OPPORTUNITY GREEN





IMO Briefing: ISWG-GHG 23 & MEPC 85

Summaries of submissions relating to the Net-Zero Framework and air pollution

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Summary

The IMO meetings taking place in November and December 2026 will cover several crucial topics central to advancing the decarbonisation of international shipping.

Key technical discussions at ISWG 23 and political deliberations at MEPC 85 will focus on the proposed legal amendments to MARPOL Annex VI; the continued development of draft implementation guidelines for zero- and near-zero emission fuels and greenhouse gas fuel intensity (GFI); and the Life-cycle Assessment (LCA) Framework.

A central point of negotiations will be ensuring that the Net-Zero Framework as approved in April 2025 or any alternative put forward in recent months supports climate ambition in line with the IMO 2023 GHG Strategy, Paris Agreement, States' legal obligations with respect to climate change, and a just and equitable transition; particularly for climate vulnerable and developing countries, while providing transparency, predictability, and clear investment signals for industry.

Note:

1. Decisions at these meetings are made by consensus, based on the Chair's understanding of the views expressed during the meetings. Member States must attend and intervene, or / and make written submissions to the meetings, to have their views considered.
2. Unless stated otherwise, all summaries are a synthesis of the text in the corresponding submission and are not reflections of Opportunity Green's views.
3. Some summaries are accompanied by Opportunity Green analysis or context not contained within the submissions; this analysis is clearly signposted in the text.

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List of Abbreviations

CoC	Chain of Custody
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DCS	Data Collection System
DLUC	Direct Land Use Change
DNIs	Disproportionate Negative Impacts
FLL	Fuel Lifecycle Label
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GFI	GHG Fuel Intensity
GFS	Global Fuel Standard
GHG	Greenhouse Gas
ICJ	International Court of Justice
ILUC	Indirect Land Use Change
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
ISWG-GHG	Intersessional Working Group on GHG
JET	Just and Equitable Transition
LCA	Life Cycle GHG Intensity of Marine Fuels
LDCs	Least Developed Countries
LNG	Liquefied Natural Gas
MARPOL	International Convention for the Prevention of Pollution from Ships
MEPC	Marine Environment Protection Committee
MEPC ES.2	The 2nd Extraordinary Session of the MEPC
NZF	Net-Zero Framework
OCCS	Onboard Capture and Storage
PPA	Power Purchase Agreement
RU	Remedial Unit
SEEMP	Ship Energy Efficiency Management Plan
SFCS	Sustainable Fuel Certification Scheme
SIDS	Small Island Developing States
SU	Surplus Unit
The Fund	The Net-Zero Fund
ToR	Terms of Reference
TtW	Tank-to-Wake
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollars
WtT	Well-to-Tank
WtW	Well-to-Wake
ZNZ	Zero or Near-Zero emissions fuels and technologies

Section 1: Overview of the approved IMO Net-Zero Framework

The International Maritime Organization's (IMO) Net-Zero Framework (NZF) is a draft regulation containing the 'mid-term' emission reduction measures. It will be included into a new Chapter 5 of the International Convention for the Prevention of Pollution from Ships (MARPOL), Annex VI.[1] The Framework is intended to become legally binding but must first be 'adopted' and 'accepted' by the States which will be legally bound by it (the parties to MARPOL Annex VI).[2]

The Framework combines technical and economic elements under a 'two-tiered' global fuel standard (GFS). There are two GHG emissions intensity limits that create two 'tiers' of emissions pricing:

- **The 'Direct Compliance Target'** is the more stringent standard – requiring more extensive emissions reductions. Alternatively, ships must pay for 'Remedial Units' priced at $100USD per tonne of CO2 equivalent to cover any emissions that are more intensive than the Direct Compliance Target.
- **The 'Base Target'** is less stringent, meaning it is easier for a ship to comply by reducing its emissions intensity. Alternatively, ships must pay for 'Remedial Units' (RUs) priced at $380USD/tonne CO2eq, OR ships may buy/use 'Surplus Units' (SUs).

Surplus units are awarded to ships with total emissions intensity that is lower than the direct compliance target, i.e. they are fully compliant with the direct and base targets and do not need to pay any penalty fees. Ships can then trade these units or use for their own compliance within two years.
The direct and base targets together create two distinct bands or tiers (Tier 1 and Tier 2), that correspond to emissions intensity and price per Remedial Unit (RU).

The IMO Net-Zero Fund will be set up to handle revenue generated by the emissions pricing element of the regulation. The Fund will be used to 'reward' ships using zero or near-zero GHG emission technologies, fuels and/or energy sources (ZNZs), and for broader financing purposes related to enabling a just and equitable transition. The governing provisions of the Fund, including guidance on how the fund is disbursed, and the governing board of the fund, is set to be discussed at the upcoming IMO meetings.

[1] A full explanation on the IMO Net-Zero Framework can be read at: https://www.opportunitygreen.org/factsheet-imo-net-zero-framework

[2] The full process required to make the IMO Net-Zero Framework binding is explained in: https://www.opportunitygreen.org/factsheet-amending-marpol-annex-vi

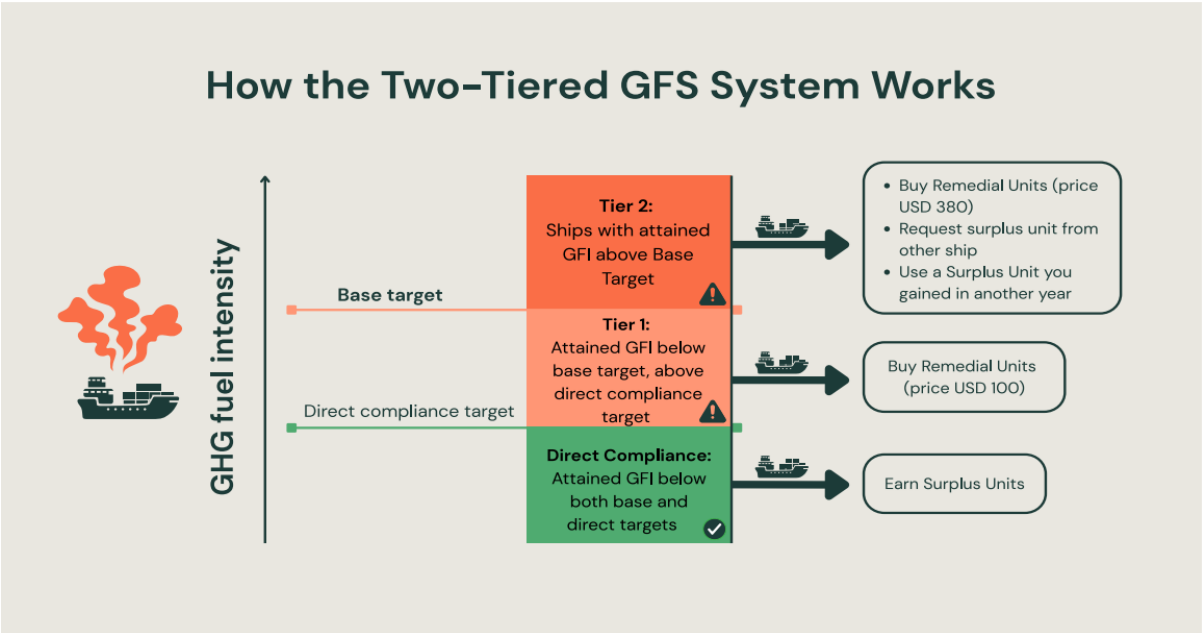


Figure 1: The Net-Zero Framework's two-tiered Global Fuel Standard approach

Section 2: Current state of play

The IMO NZF was approved in April 2025 at MEPC 83. Later that same year, in October 2025, the Second Extraordinary Session of the IMO Marine Environment Protection Committee (MEPC ES.2), was expected to mark a pivotal moment in international climate governance: the adoption of the NZF.

What happened at MEPC ES.2? The motion by Saudi Arabia to adjourn negotiations was a procedural motion under Rule 31 of the MEPC Rules of Procedure, which enabled all IMO Member States present and voting to vote and influence the trajectory of the NZF, irrespective of their Annex VI status.[3]

Voting dynamics at MEPC ES.2: Of those attending MEPC ES.2, with voting rights and credentials Member States voted in the following way:

MEPC ES.2 Voting Dynamics				
	Adjourn	**Do not adjourn**	**Abstain**	**Not present**
IMO Member State votes	57	49	21	8
Votes from Parites to MARPOL Annex VI	36	46	0	0

[3] In accordance with the relevant procedure for the amendment of Annex VI of MARPOL, only parties to Annex VI would have been able to vote on adoption of the NZF.

