designed to accelerate the energy transition towards net zero by making decarbonized vessels economically advantageous. The regulation was approved at the Marine Environment Protection Committee (MEPC) in April 2025, and discussions are underway regarding its adoption. These policy trends indicate that we have entered a transition period in which new rules are being established to ensure a level playing field for those advancing decarbonization investments and initiatives, enabling them to maintain competitiveness.

We recognize that the objectives of these new policies and regulations are aligned with the vision we have set forth in the NDS. Accordingly, we are committed to (1) steadily advancing our decarbonization initiatives and (2) actively participating in the practical implementation of global regulations and the development of standards that address the mandatory disclosure of Scope 3 emissions by our customers. Through these efforts, we aim to help establish a fair business environment in which players promoting decarbonization can maintain competitiveness while also ensuring our own compliance and leadership. *Progress Report 2025* is intended to report on our activities related to these two commitments.



Chapters

CURRENT SITUATION

01 DECARBONIZATION

02 COMPETITIVENESS

APPENDIX

CURRENT SITUATION

Decarbonization Services Gaining an Advantage Through Market and Regulatory Trends

A Car Carrier at the Port of Yokohama

Market Trends

Regulations and disclosure requirements expand Scope 3 responsibility, making low-carbon choices a business advantage.

Regulations and disclosure requirements are reshaping GHG accountability—expanding it beyond Scope 1 direct emitters to companies whose choices drive Scope 3 emissions. For many cargo owners and customers, transportation emissions fall under Scope 3—making decision-makers responsible for logistics-related carbon impacts.

This shift is accelerating demand for low-carbon transportation services, driven not only by CSR but also by cost efficiency and competitive advantage.

CBAM and EU-ETS
—Capturing and reducing PCFs

The Carbon Border Adjustment Mechanism (CBAM) aims to prevent carbon leakage, while efforts to accurately measure and report companies' product carbon footprints (PCF) are advancing. GHG emissions from transportation to Europe are subject to charges by the EU-ETS, which plays a complementary role to CBAM. To maintain competitiveness, companies need to strengthen environmental measures across the entire supply chain.

Disclosure of Scope 3 Emissions
—Impact of enhanced disclosure requirements

The SSBJ (Sustainability Standards Board of Japan) and the CSRD (Corporate Sustainability Reporting Directive) have introduced regulations requiring companies to identify and disclose their Scope 3 emissions. There is also a growing trend for environmentally conscious companies to be favored in financing.

Emissions Stressed in SBTi CNZS v2 Draft
—The need to reduce the GHG intensity of transportation

The Corporate Net-Zero Standard v2 draft by the Science Based Targets initiative (SBTi) emphasizes reducing the GHG intensity associated with transportation as an emission intensive activity. As a result, companies seeking SBTi validation are required to address Scope 3 emissions by decarbonizing their procurement and outbound logistics processes.

NYK's Decarbonization Strategy Aligns with Regulatory Requirements

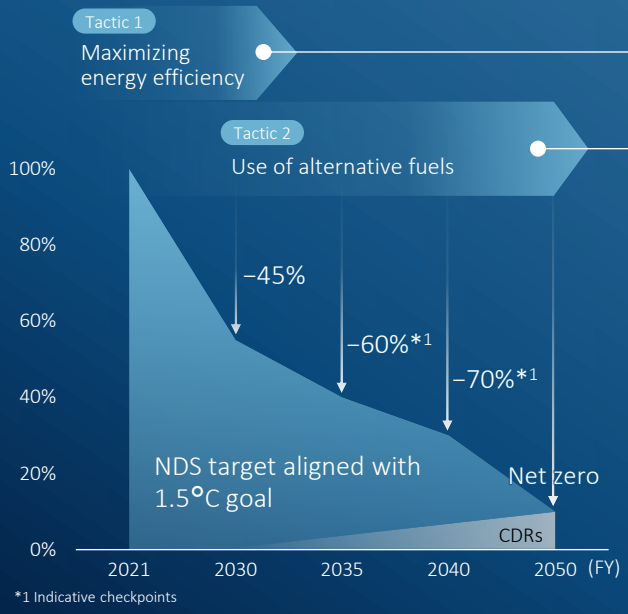
NYK's Alternative Fuel Tactic Aligns with the IMO Regulation Under Discussion

The NYK Group Decarbonization Story (NDS), formulated in 2023, sets a reduction target by 2030, followed by a trajectory consistent with the 1.5°C climate goal. The reduction by 2030 comprises contributions from energy-efficiency improvements (Tactic 1) and fuel transition (Tactic 2). Beyond 2030, further acceleration will come from fuel transition measures.

The IMO Net-Zero Framework (GHG Fuel Intensity (GFI) Regulation), currently under discussion, introduces an economic mechanism: emissions exceeding the Base Target will require pricing contributions to the IMO Net-Zero Fund, set at levels higher than fuel transition costs, thereby creating strong economic incentives for fuel switching to the extent required to achieve the Base Target.

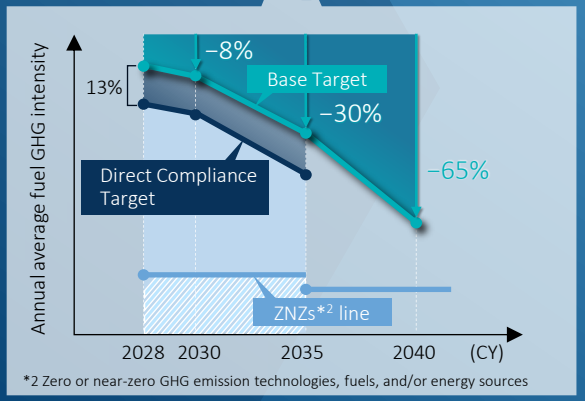
The reduction line defined by the Base Target is similar to the trajectory of NDS tactics.
If implemented, this regulation will secure the investment viability of our tactics, reinforcing the business case for decarbonization.

NYK's Trajectory Towards Net-Zero Emissions



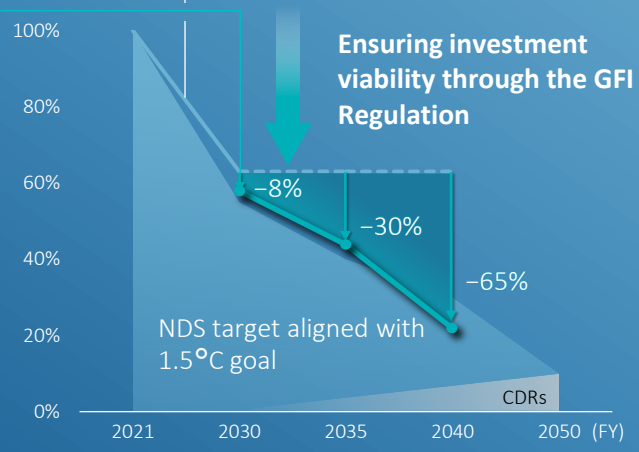
*1 Indicative checkpoints

Transition from Tactic 2 to the Base Target of the GFI Regulation



*2 Zero or near-zero GHG emission technologies, fuels, and/or energy sources

Alignment Between the GFI Regulation and NYK's Trajectory



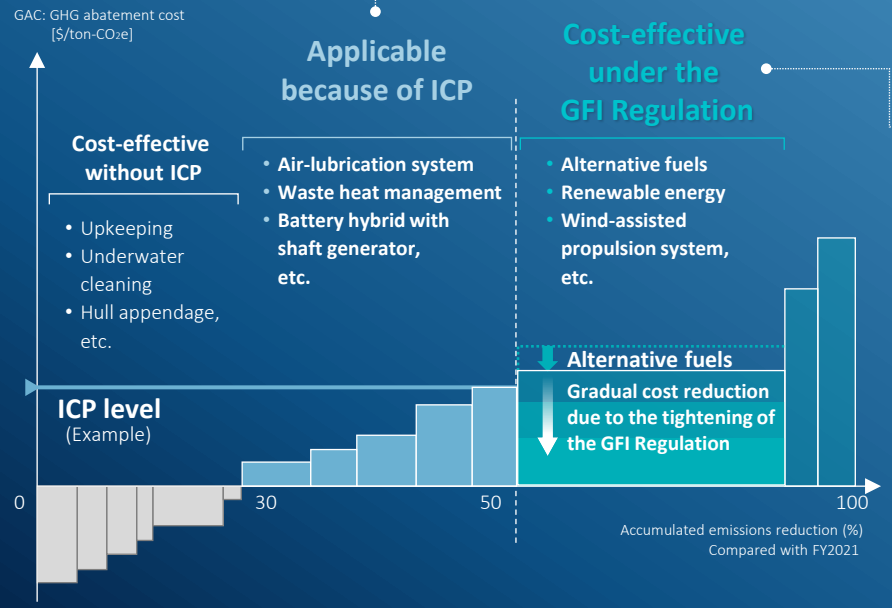
The Impact of the GFI Regulation on NYK's Decarbonization Strategy

The GFI Regulation Reduces GHG Abatement Cost for Alternative Fuels

Under the proposed GFI Regulation, when the annual average GHG intensity exceeds the base target, pricing contributions to the IMO Net-Zero Fund will be required for the excess emissions. From 2028 to 2030, this amount is set at $380 per ton of CO_2e, effectively increasing the cost of heavy fuel oil, which serves as the baseline for fuel transition. This means the regulation will replace the ICP for using alternative fuels. Furthermore, as the Base Target becomes stricter year by year, the GHG abatement cost will continue to decline.

