

Recent Topics on GHG Emissions Reduction from International Shipping

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1. INTRODUCTION

With the aim of achieving a global reduction of greenhouse gas (GHG) emissions, the Paris Agreement adopted in 2015 sets a common global goal of keeping the world's average temperature increase well below 2 °C compared to pre-industrial levels and making efforts to limit it to 1.5 °C.

Efforts to reduce GHG emissions in international shipping are being pursued by the International Maritime Organization (IMO). Since 2013, the IMO has introduced regulations in the form of the Energy Efficiency Design Index (EEDI) and the Energy Efficiency Existing Ship Index (EEXI), made it mandatory that ships have a Ship Energy Efficiency Management Plan (SEEMP), and established the Carbon Intensity Indicator (CII) rating system. Furthermore, in 2023, the IMO reviewed its GHG Strategy and set more stringent targets than the Initial IMO GHG Strategy adopted in 2018, and is now considering regulations to achieve these new targets.

On the other hand, to achieve net-zero GHG emissions by 2050, the European Union (EU) has decided to expand the EU Emissions Trading System (EU-ETS) to the maritime sector and also introduce the FuelEU Maritime regulation to promote decarbonization of fuels used in shipping.

Private sector initiatives are also underway in the maritime business. With these regulations and initiatives, efforts to reduce GHG emissions are expected to accelerate in the future.

This paper provides an overview of the regulations and schemes for GHG emissions reduction in the IMO and EU, as well as the latest discussions in this area.

2. TOPICS IN IMO

2.1 Revision of IMO GHG Strategy

Regarding the IMO strategy for reducing GHG emissions from international shipping, the 2018 IMO GHG Strategy (Initial IMO GHG Strategy) was adopted at the 72nd session of the Marine Environment Protection Committee (MEPC 72) held in 2018. This strategy outlined the vision and target levels for GHG emissions reduction from international shipping. It was agreed that this reduction strategy would be reviewed every five years. Subsequently, the 2023 IMO GHG Strategy (Revised IMO GHG Strategy), which strengthened the reduction targets summarized as follows (Table 1), was adopted at MEPC 80 in July 2023.

- Regarding marine fuels, the Initial IMO GHG Strategy focused only on emissions by onboard usage (Tank-to-Wake). However, under the Revised IMO GHG Strategy, emissions through the entire lifecycle from fuel production, transportation, and storage to onboard usage (Well-to-Wake) are to be taken into account.
- In the Initial IMO GHG Strategy, a vision which confirms IMO's commitment to reducing GHG emissions from international shipping was set as "*phase out GHG emissions as soon as possible in this century*". In the Revised IMO GHG Strategy, "*in this century*" was removed and "*as soon as possible*" was retained.
- The target for the total amount of GHG emissions in the Initial IMO GHG Strategy aimed to reduce the total annual GHG emissions by at least 50 % by 2050 compared to 2008. In the Revised IMO GHG Strategy, this target was changed to "*reach net-zero GHG emissions by or around, i.e., close to 2050*". The Revised IMO GHG Strategy also introduced indicative checkpoints to achieve this target, aiming to reduce total GHG emissions by at least 20 % compared to 2008 by 2030 and at least 70 % compared 2008 by 2040.
- The target for transport efficiency, i.e., CO₂ emissions per transport work, in the Initial IMO GHG Strategy aimed "*to reduce CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008*". In the Revised Strategy, only the target of 2030, i.e., "*by at*

least 40% by 2030”, was retained.

- The Revised IMO GHG Strategy introduced a new target related to the total energy used by international shipping relating to the uptake of zero or near-zero GHG emission technologies, fuels, and/or energy sources, which are to represent 5 %, striving for 10 %, by 2030.

The IMO will consider and implement regulations to achieve these targets outlined in the Revised IMO GHG Strategy.

