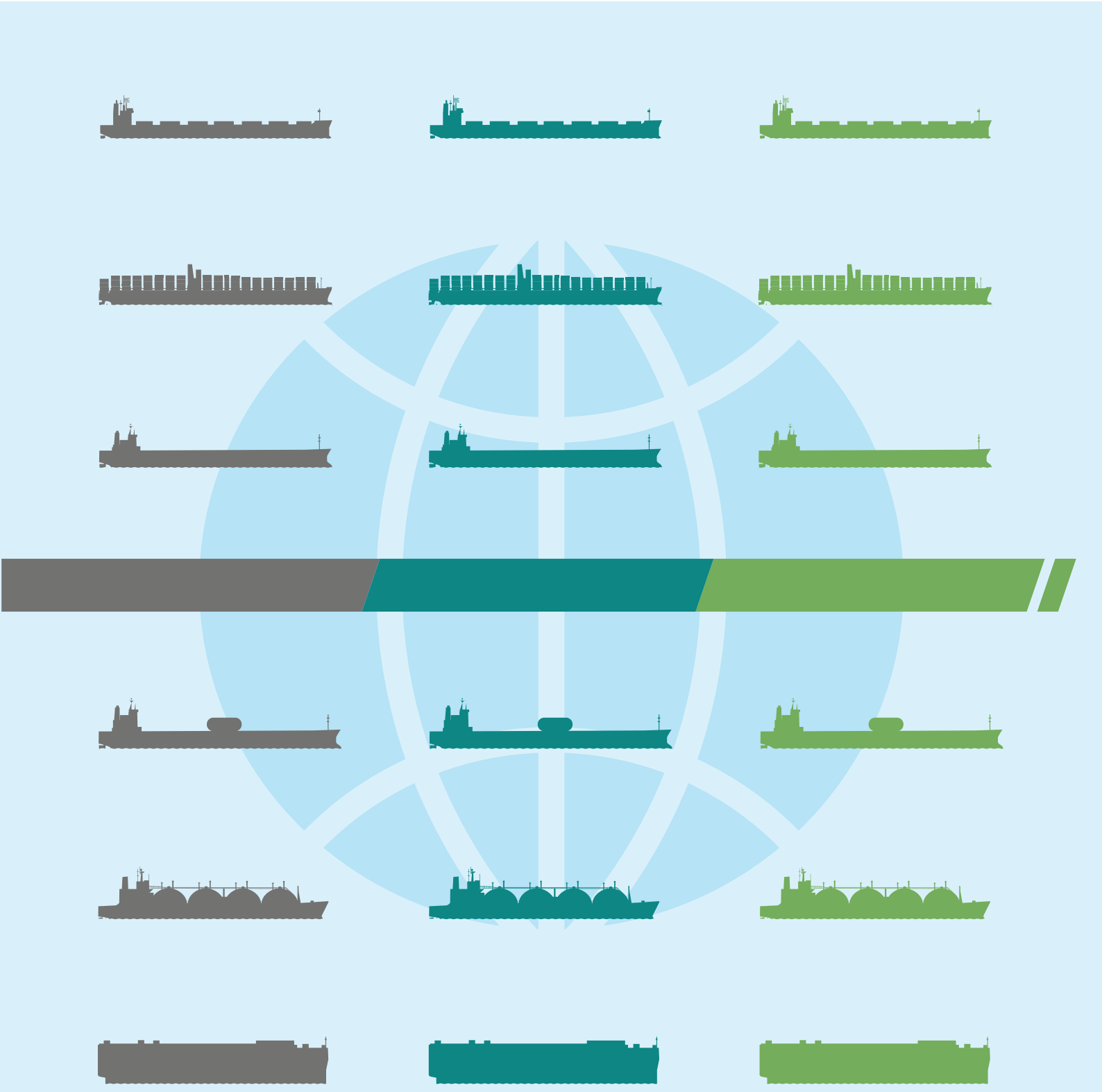
CHARTING THE FUTURE

ClassNK

What is the IMO's Mid-term measures and how it works

[English]



Contents

0. Introduction

As reducing greenhouse gas (GHG) emissions becomes an urgent global priority, the shipping industry is also seeing accelerated efforts to strengthen regulations on GHG emissions from ships.

The International Maritime Organization (IMO) and the European Union (EU) have been expanding their GHG emissions regulatory frameworks, creating a situation where shipping operators must take action.

In international shipping, the IMO revised its 2018 Initial Strategy for GHG emissions reduction by adopting the 2023 IMO GHG Reduction Strategy in July 2023. This Strategy sets a clear goal of achieving net-zero GHG emissions from international shipping by or around 2050.

As a specific measure to achieve the goal, the IMO has been developing a new regulatory framework combining technical and economic elements, known as "mid-term measures." At the 83rd session of the Marine Environment Protection Committee (MEPC83) held in April 2025, draft amendments to MARPOL Annex VI which include the following two provisions were approved as specific regulations under the mid-term measures:

- GHG intensity regulations for fuels used (GFI regulations)
- Promotion of decarbonization through the IMO Net-Zero Fund

These measures will require shipping companies to review their fuel choices and cost structures, and strategic action will be even more important going forward. The first step in responding strategically to these measures is to understand them correctly.