Once this regulation is implemented, NYK's ICP can focus on accelerating investments in energy-efficiency improvements under Tactic 1 of the reduction strategy.

Impact on NYK's Decarbonization Investments

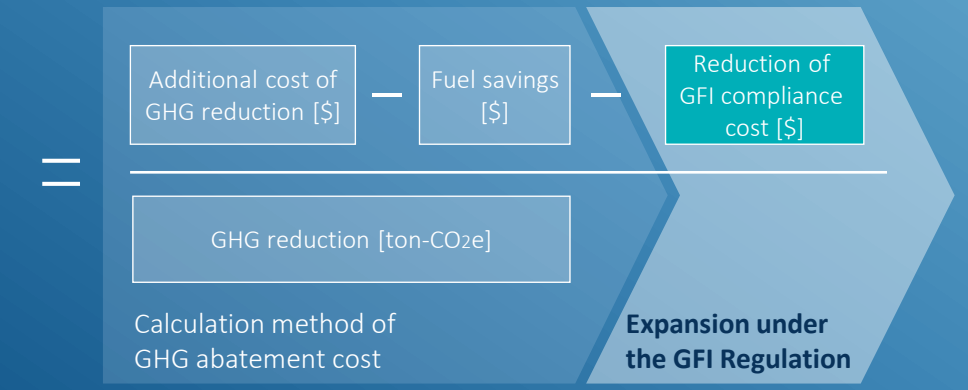


NYK's ICP

Year	2023–2026	2027–2030	2031–
Carbon price [$/ton-$CO_2e$]	**$120**	**$200**	**$250**

Expansion of GHG abatement cost calculation by the GFI Regulation

GHG abatement cost [$/ton-$CO_2e$]



Current Situation Overview

Before
regulations and disclosure

Scope 1 emitters bore most of the responsibility, and the abatement cost led to lower profits or reduced business activity.

International shipping:

The GFI Regulation is under discussion.

Global trends:

Carbon border taxes, emissions trading schemes, and mandatory disclosure requirements are progressing worldwide.

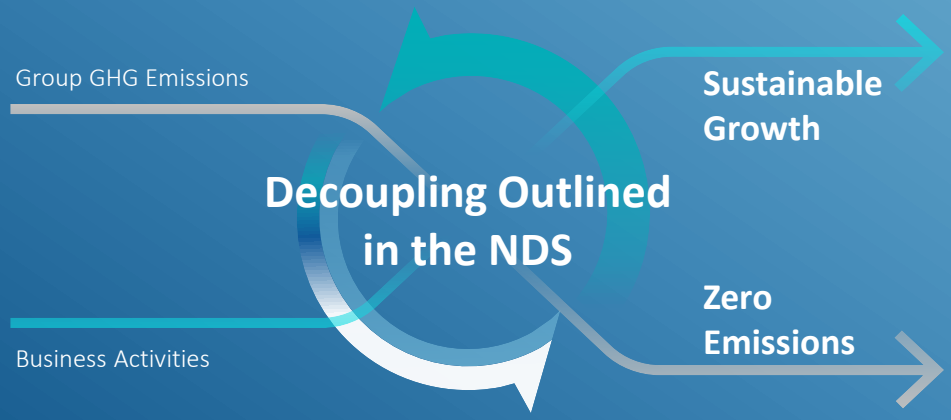
After
regulations and disclosure

Fair, forward-looking rules push all shipping companies to cut emissions. Costs are shared across the supply chain, while participants can lower Scope 3 emissions. Clear rules accelerate decarbonization investment.

The GFI Regulation applies equally to all international shipping companies, so the cost of fuel transition to achieve the Base Target should be reflected in market prices.

The cost of regulatory compliance will be fairly shared among all stakeholders of global logistics services.

Shipping companies can advance decarbonization while maintaining competitiveness and achieving sustainable growth**—representing the realization of "Decoupling," as explained in the NDS.**



GHG Reduction Activities

DECARBONIZATION

Scope 1 + 2 Emissions Reduction

Tactic 1 Maximizing Energy Efficiency

Tactic 2 Use of Alternative Fuels

Scope 3 Emissions Reduction

Carbon Dioxide Removals (CDRs)

COMPETITIVENESS

Valuable PCF (Product Carbon Footprint)

Fair Regulatory Environment

Chapter 01

DECARBONIZATION

Efforts to Achieve Net-Zero Emissions

SG Horizon, an LNG dual-fuel bulk carrier delivered in October 2025

GHG Reduction Progress as of FY2024

Achieved 11.8% Reduction in Scope 1 + 2 Emissions from FY2021

Decreasing factors: Energy-saving devices, slow steaming, expanded use of biofuels, replacement with newbuilds, including alternative-fuel vessels

Increasing factors: Increased voyage distances due to inability to transit the Suez Canal (geopolitical issues)

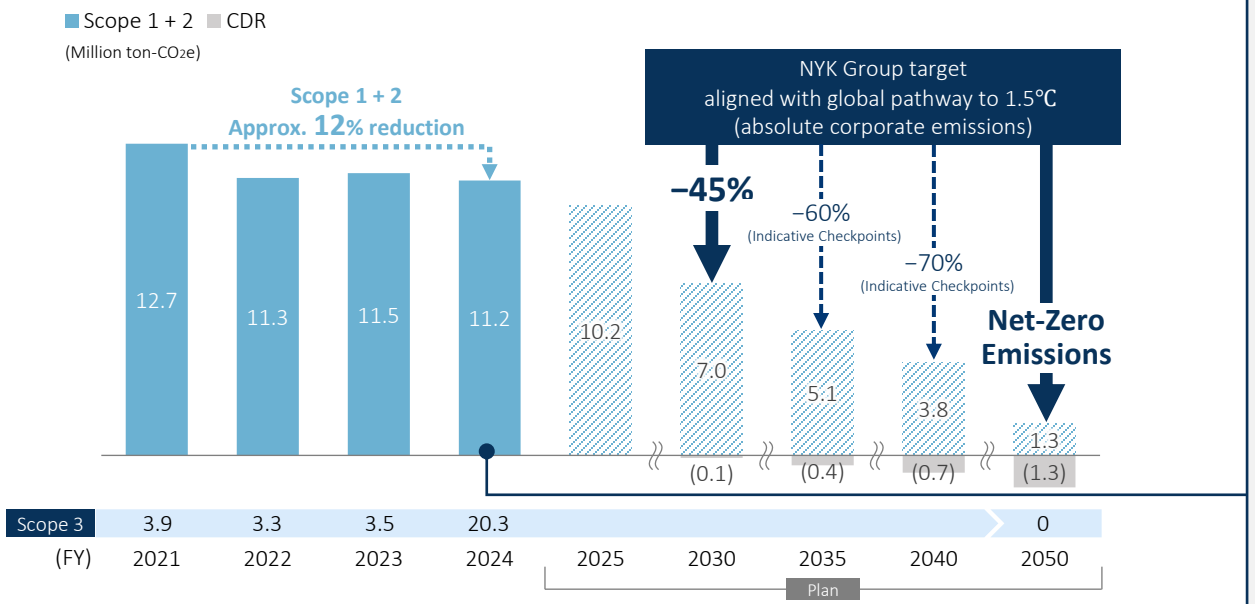
Expanded Scope 3 Emissions Reporting—One Year Ahead of Schedule

— Expanded reporting to include all major consolidated subsidiaries and equity-method affiliates

— Collected emissions data across all Scope 3 categories (See: Page 7 of *Progress Report 2024*)

— Completed disclosure one year earlier than the original plan

GHG Emissions Trajectory Toward FY2050

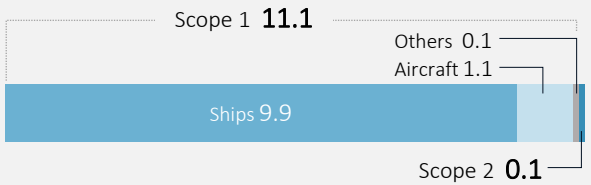


Note: Until FY2023, Scope 3 data collection was limited to the headquarters and certain Group companies. Starting in FY2024, we expanded the scope to include all major consolidated subsidiaries and equity-method affiliates. In addition, data that had previously been collected only for selected categories is now aggregated across all Scope 3 categories.