The procedural sequence was a key point of discussion in the room. Read more from Opportunity Green[4] on how the procedural motion to adjourn had 'precedence, over all other proposals or motions before the meeting' and effectively halted further consideration of the NZF.
Fast forward to the MEPC 84 in April 2026. The meetings concluded with Member States reaffirming support for the NZF, despite the outcome of ES.2.

Voting dynamics at MEPC 84: Of those in attendance, the majority of Member States aligned with the approved NZF as the basis for further work[5].

MEPC 84 Voting Dynamics		
	Support for NZF	
IMO Member State Votes	**59**	
	Including new support from countries that previously voted to adjourn adoption	Including new support from countries that previously abstained
	5	10

Furthermore, the IMO's 22nd Intersessional Working Group on GHG emissions took place in September 2026 and concluded with clear support for the 'polluter pays' principle with GHG pricing and a centralised system for collecting revenues- used for ZNZ rewards and supporting a just and equitable transition[6].

Importantly, the last year of IMO meetings on the NZF have highlighted that despite multiple efforts to water down the NZF or eradicate it entirely, no alternatives have managed to gain sufficient endorsement. The NZF represents a hard-fought compromise and remains the most credible option currently on the table to bring international shipping closer to achieving net-zero by 2050, the goals of the Paris Agreement, States legal obligation with respect to climate change, and a just and equitable transition for climate vulnerable countries[7].

[4] Opportunity Green, 2025, Adjournment of the IMO's Net-Zero Framework, available at: https://opportunitygreen.org/shipping/briefings/imo-net-zero-framework-adjournment-oct-2025-implications/

[5] Tristan Smith, et al, University College London, 2026, An overview of the discussions from IMO's 84th Marine Environment Protection Committee, available at: https://discovery.ucl.ac.uk/id/eprint/10225002/

[6] University College London, Energy Institute, 2026, An overview of the discussions from IMO's Intersessional Working Group on GHG 22nd session, available at: https://www.shippingandoceans.com/post/imo-makes-steady-progress-on-the-net-zero-framework-majority-back-ghg-pricing-centralised-fund

[7] Opportunity Green, 2025, A just and equitable transition for shipping, available at: https://opportunitygreen.org/climate-justice/reports/a-just-and-equitable-transition-for-shipping/

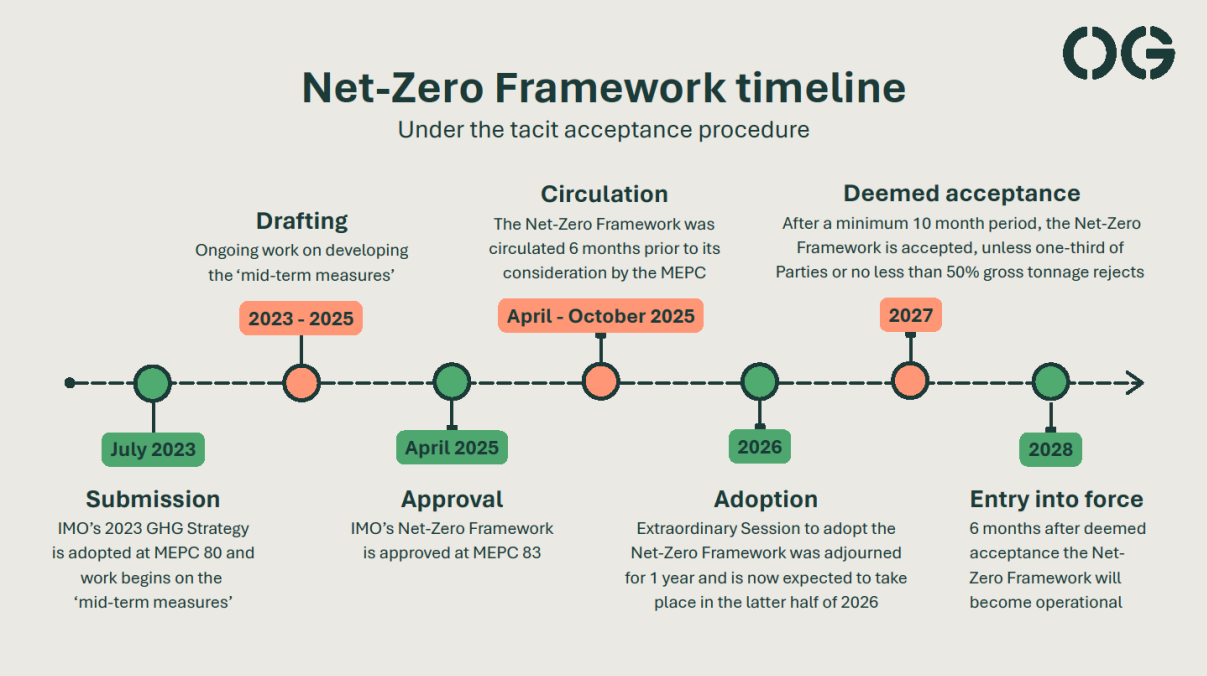


Figure 2: IMO Net-Zero Framework as approved in April 2023

Section 3: Key topics to be discussed at ISWG-GHG 23 and MEPC 85

1. **NZF ambition, economic mechanism and just transition:** Whether to preserve the NZF approved at MEPC 83, including its two-tier GFI trajectory, mandatory remedial payments and Net-Zero Fund, or whether to adopt alternative amendments centred on a voluntary approach.

2. **Decarbonisation impacts:** How to assess and address impacts on developing countries, particularly Small Island Developing States (SIDS) and Least Developed Countries (LDCs), including potential effects on freight costs, trade, food security and maritime connectivity, and how these considerations should inform Fund allocation and implementation.

3. **Compliance and incentives:** Rules for surplus units, banking, borrowing and transfers, alongside incentives for zero- and near-zero-emission fuels.

4. **Lifecycle emissions accounting:** GFI methodologies, default emissions factors and certification requirements, particularly for fossil fuels, LNG methane emissions, and biofuels.

5. **Biofuel sustainability safeguards:** ILUC risk classification, feedstock restrictions, traceability and protections against deforestation, biodiversity loss and competition with food production.

6. **Other environmental and air-pollution issues:** OCCS accounting, Arctic impacts from black carbon and other short-lived climate pollutants.

Section 4: Proposed legal amendments to MARPOL Annex VI

Several States have submitted proposals to amend the draft legal text for the IMO's NZF under MARPOL Annex VI ahead of the MEPC 85 and the resumption of the IMO's 2nd Extraordinary Session in December 2026. While many changes are presented as purely technical, they could have significant implications for the pace and direction of shipping decarbonisation, investment in ZNZ fuels, and a just and equitable transition in international shipping.

4.1: Zero-emission compliance and a dedicated Net-Zero Fund

Tuvalu's proposed legal amendments to MARPOL Annex VI ***(in Circular Letter No.5215 and MEPC 85/3/7)*** is the most ambitious under consideration. It seeks to achieve the impact of the original proposal made by Tuvalu and other Pacific islands in 2025 to impose a levy on all GHG emissions from international shipping, into the architecture of the NZF by increasing the threshold for direct compliance to 100%. This means that direct compliance with the GHG Fuel Intensity (GFI) would require zero emissions. Because direct compliance is increased to zero emissions, there is no window for SUs to be issued, and these are therefore eliminated. Therefore, any emissions above zero would be priced through the purchase of RUs, with revenues gathered into the Net-Zero Fund.

Moreover, the proposal increases the cost of RUs for tier 1 emissions (between direct and base compliance thresholds) from USD 100 to USD 300 per tonne CO_2eq on a well-to-wake (WtW) basis. The price of tier 2 emissions (above the base threshold) remains at USD 380 per tonne CO_2e.

The Net-Zero Fund would utilise revenues to reward eligible fuels and technologies, support the deployment of cleaner shipping fuels and infrastructure, facilitate technology transfer and capacity-building, enable a just transition for maritime workers, and support developing countries, particularly SIDS and LDCs. It also provides for support for national action plans, measures to address disproportionately negative impacts on States, including food security, and regular reviews of the framework's effectiveness. The proposal sets out governance arrangements for the Fund, including a Governing Board with gender and geographical balance and adequate representation of developing countries, particularly SIDS and LDCs.