Table 1 IMO GHG Strategy

	2018 Initial Strategy	2023 Revised Strategy
Scope of emissions	Onboard emissions (Tank-to-Wake)	Lifecycle emissions (Well-to-Wake) to be taken into account
Levels of ambition (Compared to 2008)	Reduce by at least 50 % by 2050 Phase out as soon as possible within the century	Reach net-zero GHG emissions by or around 2050 Peak GHG emissions as soon as possible (Indicative checkpoints) 2030: Reduce by at least 20 %, striving for 30 % 2040: Reduce by at least 70 %, striving for 80 %
Carbon intensity target (Compared to 2008)	2030: Reduce by at least 40 % 2050: Reduce by at least 70 %	2030: Reduce by at least 40 % (*1)
Introduction target zero-emission technologies, fuels and energy sources	---	2030: Represent at least 5 %, striving for 10 % (**)

(*1) Indicator is CO₂ emission per transport work (Tank-to-Wake base)

(*2) Consumption energy base

Major Changes

- ✓ Reach net-zero GHG emissions by or around 2050.
- ✓ Consider not only onboard emissions, but also lifecycle emissions, including fuel production, transportation, and storage.
- ✓ Monitor progress in terms of total GHG emissions and adopt a target of increased uptake of zero or near-zero GHG emission technologies, fuels, and/or energy sources.

In order to contribute to encouraging broad discussions among stakeholders and accelerating efforts towards decarbonization of international shipping, ClassNK attempted to visualize the actions required by the Revised IMO GHG Strategy in quantitative terms by estimating the total GHG emissions, the scale of introduction of zero-emission fuels, and the scale of introduction of zero-emission fuel ships required to achieve the 2030 zero-emission fuels introduction target and GHG emissions reduction target in the Revised IMO GHG Strategy, applying to ships of 5000 gross tonnage and above engaged in international voyages (which are subject to IMO DCS). The Society summarized this information in a White Paper (Fig. 1), which can be accessed on ClassNK’s website. ClassNK plans to continuously update its content through ongoing dialogue with stakeholders.

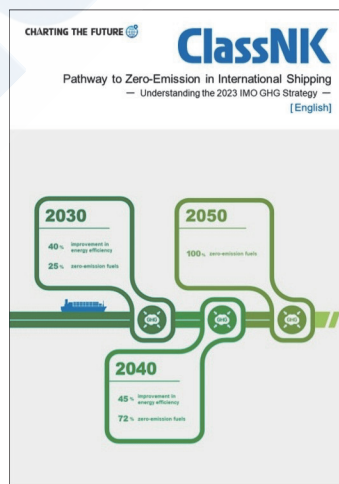


Fig. 1 White Paper

2.2 Guidelines on Lifecycle GHG Intensity of Marine Fuels

The IMO acknowledges the need to consider emissions through the entire lifecycle of low/zero-carbon fuels such as hydrogen, ammonia, and biomass-based fuels, which are expected to be more widely used in the future for the decarbonization of ships (Fig. 2). Furthermore, recognizing the significant impact on global warming of GHG other than carbon dioxide (CO₂), such as methane (CH₄) and nitrous oxide (N₂O), the IMO developed guidelines to comprehensively assess the GHG emission intensity (GHG emissions per unit of energy) through the entire lifecycle of fuels used in ships. The guidelines aim to evaluate the GHG emission intensity from marine fuels comprehensively through their production, distribution, and use onboard ships, and were adopted at MEPC 80 as “Guidelines on lifecycle GHG intensity of marine fuels (LCA guidelines)” (Resolution MEPC.376(80)).

The Guidelines provide a general framework for assessing the lifecycle GHG intensity of marine fuels. When evaluating GHG emissions through the lifecycle of a fuel, it will be necessary to follow the calculation methods and procedures outlined in the Guidelines. The Guidelines include the following aspects:

- Calculation methods for the GHG intensity for CO₂, methane (CH₄), and nitrous oxide (N₂O)
- Standardized format for a fuel lifecycle label that provides information on the characteristics of each fuel
- Method for specifying default values for the GHG intensity of representative fuels
- Third-party certification

However, the Guidelines also highlight the need for further examination of certain issues, such as inclusion of emissions resulting from land-use changes (e.g., conversion of forests to agricultural land) associated with the production of fuels derived from biomass, clarification of requirements related to certification methods, establishment of default values for GHG emissions intensity (currently only five types, including HFO, are specified), and development of guidance on third-party certification. Ongoing efforts to address these issues are planned, including expert workshops, to facilitate the practical implementation of the Guidelines.