FY2024 Reduction Progress

Investment decisions with ICP applied	Retrofitting for energy efficiency
203 cases (in total)	77 cases (FY2024 & FY2025 1-2Q)
Low-carbon fuel usage rate	**Alternative-fuel vessels**
9.5 %	26 vessels

Breakdown of Scope 1 + 2



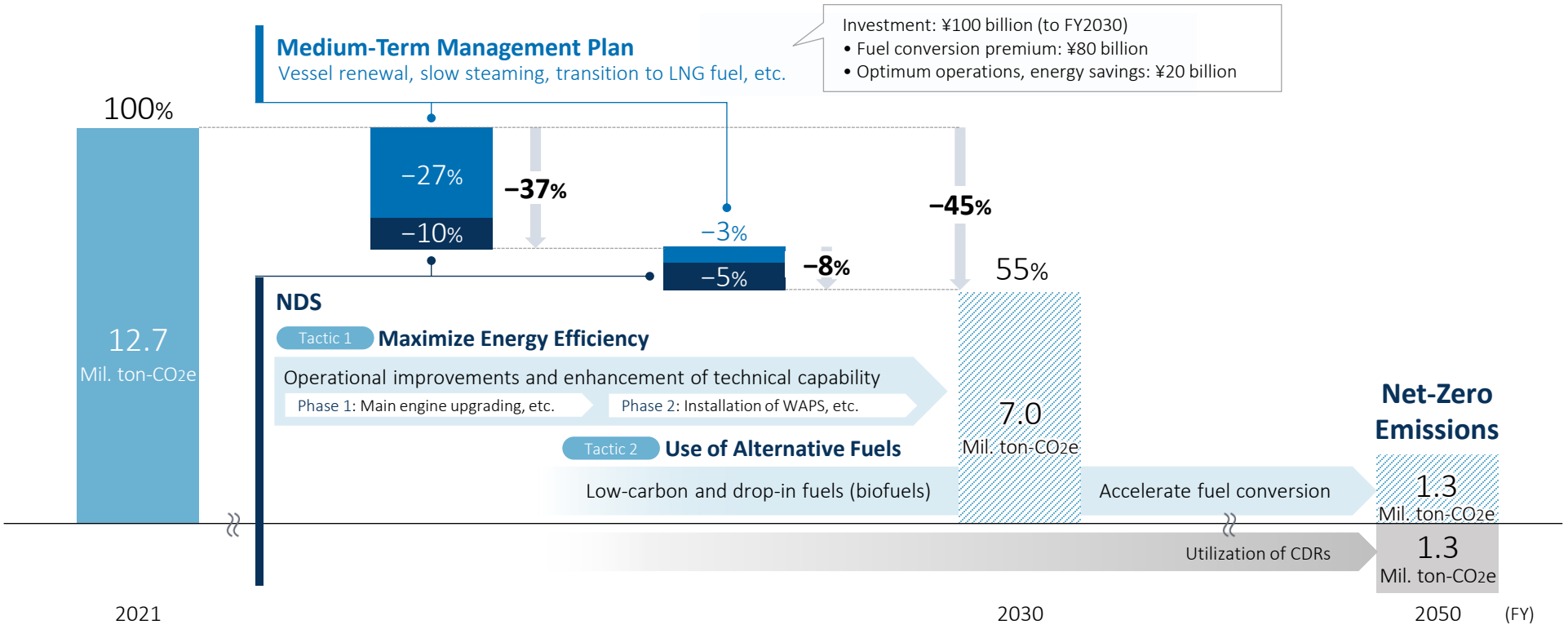
Towards Achieving the Scope 1 + 2 2030 and 2050 Targets

2030 Target: 45% Reduction by Energy Efficiency and Low-Carbon Fuels

The medium-term management plan initially set a target to reduce Scope 1 and 2 emissions for the NYK Group by 30% compared to FY2021 by FY2030. This target was updated in the NDS, adding an additional 15% reduction.

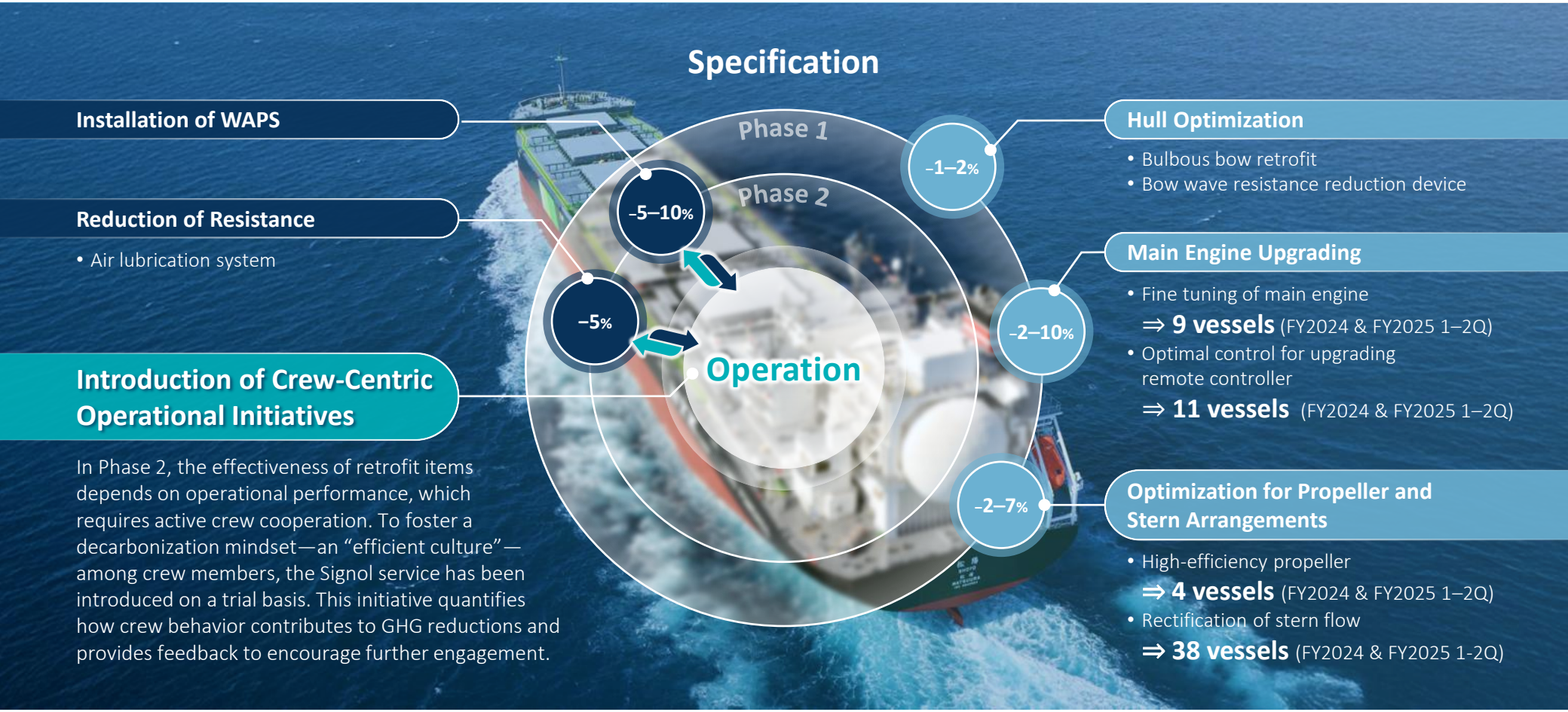
2050 Target: Net Zero by Fuel Conversion and CDRs

The transition to alternative fuels will be accelerated, together with carbon dioxide removal (CDR) initiatives, to achieve net-zero emissions.



Scope 1 + 2 Tactic 1 Growing Deployment of Energy-Saving Devices

- **FY2024: Focused on Hardware Specifications and Steady Implementation**
- **FY2025: Initiating Operational-Focused Efforts**



Installation of WAPS

Reduction of Resistance

- Air lubrication system

Introduction of Crew-Centric Operational Initiatives

In Phase 2, the effectiveness of retrofit items depends on operational performance, which requires active crew cooperation. To foster a decarbonization mindset—an "efficient culture"—among crew members, the Signol service has been introduced on a trial basis. This initiative quantifies how crew behavior contributes to GHG reductions and provides feedback to encourage further engagement.

