



REDUCTION OF GHG EMISSIONS FROM SHIPS

Proposal for a pragmatic approach for the reduction of GHG emissions from ships

Submitted by Argentina, Liberia and Panama

SUMMARY

Executive summary: Liberia, together with the co-sponsors, outlines concerns raised regarding the current formulation of the IMO Net-Zero Framework and proposes a revised, pragmatic, and consensus-building approach to defining and adjusting the trajectory of the Global Fuel Intensity (GFI) target. The proposed method links GFI adjustments to the demonstrated market uptake of low-carbon marine fuels and introduces clear, evidence-based technical boundaries and criteria related to affordability, availability, and scalability.

Strategic direction, if applicable: 3

Output: 3.2

Action to be taken: Paragraph 19

Related documents: Resolution MEPC.377(80) and MEPC/ES.2/WP.3

Introduction

1 In April 2025, the Marine Environment Protection Committee (MEPC 83) approved amendments to MARPOL Annex VI, introducing a new chapter 5, "Regulations on the IMO Net-Zero Framework" aiming to reduce GHG emissions from international shipping as soon as possible, and to deliver the reduction targets set out in *the 2023 IMO Strategy on Reduction of GHG Emissions from Ships (2023 IMO GHG Strategy)* (resolution MEPC.377(80)).

2 At its extraordinary session in October 2025, MEPC/ES.2 considered adoption of the revised MARPOL Annex VI on the IMO Net-Zero Framework. Despite extensive deliberations and a finalized draft text (MEPC/ES.2/WP.3), Member States did not reach consensus. Concerns focused on compliance costs, administrative burdens, financial implications for Member States, and strong objections to the proposed IMO Fund, which some viewed as a de facto global tax raising sovereignty and equity concerns.

3 Following a roll-call voting process, the Committee decided to adjourn the meeting for a period of one year. The motion to adjourn was adopted based on the majority view that further deliberations should be deferred to allow for additional consultations and preparatory work. Nevertheless, the Intersessional Working Group on Reduction of GHG Emissions from

Ships (ISWG-GHG) agreed to recommend that the Committee include language reaffirming that, once adopted and in force, the IMO mid-term GHG reduction measure will serve as the single global measure for international shipping, helping to avoid a patchwork of duplicative regional or national measures.

Discussion

4 Opposition to the IMO Net-Zero Framework stems from economic, geopolitical, and procedural concerns. Critics argue that the framework increases costs for consumers and industry, penalizes transitional fuels such as LNG and biofuels, and could raise food and transport prices for small island developing States without ensuring fair access to the proposed IMO Fund. They also note that the GFI threshold for zero- and near-zero-emission fuels is overly restrictive given current supply and infrastructure limitations, while projected penalties, potentially reaching \$300 billion by 2035, could disproportionately burden SMEs and tramp operators. Concerns further include the risk that the system functions more as a penalty mechanism than an innovation incentive, reduced flexibility due to expiring surplus units, and the absence of defined elements such as the reward mechanism, default life cycle assessment (LCA) values, and governance of the IMO Fund, all of which create uncertainty and implementation challenges.

5 To address the objections surrounding the IMO Net-Zero Framework and to help build consensus among Member States, a revised and more pragmatic proposal is presented in this paper, which replaces the IMO Net-Zero Framework and focuses on the following key principles:

- .1 a realistic and measurable link between GHG reduction and market readiness, ensuring targets evolve based on actual cost, availability, and uptake of low-carbon fuels;
- .2 an objective and transparent method for incorporating new fuels using clear, evidence-based criteria so stakeholders understand when and how fuels qualify;
- .3 greater predictability for industry investments, providing stable signals for planning fleet renewal, fuel supply, and infrastructure development;
- .4 genuine technology neutrality, with incentives proportional to well-to-wake (WtW) emission reductions regardless of the energy source;
- .5 realistic, achievable and cost-effective obligations based on continuous improvement;
- .6 incentives for over-compliance through pooling arrangements or equivalent mechanisms;
- .7 no establishment of an IMO Fund or any other mechanism involving direct revenue collection and disbursement;
- .8 promoting energy-efficiency improvements, by creating synergies with the existing CII framework and encouraging continuous optimization across fleets; and
- .9 incentivize the uptake of innovative technologies GFI – such as onboard carbon capture systems (OCCS), wind-assisted propulsion, and other emerging solutions – that can materially reduce a ship's GFI and accelerate decarbonization.