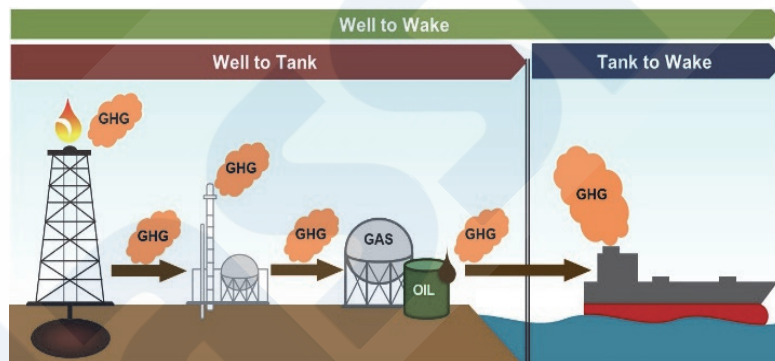


Fig. 2 GHG emissions through the entire lifecycle (WtW) of fuels

2.3 Mid-Term Measures for GHG Reduction

During MEPC 80, discussions were held on how to proceed with measures to achieve the GHG reduction targets outlined in the Revised Strategy. As a result, it was agreed that a basket of candidate measures should comprise both a technical element and an economic element. Specifically, it was agreed that the technical element should be based on the phased reduction of the GHG intensity of marine fuels, and the economic element should be based on the maritime GHG emission pricing mechanism. Candidate measures will be developed based on comprehensive impact assessments to evaluate the impact of these measures on individual countries (Table 2).

Furthermore, a timeline specifying adoption of specific mid-term measures by 2025, followed by entry into force by 2027, has been incorporated in the Revised IMO GHG Strategy (Table 3).

Table 2 Proposed mid-term measures

Measures		Proposed by	Outline
Technical measures	GFS (GHG Fuel Standard)	EU Countries, EC	<ul style="list-style-type: none"> Phased reduction of GHG intensity for fuels (gCO₂eq/MJ). Based on lifecycle GHG emissions of fuels (Well-to-Wake). Flexibility mechanisms (allocation of over-achievement to other ships or compliance by payment of contribution).
	IMSF&F (International Maritime Sustainable Fuels and Fund)	China	<ul style="list-style-type: none"> Phased reduction of GHG intensity for fuels (gCO₂eq/MJ). Based on onboard emissions (Tank-to-Wake). Flexibility mechanisms (allocation of over-achievement to other ships or compliance by payment of contribution).
Economic measures	Feebate	Japan	<ul style="list-style-type: none"> Levy for GHG emissions and rebate for zero-emission fuels. Revenue from levy: Support for first movers to accelerate the introduction of zero-emission ships.
	GHG levy	Marshall Islands, Solomon Islands	<ul style="list-style-type: none"> Levy on GHG emissions (100 USD per CO₂-ton). The amount of the levy will increase. Revenue from levy: Support for developing countries.
	F&R (Fund and Reward)	ICS (International Chamber of Shipping)	<ul style="list-style-type: none"> Levy on CO₂ emissions. Revenue from levy: Support for first movers, developing countries, and R&D.

(Prepared by ClassNK based on a report of MEPC 80 issued by MLIT in Japan.)

Table 3 Timelines for development and implementation

MEPC 81 (Spring 2024)	Finalization of basket of mid-term measures
MEPC 82 (Autumn 2024)	Finalization of comprehensive impact assessment
MEPC 83 (Spring 2025)	Approval of mid-term measures
Extraordinary session of MEPC (Autumn 2025)	Adoption of mid-term measures
16 months after adoption (2027)	Entry into force of mid-term measures

2.4 GHG Emissions Using Biofuels

From the perspective of GHG reduction, the international shipping industry has been gradually transitioning to alternative fuels, and discussions are underway at the IMO regarding the use of biofuels, which are renewable fuels with relatively easy applicability as “drop-in fuels” for existing ships.