Fiji et al. (in ISWG-GHG 23/2/7) reiterate the importance of the Net-Zero Fund or Facility for the transition of international shipping and achieving the goals of the 2023 IMO GHG Strategy. The submission emphasises that it should not be considered an optional component of the measures, but rather the indispensable central instrument that will drive the energy transition of international shipping whilst also ensuring that it is just and equitable. The submission highlights that the Fund/Facility is necessary to incentivise the transition; to ensure that the transition is just and equitable; and to effectively address DNIs. The co-sponsors stress the urgency to establish the Fund/Facility at the same time as the measures enter into force, and that this should not be delayed to later. The co-sponsors recommend that ISWG-GHG agree firstly that a Fund/Facility must form part of the final design of mid-term measures, and secondly that the Fund/Facility as part of the economic element must be operational and enter into force immediately alongside the technical measure.

4.2: The Net-Zero Framework ' as is'

The text submitted by **Australia et al** ***(in Circular Letter No.5216 and MEPC 85/3/8)*** preserves the NZF as-is in its entirety. The only amendments are to the dates to reflect the one-year delay in adoption.

4.3: Softer start, harder finish to the Net-Zero Framework

Brazil's submission ***(in Circular Letter No.5214 and MEPC 85/3/6)*** preserves the overall architecture of the NZF as approved at MEPC 83 but introduces modifications which Brazil states are aimed at improving political consensus and implementation.

The most significant change is a slower phase-in of GFI thresholds for both base and direct compliance tiers. In practice, the proposal delays stringency trajectory by two years in the early implementation period, while steepening mid-term reductions from 65% to 70% in 2040. It also aligns the direct compliance GFI limit with the base GFI in the first two years, effectively removing the need for Tier 1 RUs during that period and reducing the cost of generating SUs.

4.4: Direct voluntary contributions

Japan ***(in MEPC 85/7/1)*** proposes an amendment intended to facilitate compromise on the NZF. The central change is the removal of mandatory remedial payments and the IMO Net-Zero Fund, instead allowing ships to use SUs to offset compliance deficits in both Tier 1 and Tier 2.

Japan ***(in MEPC 85/7/3)*** also proposes a system of direct voluntary contributions, which allows ships that cannot obtain sufficient SUs to meet their compliance deficits to contribute directly to IMO-approved decarbonisation projects instead. Japan argues that this could replicate some of the Fund's intended rewards and just transition support, while allowing contributions to be reflected in fuel supply agreements and offering greater cost predictability through a pre-set contribution price, potentially based on the current RU price. The IMO would establish project eligibility and approval criteria, with contributions recorded in the IMO GFI Registry and verified by flag State administrations or recognised organisations. Japan also identifies the need for further guidelines covering project applications, approval, publication, monitoring and verification.

Furthermore, ***(in ISWG-GHG 23/2/4), Japan*** suggests reducing the administrative burden on the IMO by using IMO-accredited independent external bodies, such as financial institutions, rather than the IMO itself, assess, approve and oversee individual projects. The IMO would establish project eligibility criteria and accredit and audit these bodies, with powers to require corrective action or suspend or withdraw accreditation. Accredited bodies would be subject to fiduciary, financial management, procurement, integrity, project management, and environmental and social safeguard requirements, while individual projects would be assessed for their potential to promote new fuels and technologies, support a just and equitable transition, and demonstrate feasibility, efficiency and cost-effectiveness. Ships would contribute to these external bodies rather than select and finance individual projects directly, reducing their due diligence responsibilities and exposure to project failure, although they could still express preferences over how contributions are used. Japan also proposes that the IMO could direct how contributions are allocated between different eligible project categories, including by setting minimum percentage allocations for projects supporting a just and

equitable transition under Regulation 39.4. However, it favours allocating funding according to individual project needs rather than guaranteeing predetermined revenue shares, leaving the extent of funding for developing countries and just transition activities dependent on IMO guidance rather than a guaranteed minimum allocation.

OG analysis

Japan's proposal would fundamentally weaken the NZF by removing mandatory remedial payments and the IMO Net-Zero Fund, replacing the existing collectively governed revenue mechanism with greater reliance on SUs and voluntary, industry-directed contributions. This risks undermining the Framework's ability to deliver a just and equitable transition, as shipping companies would gain greater influence over revenue allocation, with no guarantee that finance would reach climate-vulnerable developing countries, particularly SIDS and LDCs, or support adaptation, capacity-building and technology transfer. Private investment is typically concentrated in markets offering more predictable and profitable returns, rather than developing countries and projects with high upfront costs and limited commercial returns; moreover, large shipping companies could direct contributions towards projects benefiting their own fleets and supply chains, rather than delivering wider public benefits.

4.5: Complete redesign of the Net-Zero Framework;

Liberia's proposal ***(in Circular Letter No.5213 and MEPC 85/3/5)*** outlines a substantially different model to the approved NZF, centered on a global fuel standard combined with tradable compliance credits, banking and borrowing of SUs, thereby creating what is effectively a voluntary carbon market for international shipping. Compliance would be achieved primarily through trading mechanisms rather than mandatory non-compliance financial penalties.

Furthermore, **Liberia's submission *(MEPC 85/3/17)*** defends its proposal for a market-responsive GFI trajectory, recalculated every five years as fuels meet agreed affordability, availability and scalability criteria. It argues that this approach would provide a realistic pathway for decarbonisation while avoiding disproportionate costs where compliant fuels are unavailable. The proposal also recognises verified operational and technological energy-efficiency improvements, which would generate SUs corresponding to actual emissions reductions.

OG analysis

This approach risks significantly weakening investment signals for ZNZ fuels that can deliver deep lifecycle emissions reductions but are not yet commercially available at scale. As under this proposal, investment decisions become increasingly driven by expectations about the future market value of compliance credits rather than by a predictable compliance cost established through mandatory remedial payments, which could reduce confidence for investors as viability depends on stable long-term incentives. Furthermore, making future increases in GFI stringency conditional on assessments of fuel availability and affordability would delay regulatory tightening, reinforcing this cycle. In practice, this approach continues reliance on fossil fuels, liquified natural gas (LNG), and biofuels which are unable to deliver the deep emissions reductions needed to achieve the IMO's 2023 GHG Strategy targets or put international shipping on a pathway consistent with the Paris Agreement and States' legal obligations on climate change.

In addition, removing the Net-Zero Fund eliminates a practical mechanism for financing a just and equitable transition. Without dedicated redistribution of compliance revenue, there would be fewer resources available to support implementation, capacity building and resilience in developing countries and uphold IMO's commitment to leave no country behind. (Read more from Opportunity Green).

The United Arab Emirates (in ISWG-GHG 23/2 and ISWG-GHG 23/2/3) proposes an alternative to the NZF based on absolute emissions and an amended CII metric that 'infuses' the GFI. This proposal removes the economic element, suggesting replacing it with emission allocations whereby ships that exceed their allowance 'borrow' from their allowance in future years, without a proposed mechanism to ensure compliance. Basing its conclusions on the assumption that neither the CII, the GFI, nor a pricing mechanism can ensure real GHG emissions reductions, the submissions argue that basing the measures on net emissions is the only way to achieve real reductions. OG analysis: The UAE does not cite a reference for this assumption. The submissions suggest a reduction trajectory which starts slow then increases in steepness to reach net-zero by 2050. They also propose granting a number of exemptions to particular trade, commodities and countries, which would then not be bound by the emissions limits. The submissions propose that incentives to transition to ZNZs should be given to ships as a percentage of port fees in a 'closed-loop port incentive' model, and that a three- to five-year 'experience and data gathering phase' should be allowed before measures enter into force.