Hull Optimization

- Bulbous bow retrofit
- Bow wave resistance reduction device

Main Engine Upgrading

- Fine tuning of main engine
  ⇒ **9 vessels** (FY2024 & FY2025 1–2Q)
- Optimal control for upgrading remote controller
  ⇒ **11 vessels** (FY2024 & FY2025 1–2Q)

Optimization for Propeller and Stern Arrangements

- High-efficiency propeller
  ⇒ **4 vessels** (FY2024 & FY2025 1–2Q)
- Rectification of stern flow
  ⇒ **38 vessels** (FY2024 & FY2025 1-2Q)

Scope 1 + 2 Tactic 1 Introduction of Crew-Centric Operational Initiatives

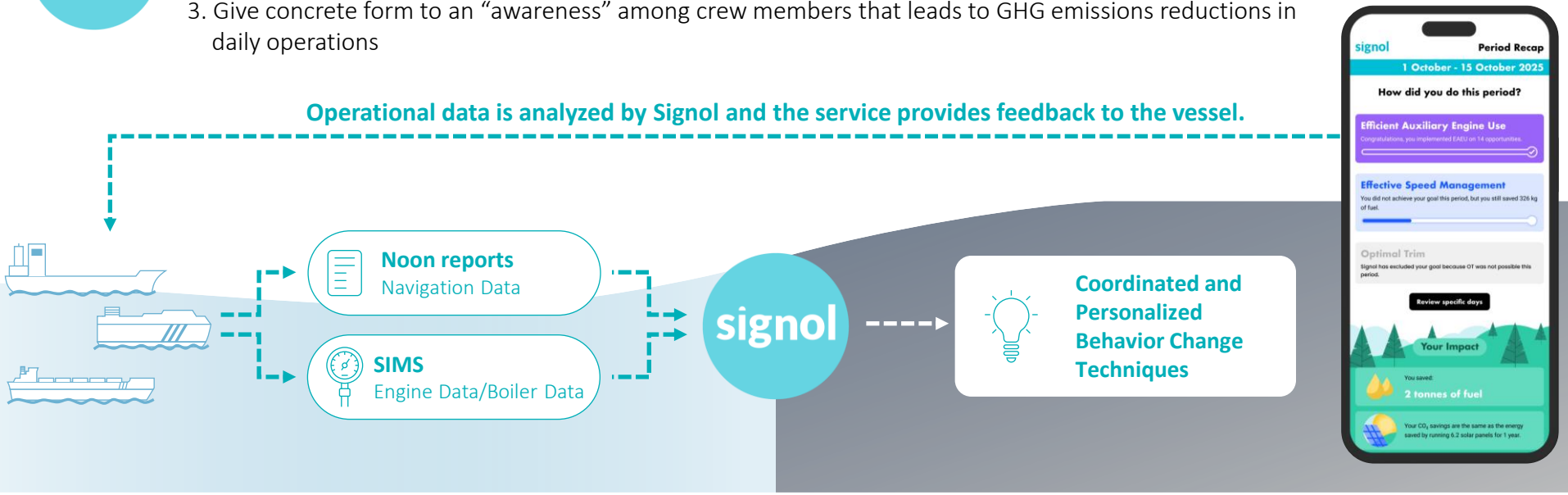
FY2025 Operational Activities

- **Analyze operational data with the “Signol” service to provide a “nudge” to seafarers and foster a decarbonization mindset.**
- **A six-month trial involving 30 dry bulk carriers, tankers, and car carriers is scheduled to commence in January 2026.**

signol

Expected Outcomes

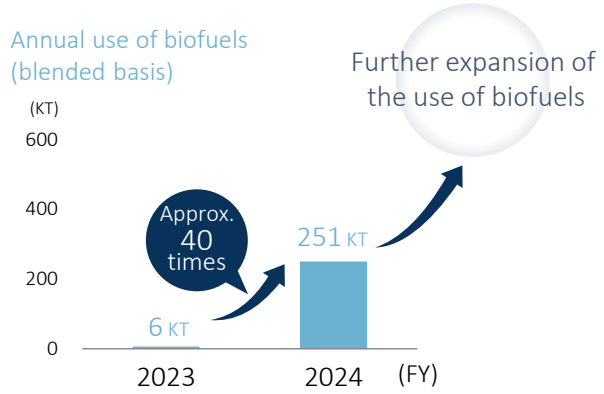
1. Visualize and verify the cultivation of a decarbonization mindset among crew members
2. Maximize the effectiveness of newly introduced energy-saving equipment through optimized operation
3. Give concrete form to an “awareness” among crew members that leads to GHG emissions reductions in daily operations



Scope 1 + 2 Tactic 2 Expansion of Biofuels

We are steadily increasing the use of biofuels. This effort in FY2024 is equivalent to a reduction of 180,000 tons of CO_2 equivalent.

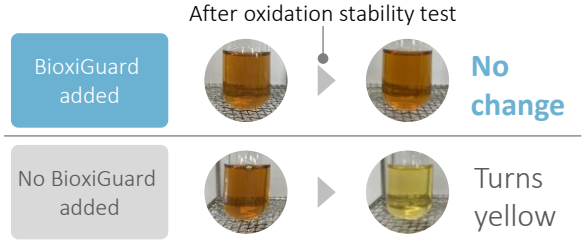
In FY2024, we launched long-term trials aimed at full-scale implementation of biofuel usage. As a result, our vessels used 251,017 tons of B24, a blended marine fuel containing 24% second-generation fatty acid methyl ester (FAME) derived from non-food sources and certified under ISCC. This marks a significant increase over the 6,287 tons used in fiscal year 2023.



We implemented initiatives in FY2024 to address challenges related to the long-term safe use of biofuels.

Long-term storability and stability

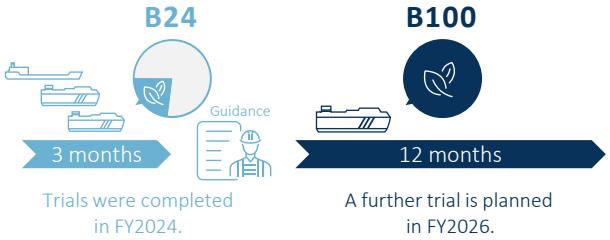
1. **Development of BioxiGuard**, an antioxidant additive for biofuels
2. **Development of Yunic800Eco**, a fuel additive designed to improve the stability of blended fuels and enhance fuel efficiency



Engine damage prevention and operational safety

3. **Shortening multi-type testing period** by installing in-house test facility

4. **Organization of operational guidance** based on the results of long-term trials



Co-creation of value

5. **Publication of deliverables from joint verification of long-term biofuel use** under Project LOTUS with the Global Centre for Maritime Decarbonization (GCMD)

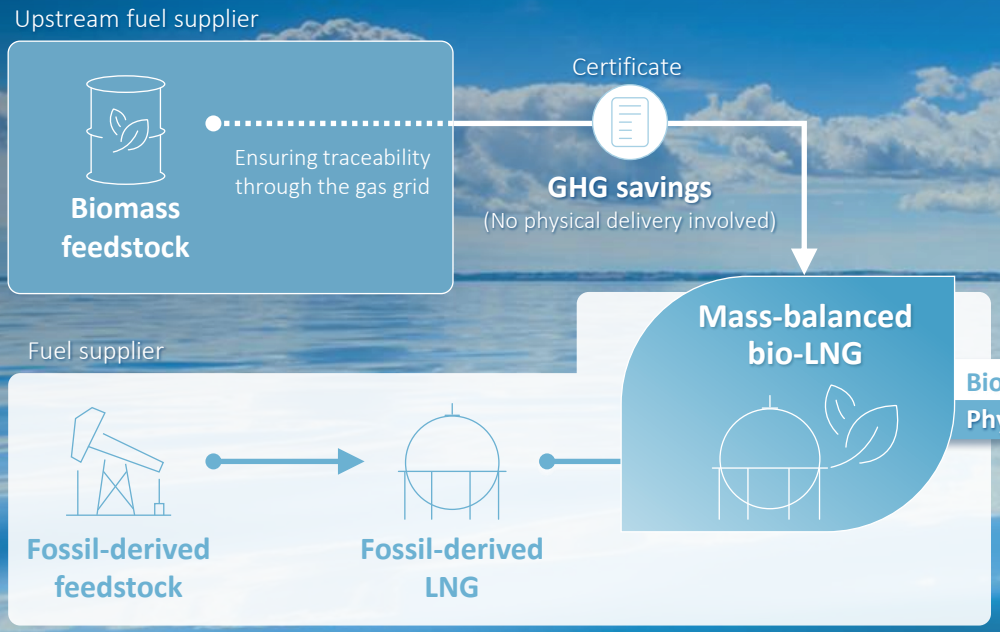
Press Release
https://www.nyk.com/english/news/2025/20250918_03.html

Initiation of Continuous Use of Bio-LNG Fuel

Since June 2025, NYK has commenced the continuous use of bio-LNG fuel on its LNG-powered car carriers. The bio-LNG fuel is supplied by Titan Supply B.V. at the Port of Zeebrugge in Belgium. Starting with the supply to two vessels—Daisy Leader in June and Sumire Leader in July—we will integrate LNG biofuel into our routine operations.

This supply is based on the mass-balance method, enabling significant GHG reductions on a well-to-wake basis. Its sustainability is verified through ISCC-EU certification, and full traceability is ensured.

EU-Certified, Extended Mass-Balance Method (Book-and-Claim)



Note: Certification and audits by third-party organizations such as the ISCC are required.

Although physically supplied LNG is entirely fossil-derived, gas managed in accordance with EU regulations can be attributed with GHG savings and consumed as low-carbon fuel.