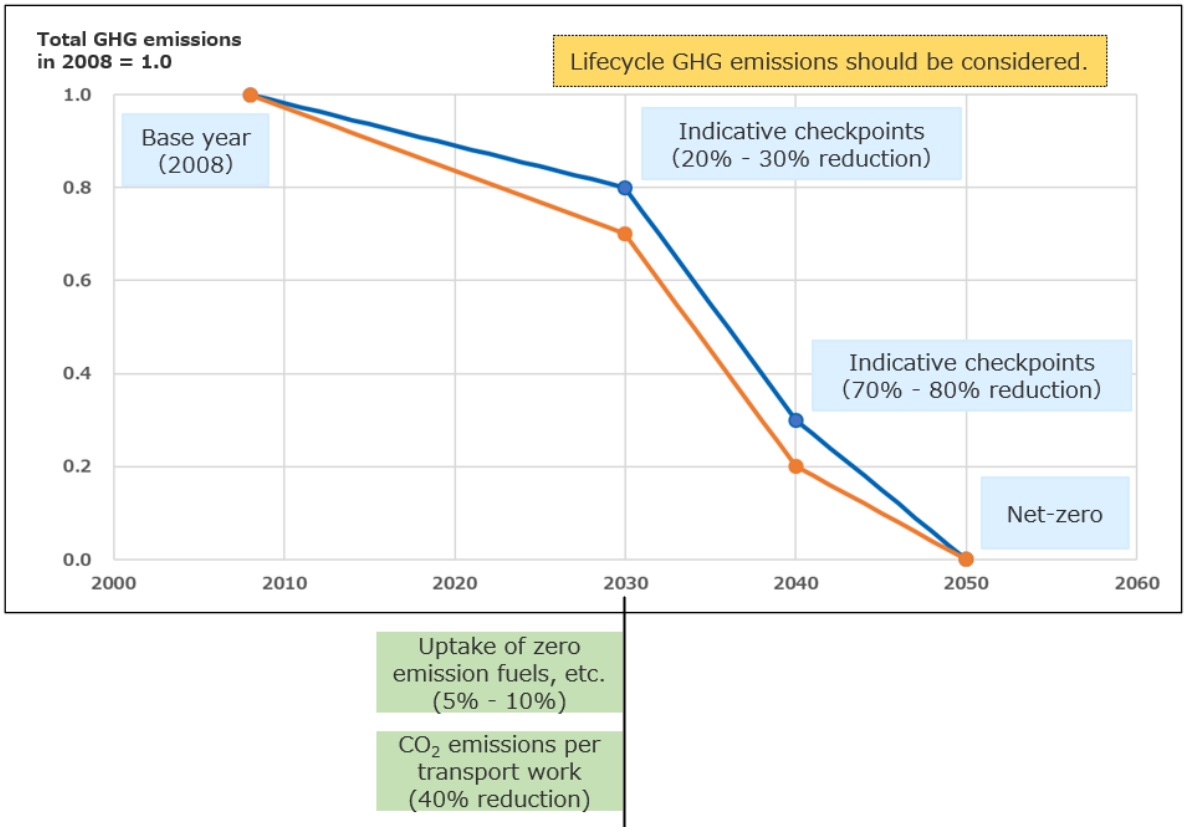
This document provides a clear explanation of the regulations to help shipping companies improve their understanding of mid-term measures, and also introduces our support services to assist with mid-term measures.

ClassNK hopes this document will help all stakeholders in the shipping sector in their efforts to achieve decarbonization.

1. 2023 IMO GHG Reduction Strategy

The IMO revised its 2018 GHG Initial Strategy by adopting the 2023 IMO GHG Reduction Strategy in 2023 and set a goal to achieve the net-zero GHG emissions from international shipping by or around 2050. In addition, as a pathway to achieve this goal, it has set indicative checkpoints of 20% to 30% by 2030 and 70% to 80% by 2040, compared to 2008 levels. Furthermore, the IMO also has set targets to introduce zero or near-zero emission fuels, etc. at a rate of 5% to 10% in international shipping and reduce CO_2 emissions per transport work by 40%, respectively, by 2030.

Additionally, the 2023 IMO GHG Reduction Strategy includes life cycle emissions - emissions from fuel production, transportation, and storage - in the scope of GHG emissions, in addition to emissions from onboard ships.



To achieve these goals, the IMO has been working on establishment of a regulatory framework that includes both technical and economic elements, known as mid-term measures, with the aim of introducing them in 2027.

At the 83rd session of the IMO's Marine Environment Protection Committee (MEPC83) held from 7 to 11 April 2025, draft amendments to MARPOL Annex VI which includes the framework for the mid-term measures, were approved. The draft amendments will be considered for adoption at the extraordinary MEPC session which will be held from 14 to 17 October 2025.