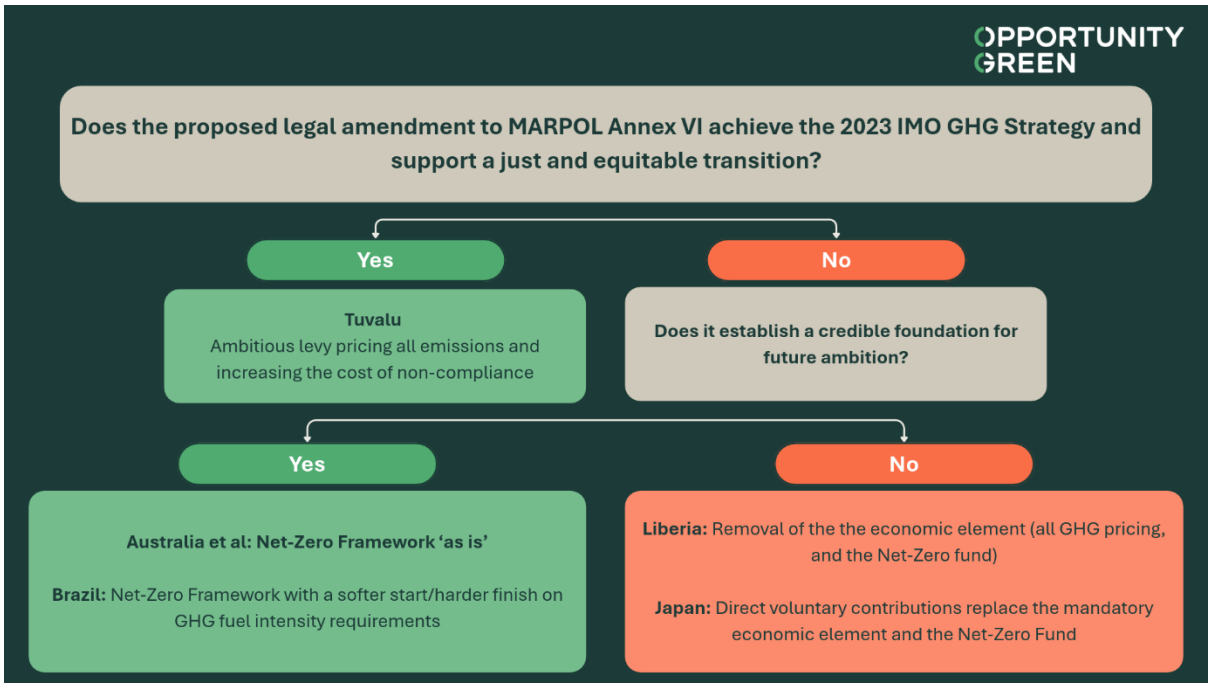


Figure 3: Impacts of the proposed legal amendments on the 2023 IMO GHG Strategy and a JET

Section 5: Comments and textual adjustments to the proposed legal amendments

5.1: On zero-emission compliance

Fiji, Palau, Tuvalu, and Vanuatu *(in MEPC 85/INF.32)* argue that the NZF must be assessed against its impact on cumulative emissions to 2050, rather than its ability to achieve net zero by around 2050 alone, given the importance of near-term reductions to limiting warming to 1.5°C. They contend that the current Framework is insufficiently ambitious and that there should be no further delays to its adoption or weakening of the GFI trajectories, remedial and surplus unit provisions, or the scope and scale of the IMO Net-Zero Fund. However, they recognise some flexibility in the GFI reduction pathway: any easing of near-term requirements to address fuel availability and transport cost concerns must be compensated by significantly steeper reductions in subsequent years, maintaining the same cumulative emissions outcome as the MEPC 83-agreed trajectory.

5.2: On the NZF ' as is'

Solomon Islands *(in MEPC 85/7/23)* argues that further negotiations on the IMO's GHG measure should build on the work that produced the NZF, rather than reopen negotiations around less ambitious alternative approaches. It warns that replacing the agreed GFI trajectory with targets contingent on fuel affordability, availability and scalability would undermine the 2023 IMO GHG Strategy and fail to drive the deployment of ZNZ fuels. It also argues that weakening the NZF would not eliminate transition costs but defer them, potentially worsening disproportionate negative impacts on developing

countries, particularly those least able to absorb the costs, while undermining the framework's just and equitable transition provisions. Solomon Islands stresses that the 2023 Strategy was unanimously adopted and should remain the basis for negotiations, and that the MARPOL amendment process should proceed in accordance with the Convention's voting rules rather than making consensus a prerequisite. It therefore calls for any measure adopted to remain based on the NZF, while remaining open to adjustments that address Member States' concerns without departing from the Strategy's agreed ambition.

5.3: On the removal of the mandatory economic element

The **Russian Federation** ***(in MEPC 85/3/10)*** argues that the NZF would substantially increase shipowners' operating costs without necessarily delivering emissions reductions, quoting a study that estimates that payments to the Net-Zero Fund would contribute to an average doubling of annual fuel costs by 2035. The sponsor identifies continued use of high-sulphur heavy fuel oil and diesel, combined with the purchase of RUs, as the least costly compliance strategy, while the use of low-sulphur fuels and biodiesel would be more expensive without eliminating the need to purchase RUs. The submission also argues that the WtW GFI methodology is largely insensitive to ships' operational efficiency and that switching to readily available alternatives, including biodiesel, would deliver limited emissions reductions once upstream emissions are accounted for. It contends that most ships would fail to meet the basic GFI targets by 2030 regardless of their fuel choice, resulting in mandatory financial contributions to the Fund.

On this basis, the Russian Federation objects to all three sets of draft amendments from Tuvalu, the U.K, and Brazil, calling for all relevant IMO guidelines to be sufficiently developed to enable reliable impact assessments before amendments are adopted and proposes a five-to-ten-year pilot phase without enforcement mechanisms to collect and analyse data and assess the effectiveness of the requirements before any subsequent amendments.

OG analysis

A predictable compliance cost, backed by mandatory remedial payments, can strengthen investment signals for ZNZ fuels capable of delivering deep lifecycle emissions reductions. By contrast, an approach such as Liberia's, that makes investment increasingly dependent on the future market value of compliance credits, or conditions tighter GFI targets on assessments of fuel availability and affordability, risks delaying investment and regulatory ambition. The Russian Federation's emphasis on the limited availability and high cost of alternative fuels therefore overlooks how regulatory certainty can help bring those fuels to commercial scale, while continued reliance on fossil fuels, LNG and biofuels risks locking shipping into pathways that cannot deliver the reductions required by the IMO's 2023 GHG Strategy, the Paris Agreement, and States legal obligations with respect to climate change.

Although the Russian Federation argues that payments to the Fund would impose unavoidable costs on shipowners, it does not consider the corresponding role of the economic element in rewarding ZNZ fuels, supporting their uptake and financing a just and equitable transition. Liberia's proposal would remove this dedicated revenue mechanism and shift compliance towards tradable SUs, weakening the predictable incentives for investment and reducing resources available for developing countries' implementation, capacity-building and resilience. The proposed five-to-ten-year pilot phase without enforcement would compound this risk by postponing the regulatory and investment signals needed to accelerate the transition.

The **Russian Federation** ***(in MEPC 85/3/15)*** goes on to warn that carbon pricing could shift costs onto consumers and divert shipowners' resources from decarbonisation investments towards purchasing compliance units. It also questions the equity of the Net-Zero Fund, citing restrictions on subsidies for existing ships and concerns that funding decisions may not reflect national priorities. The Russian Federation calls for a comprehensive impact assessment, including potential consequences for freight and food prices, particularly in vulnerable SIDS and LDCs.

The submission proposes conditioning tighter GFI targets on verified fuel availability and affordability, allowing national fuel-certification systems, replacing carbon pricing with offsetting through national schemes or Article 6 of the Paris Agreement, and providing incentives for sustainable fuels nationally rather than through a global fund.

OG analysis

The costs of decarbonisation must be weighed against the considerably greater and increasingly uneven economic costs of continued fossil fuel dependence, including exposure to volatile oil prices, geopolitical disruption and escalating climate impacts. While GHG pricing may increase shipping costs, these increases are diluted through the wider supply chain and are generally expected to have a relatively limited impact on the final price of traded goods[1]. Crucially, the IMO's own impact assessment found that disproportionate impacts on SIDS and LDCs were lowest under scenarios combining higher GHG pricing, stringent GFI requirements and targeted revenue disbursement[2]. The proposed Net-Zero Fund is therefore not simply an additional cost, but an essential mechanism for redistributing revenues towards vulnerable countries, supporting a just and equitable transition and addressing the very impacts raised by the Russian Federation. Replacing global carbon pricing and revenue distribution with national schemes or Article 6 offsetting would risk weakening the polluter-pays principle and undermining predictable, needs-based support for developing countries. Similarly, conditioning more ambitious GFI targets on fuel availability and affordability risks creating a circular justification for delaying investment and deployment, allowing continued fossil fuel dependence to constrain the availability of alternatives. Rather than weakening the NZF, Member States should focus on ensuring that its revenue-distribution arrangements adequately address disproportionate trade impacts and prioritise the needs of SIDS and LDCs[3].