Sumire Leader during bio-LNG bunkering

Scope 1 + 2 Tactic 2 Dual-Fuel Fleet

Benefits of Dual-Fuel Fleet Deployment

Enhances fuel resilience

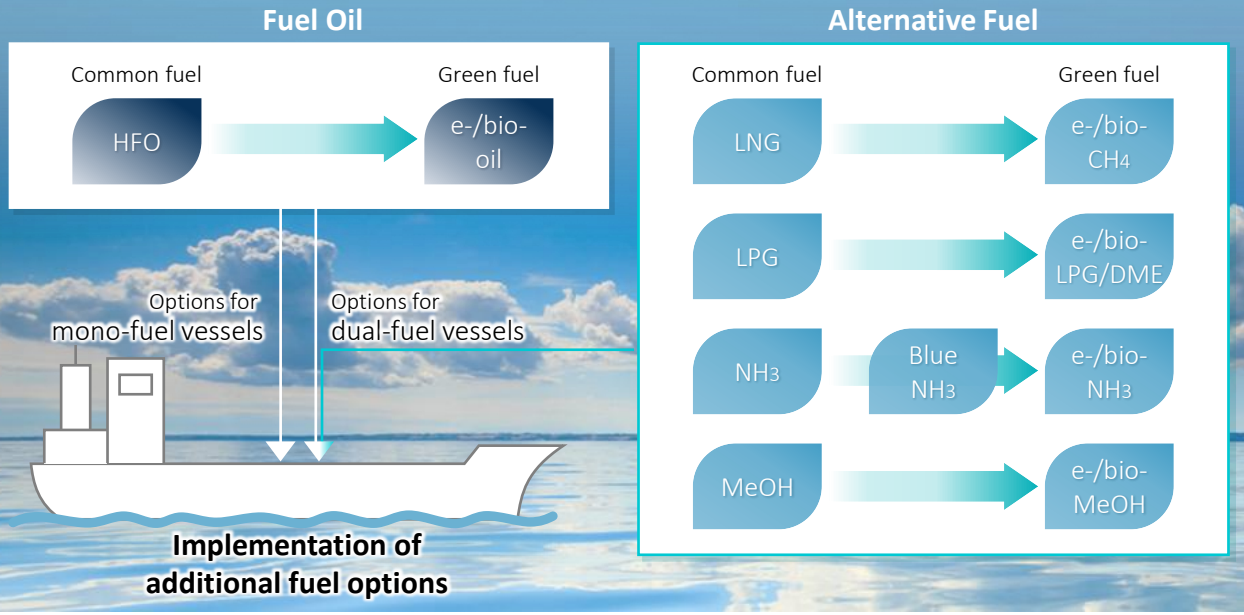
Dual-fuel vessels increase fuel options, providing resilience amid uncertain supply and price conditions.

Enables phased GHG reductions

In the short and medium terms, dual-fuel vessels can utilize readily available low-carbon fuels; in the long term, they enable deeper decarbonization through e-fuels and biofuels with lower GHG intensity.

Maintains operational flexibility

When alternative fuels are unavailable, vessels can operate on heavy fuel oil or biodiesel, ensuring routing freedom while maximizing GHG reductions where alternatives are accessible.



Focus

Residual Emissions —Why Heavy Fuel Oil Use Persists?

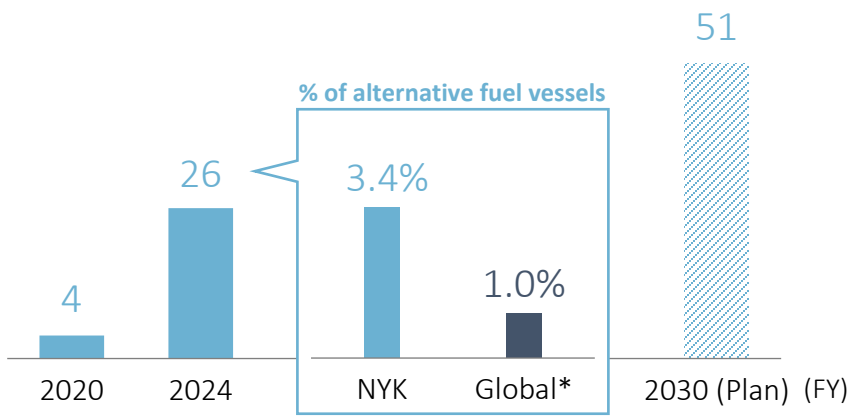
- **Pilot fuel requirement**
  Alternative fuels such as ammonia and methanol have low reactivity and slow flame propagation, requiring pilot fuel for stable ignition.
- **Safety during critical maneuvers**
  High responsiveness needed during port entry and departure may lead to heavy fuel oil operation for safety assurance.

Scope 1 + 2 Tactic 2 Dual-Fuel Fleet

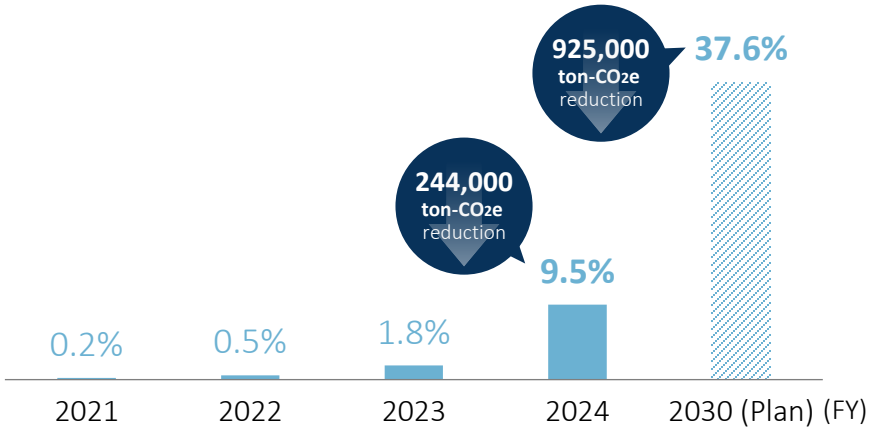
NYK has operated dual-fuel (DF) vessels since the 1980s.

Strong expertise in vessel construction and operations, supported by experienced and highly skilled seafarers

Number of DF Vessels



Low-Carbon Fuel Utilization and GHG Reduction Impact



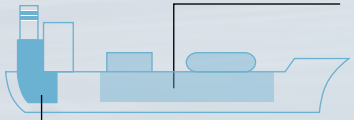
* Source: DNV Alternative Fuel Insight
Note: LNG carriers and vessels having Fuel Ready notation are not included.
Scope: Parent company and consolidated subsidiaries

Launch of Ammonia-Fueled Vessels —Establishing Safety Standards Backed by Proven Experience

Expanding ammonia fuel use requires safe handling technologies.
Through open innovation, we share safety measures and work to establish robust safety standards.

Bunkering boom image provided by TB Global Technologies Ltd.

NH_3 Carbon free, but **requires safety measures**



Existing knowledge:
We have a proven track record in safe ammonia cargo handling.

Developing safety protocols:
Use of ammonia as fuel in the engine room

Risk assessments and safety measures from the perspective of engineers

- Identification of potential leakage points
- Formulation of leakage prevention measures
- Enabling detection of accidental leaks and formulation of countermeasures

Some engine room safety measures were disclosed and certified by ClassNK as additional safety requirements (MRS Notation).

Development based on knowledge and experience

Ammonia-fueled medium gas carrier, to be delivered in 2026*

- Establishing safety measures for large oceangoing vessels with consortium members

Development based on knowledge and experience

Sakigake, tugboat delivered in 2024*

- More than 10 bunkering operations
- Commercial operation powered by ammonia

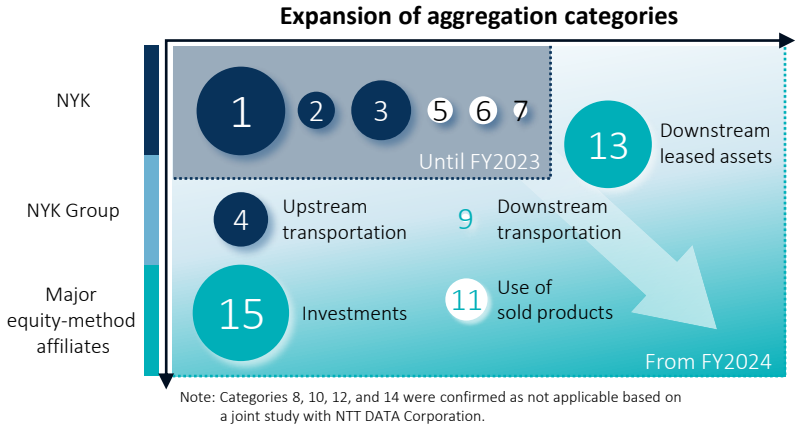
* These initiatives are being implemented under the Green Innovation Fund (GI Fund) by Japan's New Energy and Industrial Technology Development Organization (NEDO).

Scope 3 Expanding the Boundary of Scope 3 Accounting

Launching Groupwide GHG Aggregation in FY2024

Starting in FY2024, NYK expanded its Scope 3 GHG accounting to include all major Group companies worldwide, including consolidated subsidiaries and major equity-method affiliates. Data collection was also broadened to encompass all 15 Scope 3 categories. This has enabled the comprehensive monitoring and disclosure of GHG emissions for the NYK Group, covering not only Scope 1 and 2 but also Scope 3. This comprehensive data aggregation is a critical step, as the NDS designates FY2025 as the target year for our GHG emissions to peak.

We are currently refining calculations for Category 1, our largest emissions source, and will continue this process going forward.



Note: Categories 8, 10, 12, and 14 were confirmed as not applicable based on a joint study with NTT DATA Corporation.