Biofuels are produced from biomass, mainly plant oil, as the raw material. Although these fuels emit CO₂ during combustion, because the plants (biomass) used as the raw material absorb CO₂ in the atmosphere in their growth process, biofuels are regarded as “carbon-neutral” fuels in sectors other than the maritime industry. However, the IMO regulations do not provide clear guidance on how to account for the GHG reduction benefits of biofuels. Therefore, during MEPC 80, discussions were held on how biofuels should be treated within the IMO DCS and CII rating system, and how CO₂ emissions should be evaluated when biofuels are used. As a result, interim guidance titled “Interim guidance on the use of biofuels under regulations 26, 27, and 28 of MARPOL Annex VI (DCS and CII)” (MEPC.1/Circ.905) was approved until the handling of biofuels is clarified in the aforementioned LCA Guidelines.

According to the guidance, biofuels that have been certified by an international certification scheme, meeting its sustainability criteria, and that provide a well-to-wake GHG emissions reduction of at least 65 % compared to the well-to-wake emissions of fossil MGO of 94 [gCO₂eq/MJ] (i.e., emissions intensity not exceeding 33 [gCO₂eq/MJ]) according to that certification, CO₂ emission conversion factor (Cf) equal to the value of the well-to-wake GHG emissions of the fuel according to the certificate (expressed in gCO₂eq/MJ) multiplied by its lower calorific value can be used in the calculations for IMO DCS and CII.

Biofuels that do not meet these conditions should be assigned a Cf equal to the Cf of the equivalent fossil fuel type.

3. TOPICS IN EUROPEAN REGULATIONS

3.1 EU-ETS Directive

3.1.1 Background

The European Union (EU) has set a target of reducing GHG emissions by 55 % or more from the 1990 level by 2030 with the aim of achieving net-zero emissions by 2050. In July 2021, a comprehensive climate change policy package “Fit for 55” was announced to achieve the 2030 target, and a proposal to expand the EU Emissions Trading System (EU-ETS), which is a carbon pricing system, to the shipping sector was also announced. Subsequently, the European Parliament adopted the relevant legislation of Fit for 55 on 18 April 2023, including the application of the EU Directive (hereinafter referred to as “EU-ETS Directive”) to the shipping sector, and the European Council adopted the legislation on 25 April 2023, completing the legislative process. Accordingly, it was decided that the EU-ETS would start in the shipping sector from 1 January 2024. In addition, amendments in connection with the application of the EU-ETS Directive were also adopted in the EU-MRV Regulation, which is a monitoring, reporting, and verification system for ship fuel consumption that was introduced in 2018 for ships calling at EU ports.

3.1.2 Application of EU-ETS Directive

The EU-ETS will apply from 1 January 2024 to vessels of 5 000 GT and above calling at ports within the jurisdiction of EEA Member States, irrespective of the country of registry. (EEA: European Economic Area; in addition to the 27 EU member states, the EEA also includes Norway, Iceland, and Liechtenstein, for a total of 30 countries.) Beginning 1 January 2025, the EU-ETS will be extended to general cargo ships of 400 GT and above but less than 5 000 GT. The term “port call” as used in these regulations means a port call for cargo handling, passenger boarding or disembarking, or to relieve the crew of an offshore vessel. An anchorage for any other purpose (refueling, obtaining supplies, etc.) and at some container transshipment ports is not considered a port call.

The target gases for GHG emissions are CO₂ until 2025, and CO₂, methane (CH₄) and nitrous oxide (N₂O) after 2026.

The total GHG emissions for the following voyages are applicable.

- 50 % of emissions from ships sailing between ports of call under the jurisdiction of an EEA Member State and ports of call outside the jurisdiction of an EEA Member State
- 100 % of emissions from ships sailing from ports of call under the jurisdiction of an EEA Member State and arriving at ports of call under the jurisdiction of an EEA Member State
- 100 % of emissions from ships within ports of call under the jurisdiction of an EEA Member State

As a transitional measure, for the first two years after the introduction of the EU-ETS Directive, the emissions subject to the EU-ETS will be reduced as follows:

Emissions in 2024: 40 % of the total emissions in the scope

Emissions in 2025: 70 % of the total emissions in the scope

3.1.3 Obligations of Shipping Companies

After 2024, shipping companies are to purchase allowances equivalent to the annual GHG emissions indicated in paragraph 3.1.2. above and surrender them by 30 September of each year. After surrendering the required allowances, if the company has surplus emission allowances, the surplus can be sold or carried over to the next year.