Concept

6 The objective of this concept is to establish a transparent, evidence-based, and predictable process for adjusting the GFI trajectory so that regulatory ambition remains aligned with real-world fuel market developments. The mechanism ensures that new fuels are considered for the adjustments of the GFI trajectory only when they have demonstrated sufficient affordability, availability, and scalability, thereby supporting a balanced, practical, and market-responsive transition pathway.

7 **Adjustment of the GFI trajectory:** The GFI trajectory shall be adjusted based on the demonstrated uptake of low-carbon and zero-carbon fuels in the international marine fuel market, with further adjustments applied as additional fuels become available that meet all three criteria outlined below. The Global Fuel Intensity (GFI) Target is calculated through a three-step process based on commercially viable marine fuels, derived from prior-year IMO market data.

8 **Commercially viable fuels** are those that will be used for the derivation of the GFI trajectory and shall meet all of the following criteria:

- .1 The **Affordability Criterion** requires that a fuel is considered affordable when its cost does not exceed 15% above the current market average for standard marine fuels, such as VLSFO. For example, if the reference price is \$10/GJ, the maximum allowable threshold for inclusion would be \$11.5/GJ. This threshold supports the early adoption of low-carbon fuels while limiting adverse impacts on global trade and shipping costs.
- .2 The **availability criterion** requires that a fuel demonstrate a minimum 5% global commercial market share within the marine fuels market. To ensure suitability for ships operating in the tramp sector and on deep-sea voyages global availability is supplemented by requirements related to port coverage, geographical distribution and maximum distance:
 - .1 **Port coverage:** a fuel shall be considered to have demonstrated global commercial availability when the fuel is available for bunkering at sufficient ports worldwide that provide bunkering facilities for marine fuels;
 - .2 **Geographical distribution:** to ensure operational accessibility across international shipping routes, the fuel shall be available in at least five (5) of the seven (7) major **maritime** regions (North America, South America, Europe, Africa, Middle East, Asia, and Oceania) meeting the above port coverage requirement;
 - .3 **Maximum distance:** the maximum separation between consecutive bunkering points offering the fuel shall not exceed 2,500 nautical miles along major deep-sea trade lanes and ports. Compliance shall be demonstrated through a documented mapping of bunkering locations relative to primary international shipping ports.
- .3 The **Scalability criterion** provides that a fuel shall be deemed scalable when supported by commercial investment contracts or other binding commitments that demonstrate viability in production capacity, delivery and bunkering infrastructure, and ship construction or conversion activity aligned with anticipated demand. This ensures that only fuels with credible pathways towards widespread adoption are incorporated into regulatory planning.

Scalability is assessed using standardized definitions covering both current market share and future growth prospects;

- .1 **Current market state:** a fuel's current market state is classified as **mature** if it holds more than 5% market share and **emerging** if it holds less than 5%;
- .2 **Market forecast:** its market forecast is categorized as **stable** when supply shows growth with the 10-year compound annual growth rate (CAGR) being positive and at least 5%, and **declining** when the forecasted 10-year CAGR is negative and at or below -5%.
- .4 **For inclusion in the five-year target setting cycle, a fuel must either be mature – regardless of forecast category – or emerging with an expanding forecast,** meaning it demonstrates a positive (>5%) projected 10-year CAGR.