Refining Scope 3 Data and Driving Emissions Toward Peak-Out

After completing the expansion of data aggregation, the next step is to start reducing emissions. Reducing emissions involves different challenges and approaches for each category. While the benefits will appear in the future, the NYK Group has already begun taking on the challenge of emissions reduction.

Upstream emissions

Addressing upstream emissions involves multifaceted challenges, including supplier engagement, data availability, and cost allocation.

Downstream emissions

Addressing downstream emissions requires engagement and dialogue with Scope 1 emitters.

Category	1 Purchased goods and services	2 Capital goods	3 Fuel upstream emissions	4 Upstream transportation	5 Waste	6 Business travel	7 Employee commuting	8 Purchased goods and services	9 Downstream transportation	10 Processing of sold products	11 Use of sold products	12 Disposal of sold products	13 Downstream leased assets	14 Franchises	15 Investments
Thousand ton-CO_2e	5,265	386	2,259	1,321	30	86	2	—	0	—	793	—	4,799	—	5,404

Scope 3 Cases of Scope 3 Reduction

Upstream emissions

Category	Examples of Our Ongoing Initiatives/Industry Approach	Challenges
1 Purchased goods and services 2 Capital goods	**Breaking down Category 1 for effective reduction** Step 1: Identify non-GHG and non-attributable items Step 2: Change the calculation base to primary data Step 3: Design supplier-specific engagement strategy **Launching supplier commitment initiatives** Establishment of NYK Group Supplier Code of Conduct (Feb. 2025) 	**Complex purchase classification** Distinguishing emission-linked purchases from others (e.g., tug services vs. port fees) **Global supplier dependency** Reduction relies on thousands of small suppliers worldwide, making engagement difficult. **Limited industry readiness** Few marine suppliers provide PCF data or pursue GHG reductions, creating major gaps.
3 Fuel upstream emissions	**Transition to green fuel driven by regulations** The well-to-wake approach, adopted in international regulatory discussions, promotes the transition to green fuels by requiring consideration of upstream emissions for compliance.	**Hard-to-abate sector** Fuel transition remains costly, and passing these costs through the entire supply chain is highly challenging. Why is International Shipping a Hard-to-Abate Sector?
4 Upstream transportation	**Launching a service for allocating GHG savings** Yusen Logistics has launched an alternative fuel premium service, allocating GHG savings to customers and providing reduced PCF across all transport modes. YUSEN LOGISTICS GREEN SOLUTIONS + Alternative Fuel	**Costly alternative fuel transport** Using expensive alternative fuel transport requires additional revenue from customers to cover costs.

Scope 3 Cases of Scope 3 Reduction

Downstream emissions

POINTS

- **Our downstream emissions can be accurately aggregated because we have access to primary data on fuel consumption.**
- **Our close relationships with Scope 1 emitters enable us to conduct engagement activities through direct dialogue.**

Category	Examples of Our Ongoing Engagement Initiatives
13 **Downstream leased assets**	**For T/C out (lease-out) vessels:** **Promoting building dual-fuel vessels along with ICP (internal carbon pricing) support**
15 **Investments**	**Promoting the use of alternative fuels for affiliated companies** ● Delivery of LNG-fueled shuttle tanker / Knutsen NYK Offshore Tankers AS (KNOT) ● Order placed for methanol-fueled container ship / Ocean Network Express Pte. Ltd. (ONE) ● Expanding the use of bio-LNG fuel in PCCs / United European Car Carriers (UECC)

VLCC will be delivered in 2026

MGC will be delivered in 2026

VLGC delivered in 2022

Tanker delivered in 2019

CDRs The Role of CDRs in the Net-Zero Strategy

Disclosing Position Paper—Achieving Net-Zero Emissions by Neutralizing Residual Scope 1 Emissions Through the Use of CDRs

The NYK Group is committed to its 2050 net-zero target, viewing carbon dioxide removal (CDR) as a vital tool to complement—not replace—maximum emissions reduction efforts. Our focus is on neutralizing the residual emissions from our hard-to-abate shipping operations, making CDR competency a core future responsibility. While we recognize that CDR technology and markets are still immature, we believe action is necessary and that a robust global framework is needed to scale these solutions.

Therefore, starting in FY2025, NYK will proactively procure and retire high-quality CDR credits. We will exclusively source durable carbon removal credits that demonstrate clear additionality. Through this initiative, NYK aims to not only meet our own targets but also to lead by example, advocating for the global standards necessary to accelerate the CDR industry for all.

For More details, see the NYK Position Paper.

https://www.nyk.com/sustainability/pdf/environment016.pdf

Advocacy Initiatives to Integrate CDR into Future IMO Regulations

To expand CDR procurement and promote fair evaluation frameworks, we will lead the way toward regulatory consideration and implementation through proactive definition-setting and transparent communication.

Advocacy for Fair Regulations and Disclosure Standards

2025 Onward

The actions we are taking to build momentum toward the future introduction of residual emissions regulations by the IMO

Joined the Japan CDR Coalition as a promoting member

https://icf.mri.co.jp/j-cdr/information/jcdr-report20251031/ (written in Japanese)

日本CDR協議会 Japan CDR Coalition

"Promoting Member" representatives at the Japan CDR Council General Meeting

Photo: Mitsubishi Research Institute, Inc
Japan Carbon Dioxide Removal Coalition
https://icf.mri.co.jp/j-cdr/
Accessed 11 Nov. 2025.

2030 Onward

Initiate efforts to develop a framework for CDR eligibility under the IMO

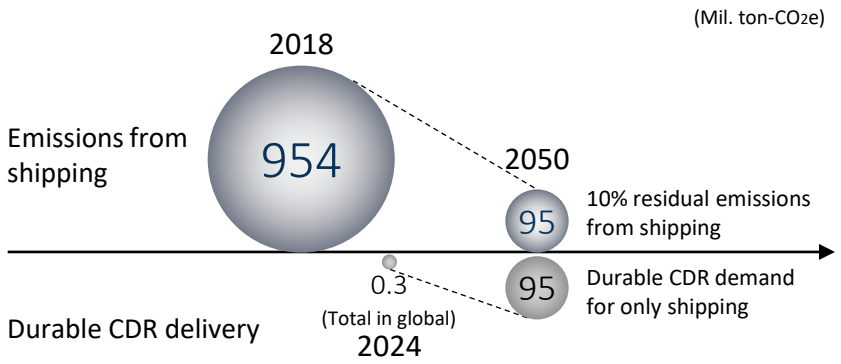
CDRs Procurement and Progress

Initiating CDR Procurement to Shape Maritime Policy and Build Capacity

To proactively shape maritime regulations and build capacity for the industry's net-zero goal, we have commenced the initial procurement of CDR credits.

This hands-on experience is essential for understanding operational challenges, establishing a network of strategic partners, and enhancing our credibility. We believe direct engagement is as crucial as policymaking, and this initiative positions us to contribute effectively to both.

Necessity of CDR Capacity Building



Sources: IMO GHG 4th Study in 2018, Durable CDR Delivery in 2024 (including other sectors)

Showcase of NYK's CDR Credit Procurements

MITSUI&CO.

climeworks

1POINTFIVE

Purchasing CDR credits generated from forestry projects in Hokkaido and Akita prefectures

Reliable CDRs backed by the forest management and advanced remote sensing of Mitsui & Co., Ltd.

Released on Feb. 5, 2025

https://www.nyk.com/english/news/2025/20250205.html

Purchasing CDR credits from Climework's portfolio–BECCS, Biochar, and enhanced rock weathering

This portfolio approach mitigates risk and ensures a resilient, reliable supply of high-quality carbon removals.

Released on May 7, 2025

https://www.nyk.com/english/news/2025/20250507_01.html

Contract via ENEOS

Purchasing marine fuel with DACCS credits

Direct Contract

Purchasing DACCS credits from its STRATOS project in Texas

DACCS (direct air capture with carbon storage) provides the highest-quality, verifiable CDR credits—a like-for-like solution that can address fossil fuel residual emissions through permanent geological CO_2 storage.

Released on Dec. 18, 2024 and Sep. 18, 2025

https://www.nyk.com/english/news/2024/20241218_01.html

https://www.nyk.com/english/news/2025/20250918_01.html

Chapter 02

COMPETITIVENESS

Building a Fair, Sustainable Environment and Enhancing Our Competitive Edge

Valuable PCF (Product Carbon Footprint) PCF: A Key Driver of Decarbonization Across the Entire Value Chain

Enhancing product value through PCF helps allocate resources for Scope 3 emissions reductions across the entire value chain.

A new era is emerging in which the disclosure and reduction of GHG emissions across the entire supply chain, including Scope 3 emissions are advancing. When a product seller is able to sell a product with a reduced PCF at a higher value, that value increase can be viewed as a cumulative reduction of PCF. This, in turn, provides additional revenue to each company along the supply chain that contributed to the reduction. Additionally, low-emission transportation in procurement and shipping also becomes a value-added feature.

To accurately reflect low-carbon products and services in PCF, it is essential to report and aggregate GHG emission factors per unit of activity.