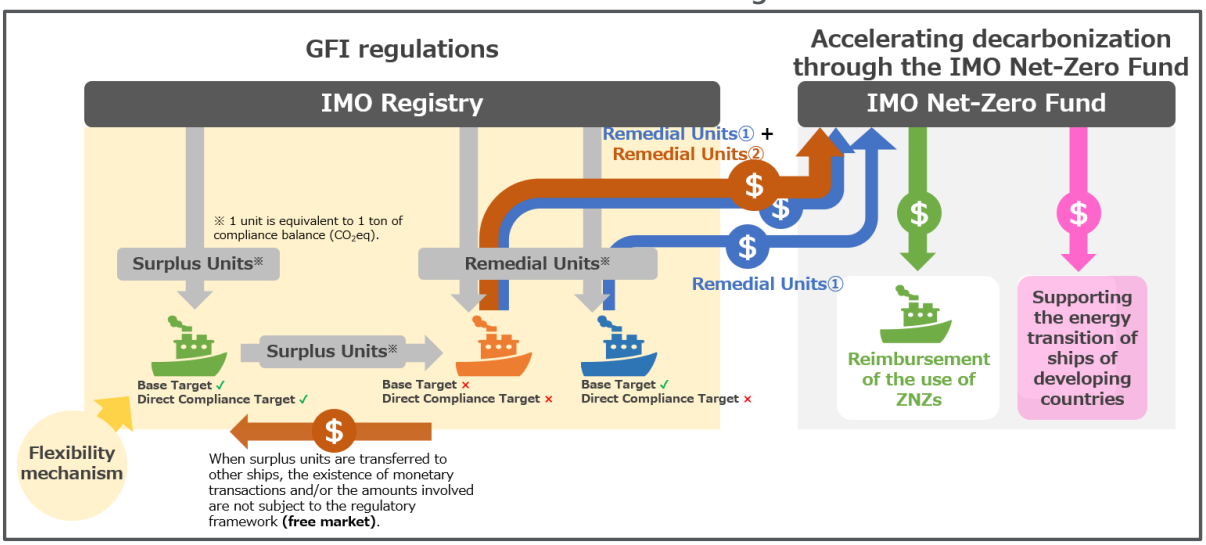
2. Overview of the Mid-term measures for GHG Reduction

MEPC83 held in early April 2025, draft amendments to MARPOL Annex VI including the IMO's mid-term measures for GHG reduction (hereinafter, "mid-term measures") were approved. In response, the draft amendments will be considered for adoption at the extraordinary MEPC session in October 2025.

Meanwhile, during the discussions at MEPC83, while there was general agreement on the regulatory framework of the mid-term measures, several Member States expressed their views indicating that the "numbers," including reference value and contribution amounts, etc. should be considered further.

Therefore, while this document includes specific "numbers" including GHG intensity target values etc. as a part of the mid-term measures outlined herein, please note that these numbers may be subject to change at the extraordinary MEPC session.

IMO mid-term measures – at a glance –



The expected implementation date and application for the mid-term measures are as follows:

Application: Ships of 5,000 GT and above engaged in international voyages, excluding:

- ships not propelled by mechanical means, and platforms including FPSOs and FSUs and drilling rigs, regardless of their propulsion; and
- semi-submersible vessels (until further review of the application of the mid-term measures).

Implementation date: 1 January 2028 (The amendments to MARPOL Annex VI are expected to enter into force in March 2027 at the earliest)

Overview:

The mid-term measures consist of the following two provisions:

(1) GHG intensity regulation for fuels used (GFI[1] regulation)

(2) Promotion of decarbonization through the IMO Net-Zero Fund[2]

[1] GFI: GHG Fuel Intensity

[2] For the IMO Net-Zero Fund, please see Section 4.

The overview of each provision is as follows:

(1) GHG intensity regulations for fuels used (GFI regulations) （see Section 3）

- The GFI regulations regulate the GHG intensity **(annual average of life cycle GHG emissions per energy)** of fuel used in ships.
- By progressively tightening the GHG intensity target values for fuels used by 2050, it is expected that the transition to alternative fuels with lower GHG emissions will accelerate, leading to a significant reduction in GHG emissions.
- If the GHG intensity target values cannot be met, compliance may be achieved through the payment of contributions proportional to the deviation from the target values, etc.

(2) Promotion of decarbonization through the IMO Net-Zero Fund （see Section 4）

- An international fund called the **"IMO Net-Zero Fund"** will be established based on contributions paid by ships that cannot meet the GFI intensity targets.
- The fund provides rewards for the use of fuels with low GHG intensity, such as zero or near-zero emission fuels.
- The reimbursement payments are expected to narrow the price gap between conventional fuels and zero or near-zero emission fuels, creating incentives for early fuel transition, accelerating global efforts to supply alternative fuels, and promoting the early expansion of zero-emission ships construction.
- Additionally, the fund also plays a role in deciding support for projects that contribute to fuel transition for ships in developing countries, in particular of Small Island Developing States (SIDS) and Least Developed Countries (LDCs).

3. GHG intensity regulations for fuel used (GFI regulations)

3.1 Base Target and Direct Compliance Target for the GFI regulations

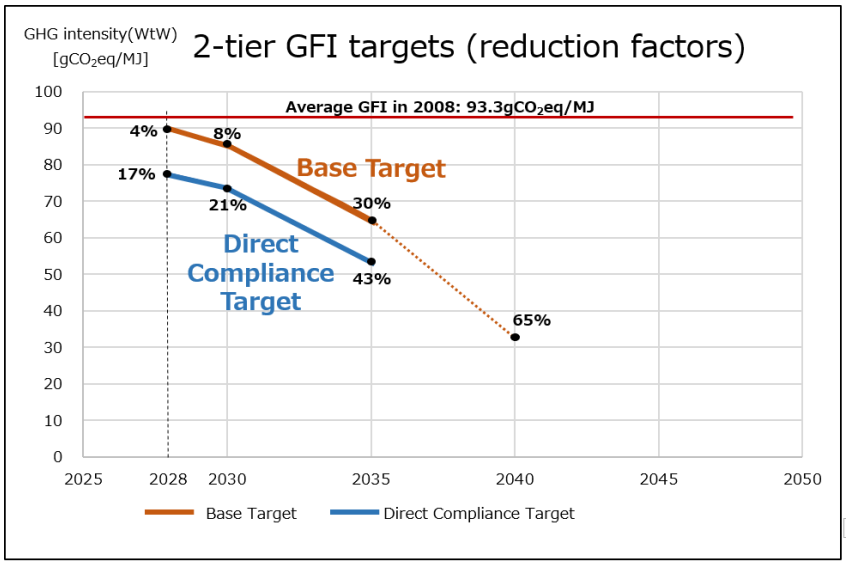
Under GFI regulations, the GHG intensity of a ship is defined as the annual average of the life cycle GHG emissions per energy of the fuel used by the ship, expressed in gCO_2eq/MJ. The GHGs include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The amount of energy used is calculated from the fuel consumption and the lower calorific value of the fuel used.