These GHG emissions are verified based on the EU-MRV Regulation. In conjunction with the introduction of the EU-ETS, the revised EU-MRV system will require shipping companies to prepare monitoring plans corresponding to the EU-ETS, which are to be verified by a verifier, and to submit them to the administering authorities listed in paragraph 3.1.4. below by 1 April 2024. They will also be required to submit emissions reports to the administering authority, the flag state (if the flag state is an EEA Member State) and the European Commission by 31 March each year after 2025, after verification by the verifier against the previous year's data for the vessels concerned. Companies will also be required to submit the sum of their GHG emissions at the company level (aggregate emission data) to the administering authority by 31 March of each year.

3.1.4 Administering Authority

The applicable shipping companies are registered with one of the EEA Member States (administering authority), and regulatory compliance is confirmed by this administering authority. The criteria for registration with the administering authority are as follows:

- (i) A shipping company registered in an EEA Member State: Registered with the administering authority of the EEA Member State in which the company is registered.
- (ii) A shipping company not registered in an EEA Member State:
 - Registered with the administering authority of the EEA Member State with the highest number of port calls of the shipping company's EU-related voyages in the last four years.
 - Registered with the administering authority of the EEA Member State where the ship first arrived/first started a voyage after 2024 if it has not made a port call in the EU in the last four years.

A list of the competent authorities with which each shipping company is registered will be published by 1 February 2024.

3.1.5 Exception of Port of Call

Under the EU-ETS for shipping, “stops of containerships in a neighbouring container transshipment port” are excluded from ports of call, and “neighbouring container transshipment port” means “neighbouring container transshipment ports where the share of transshipment of containers, measured in twenty-foot equivalent unit, exceeds 65 % of the total container traffic of that port during the most recent twelve-month period for which relevant data are available located outside the Union but less than 300 nautical miles from a port under the jurisdiction of a Member State”. This means that the voyages preceding and following such ports are considered to be consecutive voyages.

By 31 December 2023, a list of such container transshipment ports will be established by the European Commission.

3.1.6 Penalties

The excess emissions penalty is to be EUR 100 per tonne of carbon dioxide equivalent emitted, for which the shipping company has not surrendered allowances. Payment of the excess emissions penalty will not release the shipping company from the obligation to surrender an amount of allowances equal to those excess emissions when surrendering allowances for the following calendar year, and if a shipping company has failed to comply with the surrender requirements for two or more consecutive reporting periods and other enforcement measures have failed to ensure compliance, the competent authority of the Member State of the port of entry may issue an expulsion order.

3.2 FuelEU Maritime Regulation

3.2.1 Background

In the EU, CO₂ emissions from maritime transport to and from ports in the EEA account for about 11 % of CO₂ emissions from all transport sectors in the EU and 3 % to 4 % of total CO₂ emissions in the EU. Unless further measures are taken, CO₂ emissions from maritime transport are expected to increase. As described in paragraph 3.1.1, the comprehensive climate change policy package “Fit for 55” was announced to achieve the 2030 target, and in addition to the proposed expansion of the EU-ETS carbon charging system to the shipping sector described in paragraph 3.1, a draft FuelEU Maritime regulation was announced to promote decarbonization of fuels used in ships. Adoption by the European Parliament and the European Council was completed in July 2023, and introduction of the FuelEU Maritime regulation from January 2025 was decided.

3.2.2 Overview of FuelEU Maritime Regulation

FuelEU Maritime, like the EU-ETS, is a regulation that is commonly applied in the EEA Member States, regardless of the ship’s flag. FuelEU Maritime is applied to companies.

The FuelEU Maritime regulation, which will be introduced in the EU/EEA Member States in 2025 to promote the decarbonization of fuels used on board ships, consists of two main provisions:

- (1) Provisions setting a limit of the GHG intensity of energy used on board a ship
- (2) Provisions requesting the use of on-shore power supply (OPS) or zero-emission technology in port (only containerships and passenger ships)

The outline of the above two provisions constituting FuelEU Maritime is as follows:

- (1) Outline of provisions setting upper limits of GHG intensity of energy used on board ships

The GHG intensity provisions set upper limits for the annual average value of “GHG emissions per energy [gCO₂eq/MJ]”, which is called “GHG intensity”, for fuels used on voyages to and from ports under the jurisdiction of EU/EEA Member States, as follows:

- Starts from 1 January 2025.
- Fuel used on board ships of over 5 000 GT arriving at or departing from EU/EEA ports are in the scope of FuelEU Maritime.