[1] Rojon I and others, 'The Impacts of Carbon Pricing on Maritime Transport Costs and Their Implications for Developing Economies' (2021). 132 Marine Policy 104653 https://doi.org/10.1016/j.marpol.2021.104653
[2] UN Trade & Development, 'Comprehensive impact assessment of the basket of candidate mid-term GHG reduction measures. Task 3: ASSESSMENT OF IMPACTS ON STATES' (2024). MEPC 82/INF.8/Add.2. Accessible via IMODOCS.
[3] Opportunity Green, 2026, Trade impacts and the IMO Net Zero Framework, available at: https://opportunitygreen.org/shipping/briefings/trade-impacts-and-the-imo-net-zero-framework/

Liberia submits multiple comments on the NZF, as follows:

1. ***(in MEPC 85/3/18)*** Liberia argues that the NZF should allow SUs to be allocated for additional, verified annual GHG emission reductions achieved through operational and technological energy-efficiency improvements. Liberia contends that reducing fuel consumption can lower total emissions even where a ship's attained annual GFI remains unchanged. It argues that this approach would

complement the uptake of ZNZ emission fuels, reduce overall fuel demand and provide an additional incentive for emissions reductions across the existing fleet.

2. ***(in MEPC 85/3/19)*** Liberia suggests that the draft regulation establishing the Net-Zero Fund should not be adopted until a consolidated institutional and resource assessment demonstrates that it can be administered lawfully, effectively and accountably. Liberia questions whether the IMO has adequately assessed the staffing, operating costs and governance capacity needed to manage an estimated $15 billion in annual revenue. Liberia also argues that delegating project implementation to multilateral development banks or other external entities would transfer costs and operational responsibilities rather than eliminate them, while leaving questions over accountability unresolved.
3. ***(in MEPC 85/3/20)*** Liberia proposes that the financial provisions of draft Regulations 36 and 38 of MARPOL Annex VI should not be adopted until the rules governing GHG emissions pricing contributions and RUs are clearly defined. It identifies unresolved questions over who is legally responsible for payments, when payment obligations are discharged, whether third parties may pay on a ship's behalf, and when the corresponding RUs can be generated and recorded. Liberia also highlights the potential effects of taxes, banking charges, currency conversion and other deductions on the revenue actually received by the Net-Zero Fund. It argues that existing revenue estimates do not adequately account for these transaction and administrative costs, meaning gross contributions may overstate the resources available for disbursement. Liberia calls for clear regulatory provisions covering payment conditions, the allocation of costs and taxes, verification of payments through the IMO GFI Registry, and anti-money-laundering and sanctions requirements.
4. ***(in MEPC 85/3/21)*** Liberia argues that the proposed mid-term GHG reduction measures should not proceed through the MARPOL tacit acceptance process before the essential guidelines required for their initial implementation have been completed or the IMO has decided not to develop them. Liberia highlights outstanding work on GFI calculations and fuel certification, compliance approaches, reporting and verification, the IMO GFI Registry, ZNZ eligibility and rewards, and the governance and operation of the Net-Zero Fund. It warns that adopting regulations before these arrangements are settled could leave Parties accepting obligations whose practical requirements remain unclear, require further MARPOL amendments to resolve inconsistencies, or leave companies and Administrations without sufficient time to prepare for implementation. Liberia therefore proposes that the acceptance period should end no earlier than the adoption of all guidelines identified as necessary for initial implementation, or a final decision not to develop them, while retaining the existing tacit acceptance procedure.

OG analysis

Taken together, Liberia's proposals risk weakening and delaying the implementation of key elements of the IMO Net-Zero Framework, particularly its mandatory emissions-pricing mechanism and the IMO Net-Zero Fund. The challenges around draft guidelines to support implementation of the NZF should be addressed through further technical work and the design of robust safeguards rather than used as a reason to defer adoption or constrain the Framework. In particular, recognising additional energy-efficiency improvements through SUs must not weaken incentives to adopt ZNZ fuels or allow efficiency credits to substitute for absolute reductions in fuel lifecycle GHG intensity. Similarly, questions over the Fund's governance, administrative costs and payment procedures do not in themselves demonstrate that a mandatory, IMO-governed revenue mechanism is unworkable. External institutions could support implementation while the IMO and its Member States retain strategic oversight and control over revenue allocation. Nor should outstanding guidelines become a reason for switching to explicit acceptance, leading to open-ended delays to adoption. Essential guidance can be prioritised, adopted alongside the regulations where necessary, and completed through the usual tacit acceptance process which includes a clear implementation timetable. Ultimately, the proposals risk allowing technical and administrative questions to undermine the NZF's ambition and postpone the predictable revenues needed to support a just and equitable transition, particularly for climate-vulnerable developing countries.

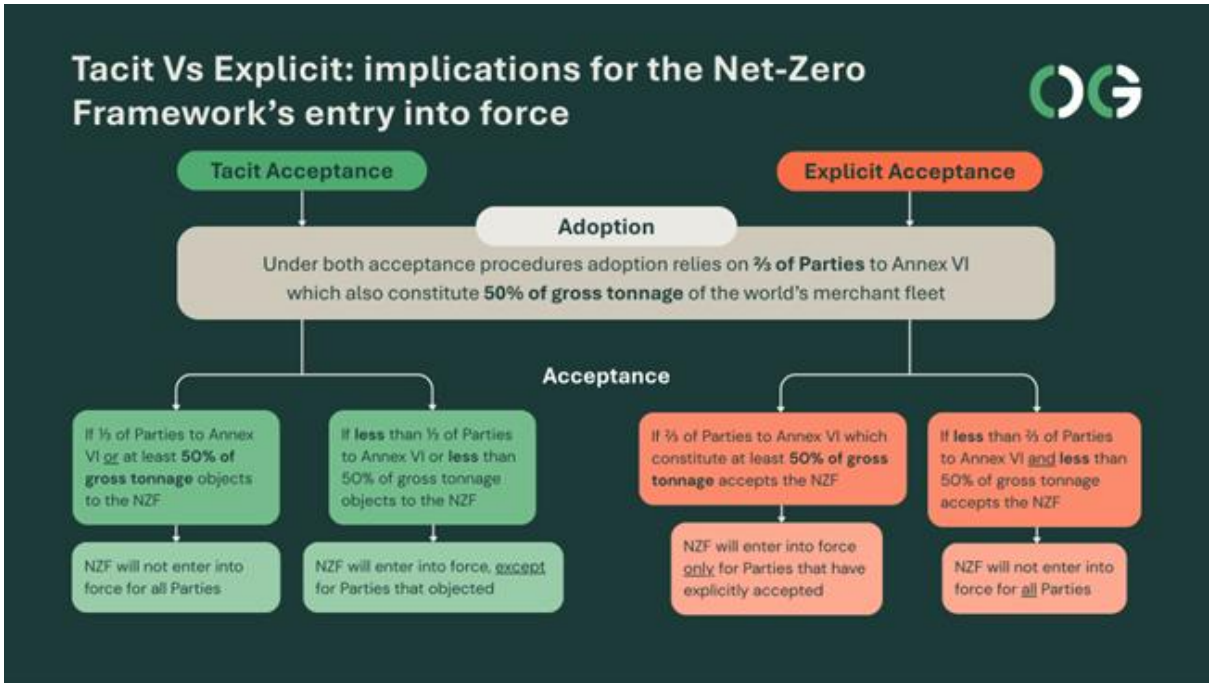


Figure 4: Tacit Vs Explicit Acceptance for the IMO Net-Zero Framework

The **United States *(in MEPC 85/7/31)*** calls for a single, gradual GFI reduction pathway, rather than the NZF's two-tier system, with targets reviewed by 2035 against evidence of fuel availability, affordability and commercial viability. It supports flexible compliance options, including direct compliance, purchasing SUs, direct contributions and multi-year compliance, but insists that all transactions must remain voluntary. The U.S advocates an industry-friendly approach that accepts all biofuels, avoids methodologies it considers unduly restrictive of LNG and bio-LNG, and prioritises commercially available technologies and an 'energy all' approach. The sponsor also argues that any global measure must be accompanied by the repeal of the EU

Emissions Trading System (ETS) and comparable regional or national schemes. On governance, it opposes a centralised IMO-run Net-Zero Fund, preferring an externally administered mechanism or facility under Member State direction, with the IMO retaining the GFI Registry but no role in handling compliance-related funds. It argues that the 2023 IMO GHG Strategy does not require a centralised revenue-collection or distribution mechanism and considers voluntary sale of surplus credits sufficient as a reward mechanism, opposing multipliers. The U.S envisages a preliminary compromise during ISWG-GHG 23 and MEPC 85, approval of legal text at an extraordinary session in early 2027, and adoption at MEPC 86 in October 2027.