GHG intensity of the fuels used

$$\frac{\text{GHG [gCO2eq]}}{\text{[MJ]}} \quad \frac{\text{Life cycle GHG } (CO_2/CH_4/N_2O) \text{ emissions}}{\text{Energy used: Fuel consumption (ton) x Lower calorific value (MJ/ton)}}$$

If more than one type of fuels is used, the GHG intensity of the ship is calculated as the weighted average of the GHG intensity of those fuels by energy used.

The GFI regulations set two levels of targets, **"Base Target"** and **"Direct Compliance Target"**, with different reduction levels from the average GHG intensity of fuel used in international shipping in 2008, which was $93.3gCO_2eq/MJ$.



(Source: ClassNK prepared based on MEPC 83/WP.11, annex 1)

Base Target :

Based on the 2008 reference GHG intensity value ($93.3gCO_2eq/MJ$), Base Target annual values are set to achieve 4% reduction in 2028, 8% reduction in 2030, and 30% reduction in 2035. In addition, 65% reduction from the 2008 reference value in 2040 is also stipulated.

Direct Compliance Target :

Based on the 2008 reference GHG intensity value ($93.3gCO_2eq/MJ$), Direct Compliance Target annual values are set to achieve 17% reduction in 2028, 21% reduction in 2030, and 43% reduction in 2035.

Furthermore, the annual values of Base Target and Direct Compliance Target in 2036 and beyond will be determined by 2032.

Reduction factors(Z) and annual values for Base Target and Direct Compliance Target

Year	Base target		Direct Compliance Target	
	Z factor (%)	Target GFI_T (gCO_2eq/MJ)※	Z factor	Target GFI_T (gCO_2eq/MJ)※
2028	4.0%	89.6	17.0%	77.4
2029	6.0%	87.7	19.0%	75.6
2030	8.0%	85.8	21.0%	73.7
2031	12.4%	81.7	25.4%	69.6
2032	16.8%	77.6	29.8%	65.5
2033	21.2%	73.5	34.2%	61.4
2034	25.6%	69.4	38.6%	57.3
2035	30.0%	65.3	43.0%	53.2
・・・				
2040	65.0%	32.7	TBD	TBD
・・・				

※ How to handle decimal points etc. is currently undecided.

3.2 Requirements for ships

Ships subject to GFI regulations are required to monitor their annual fuel consumption, including the type and quantity of fuels used, calculate GHG intensity annually, for verification by the flag Administration or a classification society.

To calculate annual GHG intensity of a ship, the GHG intensity values for each fuel type should be used. These values are calculated based on the conversion factors in the IMO's LCA Guidelines. Note that the current LCA Guidelines specify conversion factors for only a few fuel types, and future updates are expected to calculate GHG intensity values for additional fuel types.

For your reference, the conversion factors, etc. of Heavy Fuel Oil(HFO) are as follows in the table below.

An example of the conversion factors, etc. in the 2024 LCA Guidelines

Order	Fuel type	Fuel Pathway Code	WtT GHG intensity (gCO_{2eq}/MJ)	LCV (MJ/g)	Energy Converter	C_f CO_2 (gCO_2/g fuel)	C_f CH_4 (gCH_4/g fuel)	C_f N_2O (gN_2O/g fuel)	C_{slip} /C_{fug} (mass %)	e_c gCO_{2eq}/g fuel	TtW GHG intensity (gCO_2eq/MJ)	NOTE
1	Heavy Fuel Oil (ISO 8217 Grades RME, RMG and RMK, 0.10 < S ≤ 0.50%)	HFO(VLSFO)_f_SR_gm	16.8	0.0402	ALL ICEs	3.114	0.00005	0.00018				Resolution MEPC.364(79) Fourth IMO GHG study
2	Heavy Fuel Oil (ISO 8217 Grades RME, RMG and RMK exceeding 0.50% S)	HFO(HSHFO)_f_SR_gm	14.1	0.0402	ALL ICEs	3.114	0.00005	0.00018				Resolution MEPC.364(79) Fourth IMO GHG study

Source：2024 Guidelines on life cycle GHG intensity of marine fuels (2024 LCA Guidelines) (Resolution MEPC.391(81))

- Well-to-Tank (WtT) GHG intensity
  16.8gCO_2eq/MJ
- Tank-to-Wake (TtW) GHG intensity
  {3.114gCO_2/gfuel ×1 (CO_2 GWP100)[4] + 0.00005gCH_4/gfuel ×28 (CH_4 GWP100)[4]
  + 0.00018gN_2O/gfuel x 265 (N_2O GWP100)[4]} / 0.0402MJ/g = **78.7gCO_2eq/MJ**
- Well-to-Wake (WtW) GHG intensity
  16.8gCO_2eq/MJ + 78.7gCO_2eq/MJ = **95.5gCO_2eq/MJ**

[3] 2024 Guidelines on life cycle GHG intensity of marine fuels (2024 LCA Guidelines) (Resolution MEPC.391(81))

[4] GWP: Global Warming Potential. GWP100 is an indicator used to evaluate the impact on global warming over a 100-year period. The GWP in the LCA guidelines are based on the IPCC Fifth Assessment Report.