- The GHG intensity limit is assessed on a lifecycle (Well-to-Wake) basis.
 - The annual average value of GHG intensity is calculated on a ship-by-ship basis.
 - If the annual average value of GHG intensity exceeds the upper limit of GHG intensity for the year, the company concerned is considered to have complied with the regulation by paying a penalty (see paragraph 3.2.5.) corresponding to the GHG emissions [gCO₂eq] multiplied by the energy consumption for the year.
 - For the same vessel, GHG emissions for the achievement of the upper limit of GHG intensity can be carried forward to the next year (banking) or used ahead of schedule for achievement of the next year (borrowing), or “the achievement of the upper limit” and “the failure to achieve the upper limit” can be offset for multiple vessels in the fleet (pooling) in the same reporting period.
- (2) Outline of provisions requiring the use of on-shore supply (OPS) or zero-emission technologies in port (only containerships and passenger ships)
- Starts from 1 January 2030. (For some ports, starts from 1 January 2035.)
 - Containerships and passenger ships over 5 000 GT should use an on-shore power supply (OPS), etc., when moored in ports of EU/EEA Member States.
 - There are some exemptions, e.g., the provisions are not applicable to mooring for less than 2 hours.
- Failure to comply with this provision is deemed to be compliance by paying a penalty based on the amount of power, etc. during mooring.

3.2.3 Confirmation of GHG Intensity

The energy consumption and GHG intensity of ships covered by the FuelEU Maritime regulation are confirmed on the basis of data collected under the FuelEU Maritime monitoring plan (see paragraph 3.2.4.).

In FuelEU Maritime, GHG intensity is calculated on a Well-to-Wake basis. The GHG intensity of each fuel is calculated for the Well-to-Tank and Tank-to-Wake portions based on a specified coefficient, and the total value is the GHG intensity of the fuel on a Well-to-Wake basis. For example, in the case of marine diesel oil (MDO), the GHG intensity of the Well-to-Tank portion is 14.4 [gCO₂eq/MJ] and that of the Tank-to-Wake portion is 76.4 [gCO₂eq/MJ], and the total value of 90.8 [gCO₂eq/MJ] is the GHG intensity of the fuel.

The upper limit of the GHG intensity is to be increased every 5 years based on the 2020 level of 91.16.

When multiple fuels are used, the weighted average of the energy used is the GHG intensity of the ship.

As a special incentive measure, the GHG intensity of non-biological renewable fuels (RFNBO, Renewable Fuels of Non-Biological Origin), such as ammonia fuel produced from hydrogen using renewable energy sources, is calculated as half of the original value. This special measure applies from 1 January 2025 to 31 December 2033.

In addition, when monitoring and reporting under FuelEU Maritime, the information and data collected under the EU-MRV Regulation are to be used as necessary. Details are expected to be published by the EU in the future.

3.2.4 FuelEU Monitoring Plan

By 31 August 2024, shipping companies are to submit to the verifier a “FuelEU Monitoring Plan”, which specifies a method for monitoring and reporting the amount of energy (fuel type and consumption) to be used by ships during navigation and berthing. For ships calling at a port in an EU/EEA Member State for the first time after 31 August 2024, the monitoring plan must be submitted to the verifier within two months of the call.

The monitoring plan is verified by the verifier before the start of the monitoring period and is recorded by the verifier in the FuelEU database maintained by the European Commission.

3.2.5 Fines

The GHG intensity provisions stipulate that if the GHG intensity of the fuel actually used exceeds the upper limit of GHG intensity for the year, a fine calculated according to the type and amount of fuel used shall be paid. The outline of the formula for calculating the fine for each ship is as follows.