When using monetary-based emission factors, the purchase of high-value, low-carbon products and services can paradoxically result in higher reported Scope 3 GHG emissions. Therefore, transitioning to reporting and aggregating PCF or GHG emission factors per unit of activity is essential. We are currently developing a framework to quantify GHG emissions and reductions per transport unit.

Secondary Data Approach/
Monetary-Based Primary Data Approach

- Industry-average reference value
- Corporate average emission factor

x Activity →

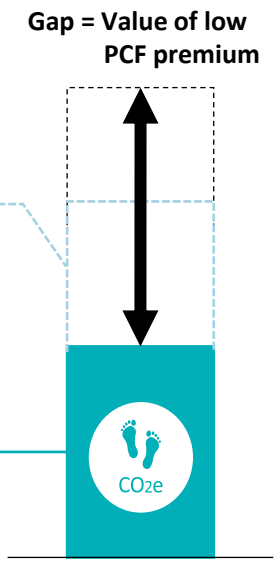
Monetary-based Emission Estimation:
GHG emissions per unit revenue of the shipping company x freight cost
⇒**The amount spent on alternative fuels may result in an increase in reported GHG emissions.**

Fuel-Integrated Primary Data Approach

- **Actual emissions data for individual fuels**
- Fuel consumption data by trade-lane

x Activity →

Enabling accurate reporting and aggregation of GHG emissions and GHG intensities based on real-world data



Valuable PCF (Product Carbon Footprint) Standardization of GHG Emissions Calculations—Development of Guidelines

New Guidance for GHG Emissions Calculation of Deep-Sea Ro-Ro Vessels Published in Line with GLEC Framework (ISO 14083)

In May 2024, NYK joined the Smart Freight Centre (SFC), an international non-profit organization driving the reduction of GHG emissions in the logistics sector. As a key member of the SFC's Global Ro-Ro Community (GRC), NYK actively participated in discussions over approximately one year, making a significant contribution to the development of the industry's first standardized guidance for calculating GHG emissions from deep-sea Ro-Ro vessels.

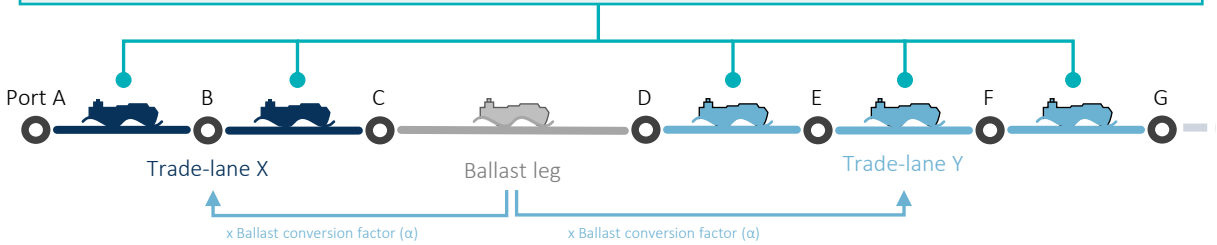
11 carrier members have joined the GRC, representing approximately 80% of the deep-sea Ro-Ro vessel fleet as of October 2025.

Smart Freight Centre × Classification Societies: ClassNK, DNV, KR

Key Points of the Guidance

Carrier Members (Deep-Sea Ro-Ro Vessel Operators)

- To provide a consistent method for customers (OEMs/Shippers) to calculate their GHG emissions, the GRC has published guidance on calculating emission intensity. This serves as a common framework rather than a mandatory requirement for customers.
- The primary unit for transport activity is defined as ton-kilometers or ton-miles, while secondary units may be determined by each shipping company based on the specific requirements of their customers.
- GHG emissions are calculated on a well-to-wake basis, using emission factors for each fuel type as defined by the IMO.



- The calculation of total GHG emissions and total transport activity shall include all voyage segments—laden, ballast, and repositioning—over at least the past 12 months, in accordance with the international standard ISO 14083.

Deep-Sea Ro-Ro Ship Greenhouse Gas Emission Intensity Calculation Methods

https://www.smartfreightcentre.org/en/our-programs/maritime/global-ro-ro-community/data-and-methods/

OEMs/Shippers

- When calculating GHG emissions, OEMs and shippers shall use the shortest feasible distance (SFD) plus 15% for voyage distance estimation. The SFD must be obtained from a reliable and recognized database.

Valuable PCF (Product Carbon Footprint) Standardization of GHG Emissions Calculations—Development of Guidelines

SFC to Publish GRC Emission Intensity as Industry Benchmark (from Dec. 2025)

GRC members, including carriers and cargo owners, will be able to reference average emission intensity values by trade lane, enabling comparisons between individual company performance and the industry average. Company-specific emission intensity data will be accessible either through the SFC system or directly from each Ro-Ro vessel operator.

Types of Disclosed Data and Scope of Disclosure

	Type	Extent of Disclosure
Industry average	GRC members—Global average emission intensity	**Public disclosure**
	GRC members—Average emission intensity by trade lane	**Limited disclosure** Only to GRC members
Company-specific data	Company-specific global emission intensity	**Limited disclosure** OEMs permitted by shipping company
	Company-specific emission intensity by trade lane	**Limited disclosure** OEMs permitted by shipping company

GRC Carrier Members

This photo was taken at Smart Freight Week 2025 in March 2025.

Fair Regulatory Environment

Advocacy for Fair Regulations and Disclosure Standards

Uniform IMO Regulations: A Competitive Edge for Decarbonization Frontrunners

The IMO's global conventions offer high predictability—key for large-scale long-term investment in alternative fuels and vessel development.

The GFI Regulation under discussion is designed to give a competitive edge to decarbonized shipping that utilizes low- or zero-carbon fuels. It is an ambitious framework that aims to achieve net-zero emissions by 2050 while balancing competitiveness and decarbonization. Furthermore, revenues from the GFI will support maritime decarbonization, including alternative fuel and infrastructure development in developing countries, helping accelerate the sector's transition.

We are concerned that regional regulations may fragment investment and increase compliance burdens. We thus advocate for global policies that promote decarbonization while respecting the maritime industry's interconnected nature.

Activities

IMO

To introduce uniform decarbonization regulations

- Attendance as a member of the Japanese delegation to establish the GFI Regulation at the IMO's Marine Environment Protection Committee (MEPC)

Left: Takuya Koizumi, Chairman of the GHG Task Force at the Japanese Shipowners' Association (JSA)
Right: Yasuhiro Fukuda, General Manager of NYK's Decarbonization Group

COP29

The Parties should raise awareness of decarbonization in international shipping

- Advocated at COP29 panels for international rulemaking and infrastructure investment for shipping

NYK Executive Vice President Akira Kono delivering speech at COP29

EU

To integrate regulations with those of the IMO

- Submitted a public comment on the EU-ETS review
  - — Advocated a global IMO-led framework for realizing net-zero emissions by 2050
  - — Expressed concerns over a dual regulatory burden (EU + IMO)
  - — Emphasized risk of diverting resources away from decarbonization initiatives

International Chamber of Shipping

Supported efforts to communicate via the JSA the Japanese government's stance on GHG-related levies and market-based measures (MBMs) to the ICS

Japan Business Council in Europe

Engaged, through the JBCE, in public consultation on the European Commission's review of the EU-ETS directive

Fair Regulatory Environment

Advocacy for Fair Regulations and Disclosure Standards

Driving Global Standards: Net-Zero Target and Updated GHG Protocol

Creating an environment where more market participants can adopt Science Based Targets transition plans is key to ensuring a fair transition. To promote measures that minimize transition costs, it is essential to enable GHG accounting based on the latest reduction methods.

Regulations and disclosure are key drivers of maritime decarbonization.

Statement

Our advocacy is focused on promoting a realistic pathway to decarbonizing international shipping. We commit not to engage in any activities that contradict climate regulations or undermine climate science, and we do not provide financial support for such activities.

Activities

SBTi

To allow shipping companies with multiple vessel types to obtain certification on net-zero targets

- Shared recognition of the challenges in the current standards that make participation difficult for the shipping sector.

  Why Is International Shipping a Hard-to-Abate Sector?

- Submitted a public comment on the SBTi

NYK Executive Vice President Akira Kono discussed the shipping net-zero target with the SBTi CEO David Kennedy during Climate Week NYC 2025

WBCSD

To incorporate the latest decarbonization approaches into the GHG Protocol

- GHG Protocol: Further work will be undertaken to enable mandatory disclosure—covering mass balance, book-and-claim, biomass and carbon credit reporting, and Scope 3 treatment.

- Net-zero drivers for shipping: regulation, disclosure, and CDRs. Harmonizing international standards and cross-sector rules is essential.

NYK Executive Vice President Akira Kono delivering a speech at the WBCSD Council Meeting held alongside Climate Week NYC 2025

In 2025, the tide surrounding decarbonization has shifted. The perception of decarbonization is evolving—from a prerequisite cost for companies aiming to participate in the investment landscape, to an investment that should generate and recover value. We have steadily advanced both reduction and removal efforts, and—building on the voluntary environmental value markets reported in *Progress Report 2024*—we are now exploring the potential for value creation and improved certainty of capital recovery within regulatory frameworks and disclosure standards. At the same time, we are identifying concrete challenges in system design and advocating for the necessity of new regulations. This report captures the current state of these developments.