The compliance approaches for the GFI regulations vary depending on where the GHG intensity value of the ship falls in relation to the Base Target and Direct Compliance Target. The details are as follows.

Direct Compliance Target achieved (● in the figure on the next page) :

- When a ship achieved Direct Compliance Target by using fuels with low GHG intensity, such as green fuels, the ship receives "surplus units " from the IMO GHG Registry, which represent the amount by which the GHG emissions are below to the Direct Compliance Target (see Section 3.3).
- A surplus unit can be used once for one of the following purposes (different surplus units of a ship can be used for the different purposes):
  - banked for use in the following reporting periods (The validity for banked surplus units is 2 years);
  - transfer to another ship that has not achieved the Base Target to balance that ship's Tier 2 compliance deficit; or
  - voluntarily cancelled as a mitigation contribution.

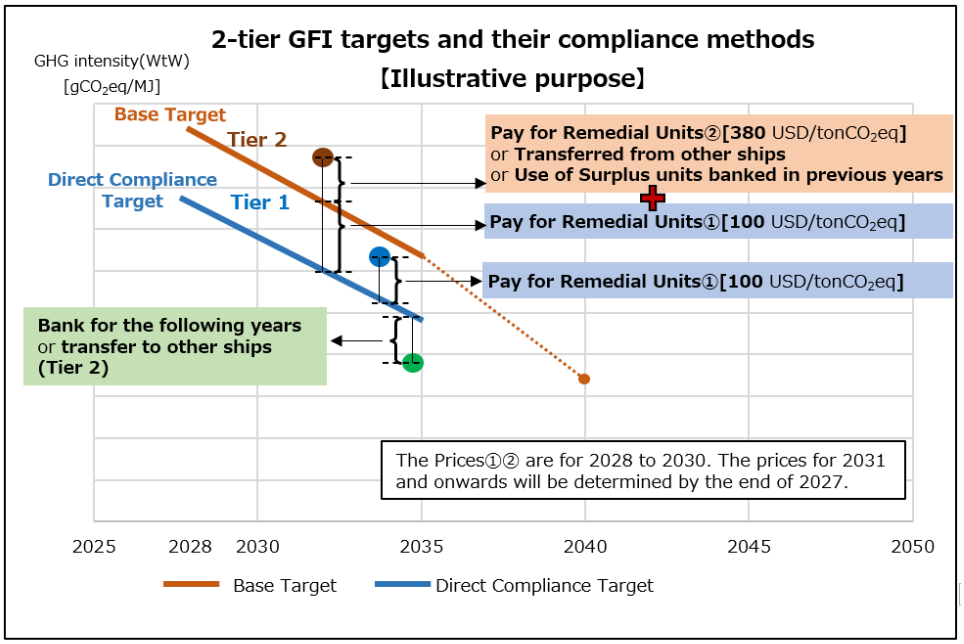
Base Target achieved but Direct Compliance Target not achieved (● in the figure on the next page) :

- Payment of contribution① equivalent to the GHG emissions exceeding the Direct Compliance Target (referred to as Tier 1) is required. The unit price of contribution① is set at 100 USD per ton of GHG emissions (100 USD/tonCO_2eq) exceeding the Direct Compliance Target.
  - The transfer of surplus units from other ships or the use of the ship's surplus units banked in the previous year is not permitted.

Base Target not achieved (● in the figure on the next page) :

- Payment of contribution① equivalent to the GHG emissions exceeding the Direct Compliance Target (Tier 1) is required. The unit price of contribution① is set at 100 USD per ton of GHG emissions (100 USD/tonCO_2eq)[5] exceeding the Direct Compliance Target.
  - The transfer of surplus units from other ships or the use of the ship's surplus units banked in the previous year is not permitted.
- In addition to the payment of contribution① above, one or more of the following approaches is required for GHG emissions exceeding the Base Target (referred to as Tier 2):
  - Payment of contribution② equivalent to the GHG emissions exceeding the Base Target. The unit price for contribution② is set at 380 USD per ton of GHG emissions (380 USD/tonCO_2eq)[5] exceeding the Base Target;
  - surplus units transferred from other ships; and/or
  - surplus units banked from previous years.

[5] The unit price applies from 2028 to 2030. The unit price for 2031 and beyond will be determined by the end of 2027.



(Source: ClassNK prepared based on MEPC 83/WP.11, annex 1)