OG analysis

The U.S proposal risks severely undermining the ambition and effectiveness of efforts to decarbonise international shipping by presenting regional and international measures as competing approaches, rather than recognising that they can be complementary and address each other's gaps. The EU ETS and the IMO NZF have different scopes and mechanisms: regional measures can drive additional action, while a global IMO framework is essential to establish consistent requirements across international shipping and prevent emissions and economic activity shifting between jurisdictions. Equally, removing the NZF's mandatory economic element and replacing the IMO Net-Zero Fund with voluntary contributions would significantly weaken its capacity to deliver a just and equitable transition, as the Fund is essential to ensure that the costs of decarbonisation are borne by polluters and that revenues can support vulnerable countries, particularly SIDS and LDCs, with the impacts of the transition and access to ZNZ emission fuels and technologies. The proposal's permissive approach to fuels also risks locking shipping into pathways that do not deliver genuine emissions reductions, as when indirect land-use change (ILUC) is accounted for, some biofuels can have emissions equal to or higher than the fossil fuels they replace, while LNG can offer limited or even negative climate benefits when full lifecycle emissions, including methane leakage and slip, are considered. Finally, delaying adoption of the NZF or substantially weakening its provisions would increase cumulative shipping emissions, prolong investment in fossil-fuel infrastructure and make the eventual transition more costly and difficult. The priority should therefore be to preserve the NZF 'as 'is' while allowing complementary regional action to drive ambition and support a rapid, equitable transition.

Djibouti, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Somalia, and Yemen *(in MEPC 85/7/30)* propose a series of compromise options to facilitate consensus on the NZF. On the GFI trajectory, they advocate a single, stepwise pathway with five-year targets and mandatory reviews, with initial targets capped at the stringency of the EU FuelEU Maritime Regulation delayed by five years and subsequent increases informed by demonstrated fuel availability, affordability, technological readiness and economic impacts. On compliance, they propose three options: **(1)** direct emissions reductions; **(2)** greater flexibility to trade, bank, borrow, and pool SUs, subject to a formula-based price ceiling; and **(3)** a new investment-based compliance pathway as an alternative to remedial payments or global penalties. Under the latter, shipping companies could meet obligations by investing in IMO-approved decarbonisation projects through accredited funds, asset managers or investment attributes, with eligible activities and investments subject to an IMO taxonomy and monitoring, reporting and verification framework. To support a just and equitable transition, they propose requiring a minimum proportion of these investments to be directed towards African countries, LDCs, SIDS and developing countries highly dependent on maritime transport. The co-sponsors present these options as potential bridging solutions, while maintaining support for Liberia's separate proposal, and suggest that, if consensus remains elusive, IMO could adopt the technical

measure first and revisit the economic elements during the review of the 2023 IMO GHG Strategy.

Iran *(in ISWG-GHG 23/2/1)* proposes principles to improve the practical effectiveness of the NZF without prejudging its position on the necessity or design of an economic element. If retained, Iran argues that the economic element should be assessed by the additional investment and measurable emissions reductions it generates, rather than revenue collection alone, and should support fleet renewal, retrofits, clean technologies, fuel production and port and bunkering infrastructure. It calls for monitoring the availability, affordability, scalability and geographical accessibility of compliant fuels and technologies, while ensuring that regulatory demand does not outpace their deployment. Iran also proposes safeguards against duplicative IMO financial obligations where the same emissions are reflected at different stages of lifecycle accounting or compliance, while maintaining comprehensive WtT accounting and allocating responsibility for upstream emissions to actors able to influence them. It similarly argues that ships should not face overlapping financial consequences for upstream emissions from shore-side electricity, while preserving incentives for cleaner electricity supply. The document advocates technology-neutral flexibility, including consideration of non-monetary and calculation-based incentives such as multipliers, alongside safeguards against double rewarding and double counting. Finally, it calls for support for developing countries through capacity-building, technology transfer, clean-energy supply chains, port infrastructure and access to finance, while leaving questions concerning the legal basis and design of any economic element for further consideration by the Working Group and Committee.

The Russian Federation (in MEPC 85/INF.7) presents the results of a Russian assessment of the costs of implementing the NZF to shipowners. The submission critiques the attained GFI calculation as being insensitive to operational efficiency and suggests that replacing conventional fuels with alternative fuels does not result in GHG emissions reductions. The paper justifies exclusion of ZNZs because they are currently too expensive, and suggests that, due to the cost increases implied by transitioning to alternative fuels, the most economically advantageous option is “to do nothing”.

OG analysis

The emissions outcome of this study is largely because the alternative fuels used in the study were all carbon-based fuels including fossil and bio fuels. Using genuine ZNZs as alternative fuels would yield starkly different emission reductions results. This analysis is fundamentally flawed because it fails to account for any future changes in fuel prices, for instance due to fossil fuel price shocks or, more critically, the use of revenue generated by the NZF to support ZNZ uptake and reduce ZNZ costs. Additionally, the paper fails to account for the economic costs of climate change. Recent research by OG has shown that the highest anticipated cost of the NZF (in global GDP loss in 2050) equals less than a quarter of shipping’s 3% share of the cost of climate inaction. Read more by Opportunity Green.

The Russian Federation (in MEPC 85/7/19) reaffirms the arguments made in MEPC 84/7/30 (Algeria et al.) outlining the key principles that, in the co-sponsors' view, should underpin the regulations regarding the IMO Net-Zero Framework. Russia outlines concerns, approaches, principles and elements that it proposes might help make progress towards a consensus solution. The submission proposes introducing a

transition period of at least five years to collect and analyse data, which would be used to adjust the NZF's requirements, during which no enforcement mechanism would be applicable. The submission also calls for an assessment on the impact of the measures on States, noting that such an assessment has already been conducted on the basket of mid-term measures that were under consideration for the NZF in 2024. However, Russia considers this assessment inadequate as it included some measures which were not ultimately included in the NZF. The submission also calls for differentiated application of the NZF measures based on ship type, size, age and technical specifications. Russia also suggests that the adoption of mid-term measures should be delayed until the Fifth IMO GHG Study is completed and all guidelines finalised, and that it should be accepted following the explicit acceptance procedure. The submission proposes extending the emphasis on food security in the draft NZF to also include energy security.

5.4: On direct voluntary contributions

The **Republic of *Korea (in MEPC 85/7/22)*** proposes governance and oversight arrangements to address concerns about Japan's proposed direct contribution scheme, while retaining it as an optional compliance mechanism allowing ships to fund individual IMO-approved decarbonisation projects rather than contribute to a centrally managed fund. It recommends transparent, objective and non-discriminatory project eligibility and approval criteria, supported by expert technical assessment before final IMO approval. To safeguard a just and equitable transition (JET) and mitigate disproportionately negative impacts (DNI), it suggests dividing eligible projects into GHG-reduction projects and JET/DNI support projects, with minimum allocation shares or equivalent safeguards to ensure funding reaches areas such as fuel infrastructure, technology transfer and capacity-building in developing countries, particularly SIDS and LDCs. It also proposes financial checks on project developers, possible guarantees against project failure, intermediary arrangements to verify and record contributions through the IMO GFI Registry, and periodic reporting, independent verification and corrective measures where funds are misused or projects fail. The proposal seeks to make direct contributions more transparent and accountable without establishing a central fund but leaves key questions, including allocation requirements and the extent of IMO oversight, to be resolved in future guidelines.