9 **Determination of GFI_{Max} and GFI_{Min}:** Once the commercially viable fuel set has been established, the GFI boundary values are determined using two complementary calculations: GFI_{Max}, representing the emissions intensity of the viable market as a whole, and GFI_{Min}, representing the cleanest viable fuel currently available. These two values define the upper and lower bounds for setting the GFI Target:

- .1 **GFI_{Max} – weighted average intensity.** GFI_{Max} reflects the combined emissions intensity of all fuels that meet the commercial viability criteria. It is calculated as a market-share-weighted average of the well-to-wake (WtW) emissions intensity of each viable fuel: $GFI_{Max} = \sum_i (\text{Market Share Fuel}_i \times WtW_i)$. Each viable fuel contributes to the GFI_{Max} in proportion to its actual market share. Fuels with a larger share of the marine fuel mix exert proportionally greater influence on the result. This ensures that the upper bound for the GFI Target is rooted in real-world fuel consumption patterns, not theoretical or niche options.
- .2 **GFI_{Min} — best available fuel.** GFI_{Min} reflects the lowest WtW emissions intensity among all commercially viable fuels: $GFI_{Min} = \min (WtW_i)$. The calculation identifies the viable fuel with the lowest WtW emissions intensity. This value ensures that the lower bound for the GFI Target is technically feasible and commercially grounded, rather than dependent on fuels that lack market maturity or availability. Together, GFI_{Max} and GFI_{Min} establish a credible and market-aligned range within which the GFI Target is set through interpolation, ensuring that the regulatory trajectory begins from the current viable market baseline represented by GFI_{Max} and moves gradually towards the best commercially viable option reflected in GFI_{Min}, in a manner that mirrors real-world progress in fuel uptake over time.

10 **Linear reduction trajectory (Z_t) 30-year pathway:** After determining the GFI_{Max} and GFI_{Min} values, the GFI Target for each milestone year is calculated through a structured interpolation method designed to guide a gradual, predictable transition from the current viable market average towards the cleanest commercially viable fuel. The annual reduction step Z_y is derived by dividing the total required decrease in GFI – represented by the difference between GFI_{Max} and GFI_{Min} — by a 30-year time-horizon, as shown below:

$$Z_t = \frac{GFI_{Max} - GFI_{Min}}{30}$$

11 This calculation establishes a **uniform year-on-year reduction** in the GFI target, ensuring that the transition from the highest to the lowest commercially viable fuel intensity

occurs along a **predictable and stable linear trajectory**. The use of a constant annual decrement provides clarity for long-term planning and supports orderly, market-aligned decarbonization. This method avoids abrupt regulatory jumps and instead provides a stable, forward-looking pathway, giving industry actors – shipowners, fuel suppliers, shipbuilders, and investors – sufficient lead time to plan and align investments with regulatory expectations.

12 Determination of the target annual GHG fuel intensity (target annual GFI_t):

The target annual GFI for each year on the 30-year trajectory is calculated by applying a uniform annual reduction from the upper boundary (GFI_{Max}) to the lower boundary (GFI_{Min}). Using the annual reduction step Z_t , the target annual GFI in year t is: *Target Annual GFI_t = GFIMax – (t × Z_t)*. This produces a predictable, linear decarbonization pathway, ensuring that the GFI target declines steadily from the current viable market baseline towards the cleanest commercially viable fuel over the 30-year horizon creating a stable, adaptive, and forward-looking compliance pathway. It prevents abrupt regulatory shifts, supports effective planning across the maritime value chain, and keeps the decarbonization trajectory aligned with both market readiness and long-term strategic objectives.

13 Five-yearly reviews: At five-year intervals, the Organization shall conduct a comprehensive review of the GFI target trajectory to ensure its continued alignment with the evolving technological, economic, and market conditions of alternative marine fuels. In undertaking such reviews, the Organization shall assess, inter alia, the affordability, availability, and scalability of any fuel that has demonstrated commercial deployment since the previous review period. When new fuels or technologies exhibit verified improvements in cost competitiveness, infrastructure readiness, production capacity, or global accessibility, the Organization will adjust the GFI Linear Reduction Trajectory for a new 30-year horizon to reflect updated evidence of attainable decarbonization pathways. Any such adjustment shall maintain the principle of a stable, predictable, and forward-looking regulatory framework, avoiding abrupt changes while ensuring that the GFI Target remains anchored in demonstrated commercial viability and advances in market maturity.