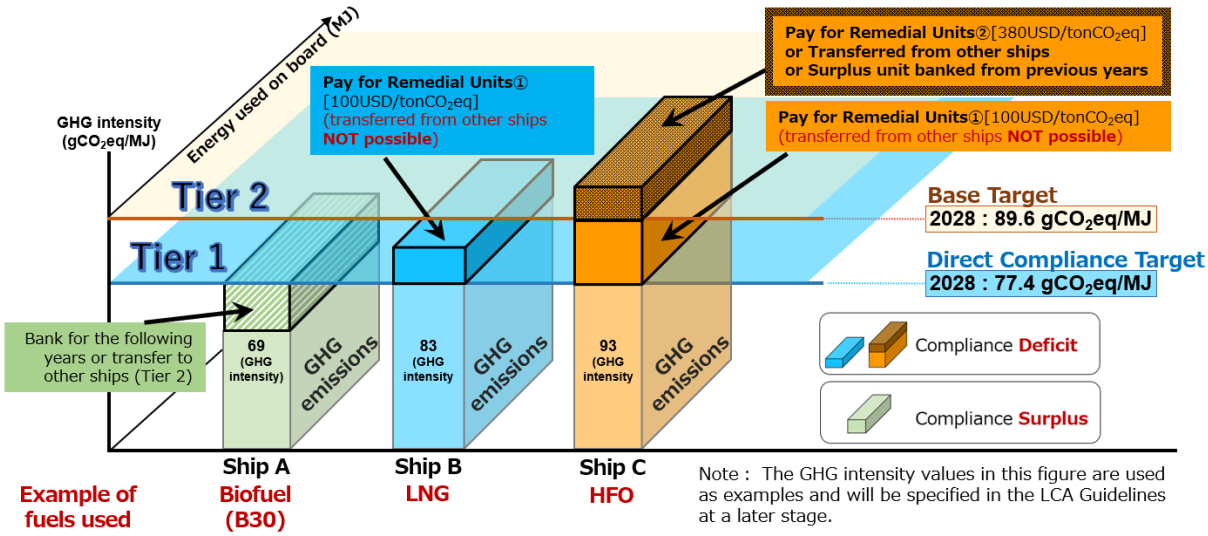
When calculating the amount of surplus units or contribution①②, a unit called "compliance balance" is used. The compliance balance for each ship is calculated by multiplying the deviation of the ship's GHG intensity from the Direct Compliance Target for that year by the annual energy consumption.

Compliance Balance

(Direct Compliance Target of the year [gCO_2eq/MJ] − GHG intensity of the year [gCO_2eq/MJ]) × Energy used on board [MJ] = over-/under- compliance against Direct Compliance Target [gCO_2eq]

The figure below shows examples of GFI compliance approaches for three ships, Ship A using biofuel (B30), Ship B using LNG as a fuel, and Ship C using heavy fuel oil (HFO), using the Base Target and the Direct Compliance Target of 2028 values.

Examples of GFI compliance approaches based on GHG intensity of ships



Examples of the calculation method for the amount of contributions for Ship B and Ship C for 2028 are as follows:

◆ **An example of the calculation method for the amount of contributions for Ship B**

Based on annual LNG consumption of 4,187.5tons.

4,187.5tons × 1,000,000 (conversion from grams to tons) × 0.0480MJ/g = 201,000,000MJ

Tier 1 (contribution①)

(Direct Compliance Target 77.4gCO_2eq/MJ – Ship B's GHG intensity 83gCO_2eq/MJ) × Energy consumption 201,000,000MJ / 1,000,000 (conversion from grams to tons) × Price of Remedial Unit① 100USD/tonCO_2eq = **-USD112,560**

◆ **An example of the calculation method for the amount of contributions for Ship C**

Based on annual HFO consumption of 5,000tons.

5,000tons × 1,000,000 (conversion from grams to tons) × 0.0402MJ/g = 201,000,000MJ

Tier 1 (contribution①)

(Direct Compliance Target 77.4gCO_2eq/MJ – Base Target 89.6gCO_2eq/MJ) × Energy consumption 201,000,000MJ / 1,000,000 (conversion from grams to tons) × Price of Remedial Unit① 100USD/tonCO_2eq = **-USD245,220**

Tier 2 (contribution②)

(Base Target 89.6gCO_2eq/MJ – Ship C's GHG intensity 93gCO_2eq/MJ) × Energy consumption 201,000,000MJ / 1,000,000 (conversion from grams to tons) × Price of Remedial Unit② 380USD/tonCO_2eq = **-USD259,692**

3.3 IMO GHG Registry

The IMO GHG Registry (hereinafter, "Registry") will be established to centrally manage GHG emissions and compliance surpluses/deficits for ships subject to GFI regulations.

Each ship subject to GFI regulations will be required to open a ship account with the Registry. The Registry will primarily have the following functions:

- for compliance surplus, recording the banking, transfer to other ships, and use by the ship banked in the previous years; and
- for compliance deficit, recording of balance after confirmation of payment of contributions and/or through transfers from other ships.

The payment destination for contributions when a ship cannot achieve the Base Target and/or Direct Compliance Target is the IMO Net-Zero Fund (see Section 4). After payment of contributions, remedial units will be issued to the ship account by the Registry. Not that each ship is required to pay the annual administration fee for the ship account by 30 June of each year. Details regarding the Registry and the annual administration fee will be specified in guidelines to be developed by IMO.