Norway *(in ISWG-GHG 23/2/6)* proposes a package of adjustments to the NZF intended to address Member State concerns while maintaining alignment with the 2023 IMO GHG Strategy. It proposes retaining the two-tier compliance system but replacing mandatory remedial units (RUs) with two levels of voluntary contribution units (VCUs), allowing ships to make monetary contributions to a compliance facility and use the resulting units to offset Tier 1 and Tier 2 compliance deficits. VCUs would be recorded in the IMO GFI Registry but could not be banked or traded. Norway also proposes extending the validity of SUs to five years and allowing them to offset deficits in both tiers, alongside introducing a technology-neutral ZNZ multiplier to reward emissions avoided through ZNZ fuels and technologies, including onboard carbon capture. Norway further proposes that revenues from voluntary contributions could be earmarked for just and equitable transition projects, particularly supporting developing countries, SIDS and LDCs, with robust arrangements for project approval, monitoring and verification. Norway argues that the combined measures would provide greater compliance flexibility and cost predictability for industry while preserving incentives for direct emissions reductions and early ZNZ uptake.

Section 6: Consideration of implementing guidelines and other policy instruments

6.1: GHG Fuel Intensity (GFI)

Japan *(in MEPC 85/7/2)* explains that the revised GFI targets proposed in MEPC 85/7/1 are intended to align with the 2023 IMO GHG Strategy while avoiding rapid fleet replacement or major ship conversions. Its modelling accounts for projected transport demand, fleet development and survival rates, improvements in energy efficiency, the fuel specifications of new ships and expected fuel use. It assumes energy efficiency improves by 45% by 2030 and 70% by 2050, compared with 2008, and that alternative fuels are introduced progressively according to existing fleet capabilities. On this basis, Japan estimates that international shipping's total GHG emissions in 2030 would fall to 81% of 2008 levels, with new fuels, including biodiesel, biomethane, methanol, ethanol and ammonia, accounting for 5.8% of total fuel use. The modelling assumes biodiesel use increases to 0.2 EJ in 2030 and 0.7 EJ in 2035, while LNG use reaches 1.3 EJ in 2030 and remains broadly stable through 2035. Japan argues that these results demonstrate that its proposed GFI targets could meet the Strategy's ambition and indicative checkpoints without requiring premature vessel replacement, while acknowledging that outcomes depend on future trade volumes and energy-efficiency improvements and will require ongoing review.

The **Republic of Korea *(in ISWG-GHG 23/2/2)*** proposes restructuring the NZF's GFI targets to maintain its existing level of ambition while better reflecting the availability and affordability of compliant fuels. It would retain the current direct compliance target trajectory, renaming it the Net-Zero GFI Target (GFI NZ), with reduction factors of 19% in 2029, 21% in 2030 and 43% by 2035. The current base target would become a GFI Compliance Limit (GFI CL), above which a Tier 2 compliance deficit would arise, determined dynamically according to the affordability, scalability and availability of commercially available fuels. For 2029 and 2030, Korea suggests illustrative GFI CL reduction factors of 3% and 4%, respectively, based on an initial assessment of Heavy Fuel Oil-type fuels and Liquified Natural Gas; these are not definitive technical values. From 2031, the GFI CL trajectory would be determined every five years using actual implementation data, IMO fuel-consumption and lifecycle emissions data, and market information, with the methodology set out in IMO guidelines. The proposal retains the existing two-tier compliance structure and argues that multiple compliance options should coexist, including SUs, banking, transfer, pooling, borrowing and direct contributions, to manage unforeseen implementation challenges such as SU price volatility and regional disparities in fuel availability. Korea presents the approach as a possible basis for convergence, rather than a preferred design, and argues that it would preserve the framework's long-term ambition while providing greater flexibility and predictability for implementation.

The Secretariat (in MEPC 85/7/9) responds to the Committee's request at MEPC 84 to provide more information on the possible costs involved in the establishment and operation of an IMO GFI Registry. The Secretariat reiterates that these costs depend on the scope and scale of the GFI registry, basing its analysis on draft provisions and not prejudging the outcome of NZF negotiations. The Secretariat divides the costs into three categories: 1) system development costs; 2) system maintenance costs; 3) Secretariat support costs. It foresees outsourcing the development and maintenance of the underlying IT system to an external provider while retaining oversight of the day-to-day functioning of the Registry. The analysis calculates total annual costs at several million US$, depending on the scope of the Registry. The submission consequently estimates

reasonable administration fees as a one-off onboarding fee of US$400 plus an annual administration fee of US$200.

Brazil (in ISWG-GHG 23/3/1) builds on document ISWG-GHG 22/INF.3 (Brazil) and sets out the concept of a fuel registry: a shared digital record in which the sustainability information of marine fuels is passed from one actor to another along the fuel supply chain, from the certified producer to the final user. Under a fuel-based regulation, a ship's compliance would depend on this information, which today is contained in separate documents that no single actor can verify their throughout the entire chain of custody. A common digital record would make these checks possible and, over time, reduce the manual work along the chain. This document describes how a registry would work, the main concerns, outstanding questions and lessons learned to date, including from a pilot with industry, and options for its governance and development, as a basis for discussion.

UAE and IACS (in MEPC 85/5) highlight that bunker delivery notes (BDNs) are not applicable to ships using part of their own cargo as fuel and propose amending paragraphs paragraphs 4 and 5 of Regulation 18 of MARPOL Annex VI to introduce requirements specifying alternative documentation for ships that use part of their cargo as low-flashpoint or gas fuel.

Korea (in ISWG-GHG 23/3) examines whether the proposed default energy conversion efficiency for wind propulsion systems (WPS) in the draft guidelines for the calculation of the attained annual GHG fuel intensity (GFI) adequately reflects the equivalent fuel consumption that can be avoided under operating conditions. It reviews the basis for the current default value and its representativeness under actual operating conditions, as well as the consistency between the reference point for WPS power and the applicable conversion efficiency. On this basis, the document proposes that the current default conversion efficiency be reconsidered and, if necessary, revised so that the propulsive power generated by WPS is appropriately reflected as fuel-equivalent energy.

Norway (in ISWG-GHG 23/3/4) proposes a revised draft of the guidance, for voluntary application, on Wind Propulsion Systems (WPS). The submission updates the following from the previous draft of the guidance (in MEPC 84/WP.5): reliability factors, accepted models and methods, method for Tier 4 (direct thrust measurements) added, review and future updates, example methods and case studies.

IMarEst (in ISWG-GHG 23/2/9) analyses a broad range of potential design options for the IMO Net Zero Framework, building on document ISWG-GHG 22/2/2. The analysis considers variations and different combinations of the tier architecture (single/two-tier), the GHG fuel intensity (GFI) trajectories (both the base and direct compliance trajectories) and the Remedial Unit (RU)/direct compliance pricing (third compliance option). The results of nearly three hundred different scenarios are quantified relative to the 2023 IMO GHG Strategy objectives and discussed. The results show that the combined specification of the GFI trajectory and the level of the RU price are key to the outcomes (GHG emissions, energy transition, minimization of negative impacts on States) approaching the objectives/specifications of the 2023 IMO GHG Strategy. The single tier and direct contribution compliance design option independently and in combination create significant risks to both energy transition and just and equitable transition (JET).

A few submissions explore operational approaches to reducing GHG intensity:

Thailand (in MEPC 85/7/8) presents the experience of a Thai shipowner that reduced the carbon intensity of its fleet by 55% over 2014-2025 as a best practice example. The submission emphasises that the existing provisions under MARPOL Annex VI have yielded substantive and measurable reductions in GHG emissions, especially through EEDI and SEEMP, without prejudice to the ongoing negotiations on amendments to the Annex. The shipowner's experience demonstrates how GHG reductions can be achieved through the adoption of new technologies, operational techniques and optimised hull forms, highlighting the importance of fleet renewal, energy saving, good governance and clear regulation to support investment. The submission advocates for an outcome-focused and technology-neutral approach.

Pacific Environment (in MEPC 85/7/17) highlight that practising 'Just in Time' (JIT) Arrival can reduce GHG emissions from ships and improve environmental conditions in port areas, but faces barriers to implementation. The submission finds that ships averaged between 64 and 139 days per year of waiting time, and relatedly that waiting costs and environmental costs represent 78-86% and 14-22% of a ship's total loss costs respectively. The submission identifies and ranks seven barriers to JIT Arrival, largely related to uncertainty, reliability, standardisation, costs, benefits and policy linkage and suggests pathways towards removing these barriers.