14 Flexibility mechanism(s): To facilitate cost-effective compliance while ensuring real emissions reductions, the regulation shall establish a flexibility mechanism allowing the transfer, banking, and limited borrowing of surplus units (SUs), expressed in tonnes of CO₂-equivalent. Ships that outperform the applicable GFI Target will generate SUs, which may be transferred – exclusively through the **IMO GFI Registry**. Banking of surplus units for future use shall be permitted. Borrowing from one subsequent calendar year shall also be allowed, up to a maximum of two consecutive years, with the borrowed amount added to the ship's compliance balance in the year of use. This framework provides operational flexibility while maintaining environmental integrity and discouraging persistent reliance on future-year borrowing.

15 Market stability review and regulatory adjustment mechanism: To maintain a stable and predictable compliance environment and avoid excessive volatility in surplus unit (SU) prices, the Organization shall periodically review market-stability parameters while exercising no financial or monetary functions. SU stability shall be safeguarded solely through **rule-based adjustments** to regulatory elements within the GFI framework.

- .1 At each five-year GFI Target Review—and at interim intervals triggered by predefined exception criteria—the Organization shall assess whether SU prices reflect reasonable market conditions, considering the affordability, availability, and scalability of commercially deployed fuels. Where warranted, the Organization may adjust the GFI trajectory or modify borrowing and banking provisions to relieve undue cost pressure while preserving environmental integrity.

- .2 Interim action may be triggered by sustained SU price escalation relative to benchmark fuel prices, prolonged market illiquidity, or verified structural SU shortages. In such cases, the Secretariat may apply predefined corrective measures, including temporary adjustments to borrowing limits or accelerated review of the GFI pathway, strictly within the Organization's non-financial mandate.

16 **Enforcement mechanism for non-compliance:** To ensure credible compliance and maintain a level playing field, the Organization shall establish enforcement measures applicable to ships that fail to meet their annual GFI obligation and do not cure the resulting compliance deficit through SUs, banking, or borrowing within the prescribed deadlines. By [date, e.g. 30 April] following the end of each reporting year, the company shall reconcile each ship's GFI position by surrendering SUs and/or applying banked or permitted borrowed units sufficient to eliminate any compliance deficit, together with the submission of verified emissions data and GFI calculations in the IMO GFI Registry. If, after the annual deadline, a compliance deficit remains, the flag State or its Recognized Organization shall notify the company accordingly and initiate the cure process, under which the company shall have 90 days from the date of notification to remedy the deficit. Cure shall be deemed achieved upon validated surrender of the required SUs and/or the application of eligible banked or borrowed units equivalent to the outstanding deficit. If the deficit is not cured within the cure period, enforcement actions will apply as follows:

- .1 **Non-issuance / suspension of Statement of Compliance:** The SoC for the affected period shall not be issued (or, if already issued based on preliminary submissions, it shall be suspended) until the deficit is cured and any penalties imposed by the competent authority have been discharged. Absence or suspension of a valid SoC may be grounds for port State control (PSC) control actions, including detention or refusal of entry, in accordance with relevant conventions and national laws.

Proposal

17 To build consensus and balance ambition with feasibility, equity, and geopolitical considerations, the IMO Net-Zero Framework should be replaced by the framework presented above which periodically adjusts the trajectory of the GFI target in line with demonstrated market uptake of low-carbon marine fuels, supported by clear, evidence-based technical criteria addressing affordability, availability, and scalability.

18 In light of the forthcoming review of the 2023 IMO GHG Strategy, the Committee is invited to reflect on the trajectory outlined above, with a view to supporting a pragmatic, equitable, and evidence-based approach.

Action requested of the Committee

19 The Committee is invited to note the proposals outlined in paragraphs 17 and 18.