4. Promotion of decarbonization through the IMO Net-Zero Fund

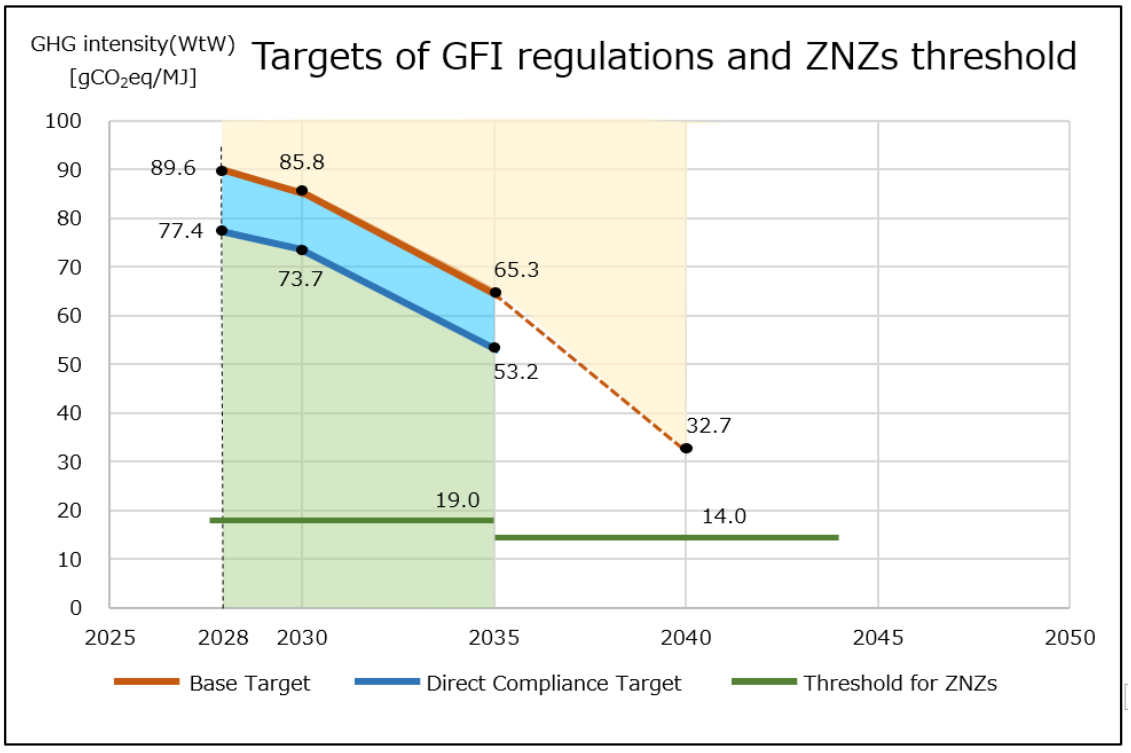
An IMO Net Zero Fund will be established based on contributions paid by ships that cannot meet the GFI intensity targets.

This fund will provide rewards for ships using zero or near-zero emission fuels, etc. and support projects that contribute to fuel conversion for ships in developing countries.

◆ Disbursement for ships using zero or near-zero GHG emission technologies, fuels and/or energy sources (ZNZs)

Starting in 2028, the aim is to promote early transition to zero emissions by providing rewards for the use of ZNZs. The GHG intensity threshold for ZNZs is set at 19gCO_2eq/MJ from 2028 to 2034 and 14gCO_2eq/MJ from 2035.

Note that the calculation method and unit price for these rewards will be determined by March 2027.



(Source: ClassNK prepared based on MEPC 83/WP.11, annex 1)

5. Timeline for GFI regulation compliance

The timeline for reporting and verification to comply with GFI regulations is as follows:

◆ **By 1 October 2027**

Each ship is required to open a ship account in the IMO GFI Registry by 1 October 2027.

◆ **By 31 December 2027**

Each ship should update its Ship Energy Efficiency Management Plan (SEEMP) to include information on data collection methods for fuel used under the GFI regulations and GHG intensity calculation methods, and have the SEEMP verified by the flag Administration or a classification society by 31 December 2027.

※ The annual administration fee will be specified in guidelines to be developed by the IMO.

◆ **From 1 January 2028**

From 1 January 2028, each ship is required to collect and record the necessary information in accordance with the updated SEEMP.

◆ **By 30 June 2028 (thereafter, by June 30 every year)**

Each ship is required to pay the annual administration fee to the IMO GFI Registry by 30 June.

※ The annual administration fee will be specified in guidelines to be developed by the IMO.

◆ **By 31 March 2029 (thereafter, by 31 March every year)**

Each ship is required to calculate the GHG intensity (Attained annual GFI), Base Target and Direct Compliance Target values (Target annual GFI), and report the compliance balance to the flag Administration or a classification society for the previous reporting year.

◆ **By 30 June 2029 (thereafter, by 30 June every year)**

The flag Administration or the classification society verifies the submitted data, and reports the verified data to the IMO GFI Registry by 30 June.

◆ **By 31 July 2029 (thereafter, by 31 July every year)**

Each ship is required to determine the compliance approach(s) to the GFI regulations and to record them in the IMO GFI Registry by 31 July. The transfer of surplus units to other ships, payment of contributions to the IMO Net-Zero Fund, and use of banking must be completed by the same date.

◆ By 31 August 2029 (thereafter, by 31 August every year)

The IMO GFI Registry issues a Ship Account Statement to each ship by 31 August. This statement will include the regulatory compliance approach(s) selected by the ship.