The tide of decarbonization is ever-changing, driven by powerful currents of transformation. Yet, amid this turbulence, we have met countless individuals striving to create a better environment for the next generation. It is our hope that this report serves as a reference for someone's decarbonization journey and becomes a small ripple in the larger wave toward a future that curbs climate change. With that hope, we set down our pen.

Bringing value to life.

Our journey is to be continued.
Please look forward to the sequel to this story.

APPENDIX

Why is International Shipping a Hard-to-Abate Sector?

Ships require large energy storage capacities for propulsion, but all solutions to replace heavy fuel oil face challenges.

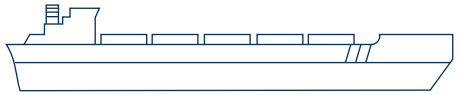
Example Battery-Powered

Low energy density and cargo efficiency

Ship propulsion demands substantial energy, and balancing cargo space with energy storage requires high energy density solutions.

E.g., 95 kDWT bulk carrier

= Cargo hold capacity: 110,000 m^3



Heavy oil

25 tons/day

→750 tons/month

1MWh 20ft container-type battery

Approx. 3,500 units

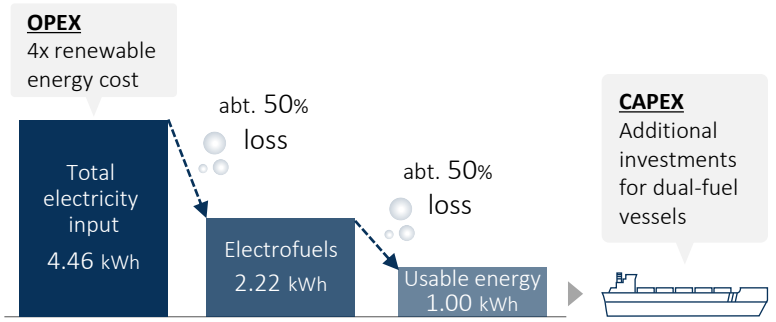
→ 105,000 m^3 hold space

Cargo space fully occupied by batteries

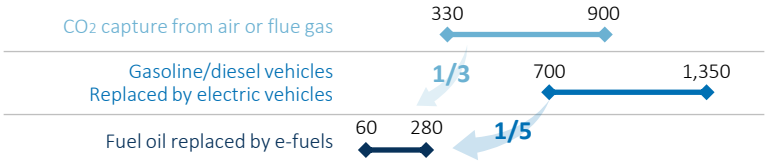
Example E-Fuel

Low energy conversion efficiency

E-fuels are promising for their low carbon intensity, but converting electricity into hydrogen carriers and then into power causes major energy loss—requiring about four times more renewable energy than land electrification. Dual-fuel vessels also raise CAPEX.



GHG reduction per 1 kWh of renewable energy is relatively small compared with other uses.

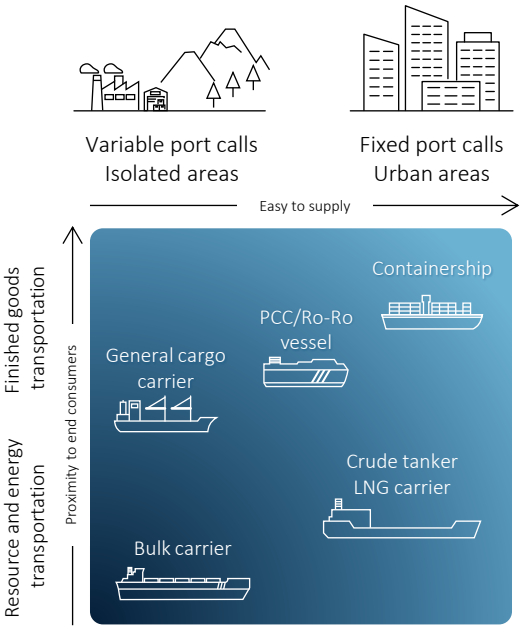


Units: gCO_2eq reduced per kWh zero-GHG electricity input
Source: DNV Maritimer forecast to 2050 – Energy Transition Outlook 2024, 2025

Example Alternative Fuel

Not available at all ports

Fuel transition is especially difficult for resource and energy carriers due to slow fuel availability at dispersed ports and delayed PCF reduction demand, as these carriers are farther from end consumers in the value chain.



Toward the Decarbonization of International Shipping

Regulations and disclosure are key drivers of maritime decarbonization.

International shipping is hard-to-abate but uniquely suited for global GHG regulations with cost pass-through. Combined with disclosure standards that highlight benefits for cargo owners and customers, the entire value chain can move together toward compliant decarbonization.

Establishment of Fair Regulations

Regulations have been standardized under the IMO.
This enables the implementation of regulations that allow cost pass-through across the entire supply chain.

United Nations

International shipping

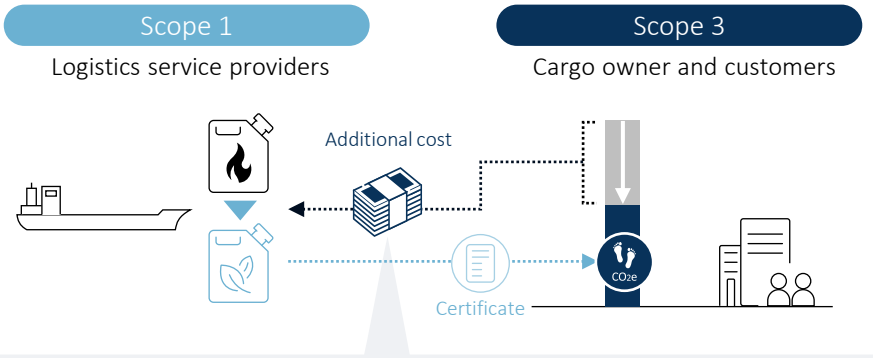
The IMO makes decarbonization strategies, global regulations, and aggregate GHG emissions.

Other sectors

Each UNFCCC signatory country formulates its own nationally determined contribution and implements regulations and GHG accounting on a national basis.

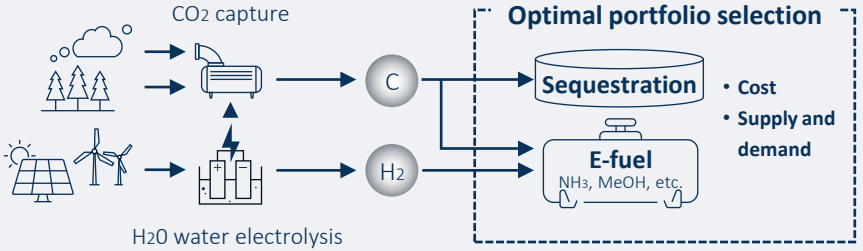
Convincing Value Sharing Through Disclosure

With the progress of disclosure regulations for cargo owners and customers, the value of paying for emissions reductions and opting for GHG-reducing transport is increasingly recognized as a competitive advantage.



What Maritime Shipping Can Do to Minimize the Increase in Logistics Costs

- By improving vessel operational efficiency—including enhanced performance and wind-assisted propulsion—utilizing shore power while at berth, and recovering waste heat, the consumption of alternative fuels (e-fuels) can be minimized.
- Defining residual emissions and establishing appropriate standards for CDRs, then integrating those into regulatory portfolios, can also serve as a means of minimizing overall costs.



Beyond Value Chain Mitigation (BVCM)

BVCM refers to corporate investments and mitigation actions that go beyond direct emissions reductions, aiming to further address climate change.

As a Scope 1 emitter, NYK is in the process of prioritizing direct emissions reductions. While a formal commitment target has not yet been established, the Company has already initiated actions that contribute to BVCM.

Forests Giving Back to the Ocean

- **Yu no Mori**
  Through the restoration of neglected plantation forests, we can reinstate their greenhouse gas absorption capacity, enhance water recharge functions, and safeguard biodiversity.

https://www.nyk.com/english/stories/01/01/20250122_1.html

Investment in Blue Carbon

- **Investment in Urchinomics Group, a Sea Urchin Farming Business**
  By removing overpopulated sea urchins, we aim to contribute to kelp-bed restoration and a blue-carbon business.

https://www.nyk.com/english/news/2024/20240725_02.html

Contribution to Creating Carbon Credits

- **Joint Investment in Forest Funds**
  Joint investment in a forest fund organized by the Sumitomo Forestry Group is expected to generate approximately one million tons of CO_2 absorption annually. This initiative contributes to the realization of a decarbonized society through the creation and distribution of high-quality carbon credits.

https://www.nyk.com/english/news/2023/20230710_01.html

Investment in Companies Developing GHG Reduction Technologies

- **Marunouchi Climate Tech Growth Fund**
- **Tsubame BHB**
  By investing in climate tech companies engaged in decarbonization-related businesses such as ammonia, NYK contributes to building supply chains and creating green business opportunities.

https://www.nyk.com/english/news/2023/20230502_01.html

https://www.nyk.com/english/news/2021/20210602_02.html

NYK GROUP

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