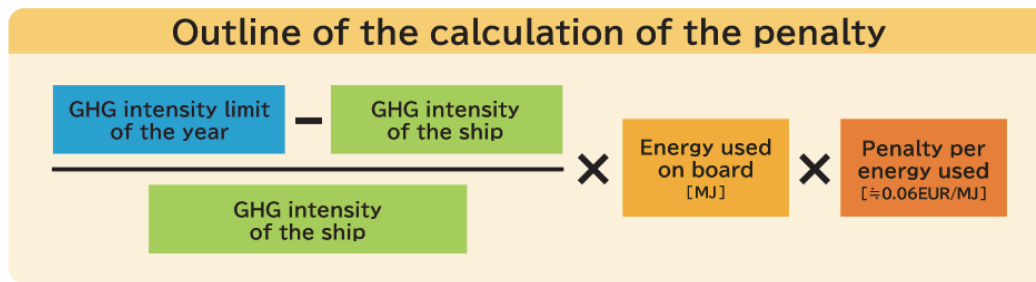


Fig. 3 Outline of the calculation of the penalty

When the result of the above formula is negative, a fine is incurred, and the absolute value is the amount of the fine. When more than one fuel is used, the “GHG intensity of the fuel actually used” in this formula is the weighted average of the amount of energy used and the GHG intensity of the ship.

The fine for a ship that fails to achieve the upper limit of GHG intensity more than twice (2 years) in consecutive monitoring periods is increased to $1 + (n-1)/10$, depending on the number of monitoring periods n for which the fine is applied. In other words, if the same ship is subject to payment of the fine for 2 consecutive years, the amount paid in the second year is 1.1 times the amount calculated by the above formula.

3.2.6 ClassNK MRV Portal Support

In order to support the EU-MRV and IMO DCS regulations, the Society provides the ClassNK MRV Portal data collection management and authentication system. This is a “one-stop” system that allows users to provide templates for data collection, report data from ships, manage data on land, apply for certification of annual reports, issue certificates of compliance, and manage invoices.

The ClassNK MRV Portal will also be updated for FuelEU Maritime so that verification of FuelEU monitoring plans and FuelEU reports can be carried out smoothly.

4. CONCLUSION

In recent years, the urgent need for global efforts to combat climate change due to frequent extreme weather events and large-scale disasters has become increasingly apparent. In international shipping, regulations and systems to reduce GHG emissions from ships are being discussed in organizations such as the IMO and the EU.

The IMO, which is responsible for developing global regulations in the maritime sector, revised its GHG reduction strategy at MEPC 80 in 2023 and set ambitious targets towards achieving net-zero GHG emissions by 2050. A new target related to the uptake of zero or near-zero GHG emission technologies, fuels, and/or energy sources was also introduced. In the future, the IMO will engage in discussions on midterm measures to achieve these targets.

On the other hand, the EU has decided to introduce regional regulations that include economic measures such as the EU-ETS system and the FuelEU Maritime regulation. These regulations are expected to increase costs for ships sailing to or from EU ports, depending on their emissions and the types of fuels used.

To advance GHG emissions reduction in international shipping, it is not only crucial to transition from conventional ships using fossil fuel to zero/low-emission ships, but also to ensure a stable supply of zero/low-emission fuels. Collaborative efforts are urgently needed among international organizations, member states, the maritime industry, the energy sector, cargo owners, the financial industry, and others. ClassNK will continue to disseminate information on regulatory developments and their impacts related to GHG reduction, and will also actively support stakeholders in their GHG reduction efforts by providing new services tailored to the needs of customers and society in addition to the currently-available “ClassNK Zero Emission Support Service”.

REFERENCES

- 1) Resolution MEPC.376(80), Guidelines on lifecycle GHG intensity of marine fuels (LCA guidelines)
- 2) Resolution MEPC.377(80), 2023 IMO Strategy on Reduction of GHG Emissions from Ships (2023 IMO GHG Strategy)

- 3) MEPC.1/Circ.905, Interim guidance on the use of biofuels under regulations 26, 27, and 28 of MARPOL Annex VI (DCS and CII)
- 4) Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system (Text with EEA relevance)
- 5) Regulation (EU) 2023/957 of the European Parliament and of the Council of 10 May 2023 amending Regulation (EU) 2015/757 in order to provide for the inclusion of maritime transport activities in the EU Emissions Trading System and for the monitoring, reporting and verification of emissions of additional greenhouse gases and emissions from additional ship types (Text with EEA relevance)
- 6) Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC (Text with EEA relevance)