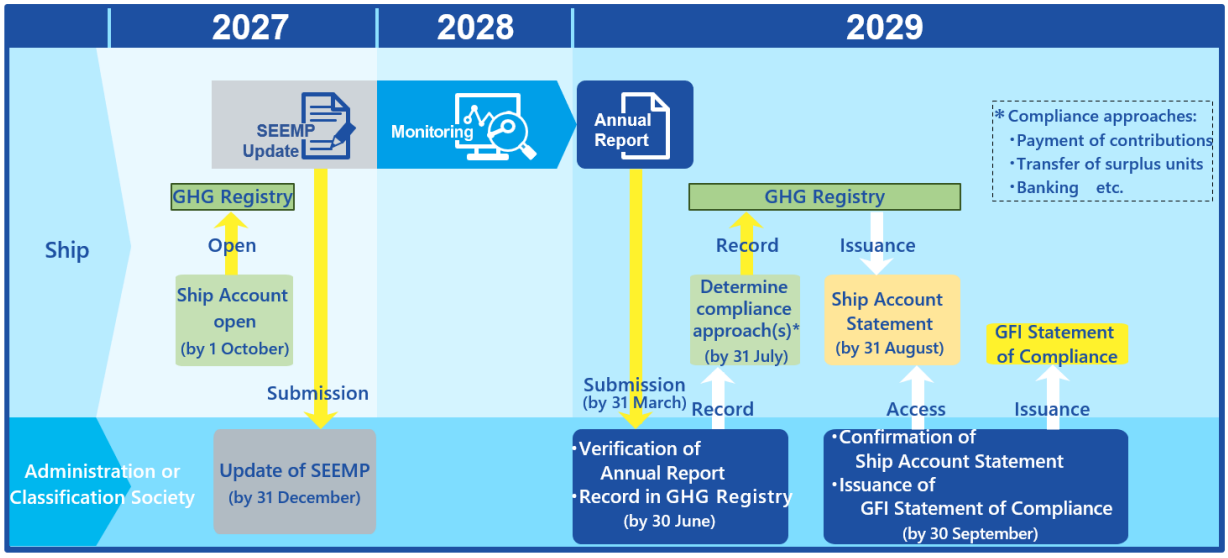
◆ By 30 September 2029 (thereafter, by 30 September every year)

Based on the Ship Account Statement, the Statement of Compliance of the GFI regulations is issued by the flag Administration or the classification society by 30 September.

◆ By 31 October 2029 (thereafter, by 31 October every year)

The Statement of Compliance of the GFI regulations is reported to the ship account by the flag Administration or the classification society by 31 October.

Timeline for GFI regulation compliance



6. Next steps

The draft amendments to MARPOL Annex VI, approved at MEPC83, will be considered for adoption at the extraordinary MEPC session in October 2025. If the amendments are adopted at that session, the amendments are expected to enter into force in March 2027, with the date of implementation of 1 January 2028.

In addition, an indicative list of new guidelines to be developed and existing guidelines to be amended to support the mid-term measures was developed, and some of them are shown here:

New guidelines to be developed (examples) :

- Guidelines for the calculation of the attained GHG fuel intensity (GFI)
- Guidelines on the annual GFI compliance approaches and method of calculation of surplus units and compliance deficit for ships
- Guidelines on requirements and procedures for recognition of certification schemes/standards and reporting of certification activities to IMO
- Guidelines on the definition of ZNZs, of ZNZs rewards and the methodology to determine such rewards
- Guidelines for the establishment, the administration and management of the IMO GFI Registry
- Governing provisions of the IMO Net-Zero Fund and its Governing Board

Existing guidelines to be amended (examples) :

- 2024 Guidelines on life cycle GHG intensity of marine fuels (LCA Guidelines)
- 2024 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)

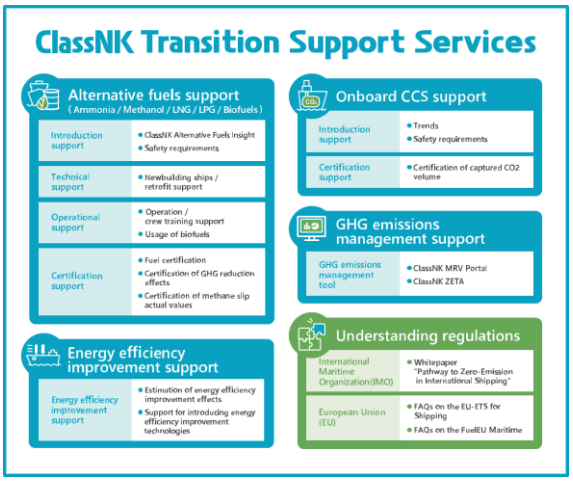
7. ClassNK support

7.1 ClassNK Transition Support Services

As reducing GHG emissions becomes an urgent issue for the international society, the maritime industry is facing increasingly stringent pressure to reduce GHG emissions from ships, and the IMO and the EU are strengthening environmental regulations.

In this regulatory landscape, long-term measures such as the introduction of zero-emission fuels ships are essential for the planned reduction of GHG emissions. However, the infrastructure for supplying zero-emission fuels is still under development, requiring the introduction of various GHG reduction measures during the transitional phase.

ClassNK provides "ClassNK Transition Support Services" to comprehensively facilitate a smooth transition to zero-emission. This service offers a comprehensive menu of solutions to support clients in reducing GHG emissions and proposes optimal strategies tailored to clients' needs.



7.2 ClassNK ZETA

ClassNK ZETA is a tool to visualize and manage emissions from ships.

ClassNK ZETA is currently used by over 5,000 ships and includes features to monitor GHG emissions and CII ratings of individual ships and fleets at any time, and features to comply with EU-ETS and FuelEU Maritime regulations.

In addition to these GHG emissions management features, ClassNK ZETA will provide features to comply with mid-term measures, and will be able to check and manage GHG intensity and compliance balance in the future.

You can start using ClassNK ZETA with just a few steps.

* ClassNK's verification services for IMO-DCS/EU/UK regulations etc are completely independent from ClassNK ZETA. The use of ClassNK ZETA does not impact the outcome of our verification services.

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May 2025