FIATA (in MEPC 85/7/15) emphasises the need for transparency of compliance costs as they pass through the transport chain; the allocation of GHG emissions reductions between ships and cargo interests; and the practicability of information requirements that affect intermediaries. FIATA notes that, while RU prices are fixed and published, it is harder for ship users to have clarity on SU prices and compliance costs integrated into fuel. FIATA suggests that the guidelines could help resolve this, such as by way of the suggested annual report by the Secretary-General on transactions recorded in the IMO GFI Registry. FIATA also highlights the importance of transparency in allocating environmental attributes and preventing double counting, welcoming the Expert Workshop on chain of custody models for fuel supply chain traceability and the development of the FSCS.

6.2: Zero- and near-zero emission fuels and technologies

IMarEST (in ISWG-GHG 23/3/8) argue that the integrity, transparency and robustness of the revision process of the values of incentives, including Tier 1 and Tier 2 RUs and ZNZs, will be critical to the incentivization of compliance at the base GHG fuel intensity (GFI), as well as the use of ZNZs. The submission notes that although some initial values have been given for Tier 1 and Tier 2 units, the ongoing revision of these values, and of any ZNZ incentives, has not yet been defined. This document then describes the different options that exist for data that could be used in a revision process and makes recommendations from a discussion of those options for how a revision process could be progressed.

MI (in ISWG-GHG 23/3/6) suggests what it considers as success factors for the design of rewards for ZNZs under the IMO Net-Zero Framework, from the commercial and investment perspective of ZNZ producers, shipping companies and financiers. It evaluates the reward options under consideration against three tests: financial viability, investability and administrative simplicity; while also considering the time required to bring forward new supply. It draws attention to practical questions on the timing, working capital and liquidity of rewards and concludes that a multiplier, with early-mover protection, is the best option to incentivize early ZNZ projects.

The Secretariat (in MEPC 85/INF.2) provides information on the IMO technical seminar on methane-based fuels, held on 12th May 2026 to advance understanding on the latest

developments in the use of methane-based fuels in shipping to reduce GHG emissions. Experts made presentations which touched on issues including methane emissions and methane slip reduction options, engine technologies, the calculation of WtW GHG emissions, chain of custody models, bunkering and safety aspects. ***In MEPC 85/INF.13, the Secretariat*** provides information on the IMO technical seminar on ammonia as a marine fuel, held on 17th September 2026 to share experience and enhance understanding of the use of ammonia as a marine fuel. Experts made presentations which touched on issues including supply and availability, practical experience with bunkering and vessel operations, engine certification, the management of ammonia-containing effluents, and the wider environmental impacts of reactive nitrogen and organisational safety frameworks.

6.2.1 ZNZ Multiplier

Norway ***(in ISWG-GHG 23/2/5)*** proposes introducing a ZNZ technical multiplier to incentivise the uptake of ZNZ fuels and technologies under the NZF, alongside changes to the flexible compliance mechanisms to support market stability and investment certainty. It assesses two approaches:

1. Applying a multiplier to ZNZ energy in the attained GFI calculation,

   OR

2. Generating additional SUs based on the multiplier and the verified GHG emissions avoided through ZNZ use.

Norway favours the latter, arguing that it provides a consistent compliance benefit regardless of the share of ZNZ energy used, whereas an energy-based multiplier would progressively reduce the marginal benefit of additional ZNZ use and favour spreading small quantities across multiple ships. However, Norway acknowledges that additional SUs could weaken overall emissions reductions by allowing other ships to use them to offset compliance deficits. It therefore proposes an initial multiplier of 1.25 in 2029, declining to 0.30 by 2033 and remaining at that level until 2036, alongside strengthening GFI base targets by 20% to compensate for the resulting reduction in emissions savings. It also recommends reviewing the multiplier after three years and periodically thereafter. To support SU market stability, Norway proposes extending their validity from two to five years and allowing them to offset both Tier 1 and Tier 2 compliance deficits. Finally, it recommends retaining the option of balancing deficits through contributions at set prices, providing a predictable upper limit on compliance costs if SUs or low-GHG fuels are in short supply.

China ***(in ISWG-GHG 23/3/2)*** proposes developing and amending IMO guidelines to support a ZNZ incentive multiplier, should this be adopted instead of a monetary reward. It recommends applying the multiplier only to the eligible ZNZ share of energy in the denominator of the attained annual GFI calculation, while retaining actual WtW emissions in the numerator and recording actual and multiplier-adjusted energy and GFI values separately. The adjusted GFI would determine annual compliance, including compliance deficits and the generation of SUs, but calculations would continue to use actual energy consumption as their basis. China also proposes corresponding amendments to reporting, verification and the IMO GFI Registry guidelines, requiring fuel eligibility, the multiplier applied and resulting compliance figures to be independently verified and traceable to actual fuel-use data. It recommends a dedicated guideline covering the multiplier's scope, application, reporting and review, coordinated with

existing ZNZ eligibility and certification requirements. The submission does not propose a multiplier value or determine whether the mechanism should be adopted; it focuses on the regulatory and administrative arrangements needed to implement it consistently.

China *(in ISWG-GHG 23/3/3)* also proposes a methodology for setting a ZNZ incentive multiplier under the NZF's two-tier GFI framework, using a cost-gap approach to make ZNZ fuels economically competitive with a biodiesel reference pathway at the base compliance target. It calculates indicative multipliers declining from 1.95 in 2029 to 1.10 in 2035, based on assumed fuel prices, lifecycle emissions intensities and remedial unit prices. China's modelling suggests that, at these cost-parity levels, ships could achieve the base target at the same total cost using ZNZ fuels rather than biodiesel, without necessarily generating additional SUs. However, the analysis also identifies a significant emissions trade-off: in its individual-ship scenario, actual WtW emissions are 2.7–8.2% higher annually (6% cumulatively over 2029–2035) than under the biodiesel reference pathway, because the multiplier allows ships to meet the same adjusted GFI target while using a greater share of conventional fuel. Higher multipliers can further reduce compliance costs and encourage ZNZ uptake but may increase actual emissions by even more; China therefore recommends calibrating the multiplier against fuel prices and emissions intensities, balancing incentives for ZNZ uptake against genuine emissions reductions and avoiding excessive incentives.

IMarEST *(in ISWG-GHG 23/3/7)* finds that narrow or differentiated rewards are more effective than multipliers in accelerating ZNZ uptake during the 2030s, including e-fuels, biofuels and wind propulsion. The Chinese multiplier design *(in ISWG-GHG 22/3/1)* provides weaker incentives because its benefit diminishes as ZNZ consumption increases, potentially limiting uptake to small proportions of drop-in fuels rather than encouraging investment in alternative-fuel vessels. Multipliers may also raise cumulative emissions. Conversely, broad rewards risk exceeding available revenues (potentially reaching US$100 billion annually against estimated framework revenues of US$10–12 billion in the 2030s), reducing funding available for other purposes, including a just and equitable transition. Narrow or differentiated rewards are more financially manageable. IMarEST concludes that early ZNZ incentives are essential to building fuel supply and infrastructure for an affordable transition in the 2040s, and identifies reverse auctions as potentially more cost-effective and predictable than IMO-determined reward rates.

OG analysis

As shipowners would know the value of their reward before investing in ZNZs under this model, it provides certainty for investors on the received reward value based on actual GHG emissions avoided offers a strong incentive both for investment in transition and for real emissions reductions, leading to stronger transition outcomes and ZNZ availability.

6.3: Disproportionate Negative Impacts (DNIs)

Fiji, Palau, Tuvalu and Vanuatu *(in ISWG-GHG 23/3/5)* propose developing dedicated IMO guidelines to identify and measure DNI of the NZF on individual Member States, including impacts on food security. They argue that existing assessment procedures provide neither operational metrics nor thresholds for determining when impacts are disproportionate, while previous modelling relies on uncertain data and regional aggregations that can mask the specific vulnerabilities of SIDS and LDCs. They propose a simpler, transparent methodology combining ongoing techno-economic fleet

modelling using actual fuel and SU prices with publicly available country-level trade data, bilateral sea distances and vessel characteristics to estimate NZF-related changes in import and export transport costs. These estimates could then inform indicators of wider impacts, including food security, cost of living and GDP, with results periodically validated against more complex models. The co-sponsors call for dedicated intersessional work to develop these guidelines and emphasise that addressing DNI, including food security, requires a funded economic element of the NZF capable of generating sufficient revenue under draft Regulation 41.

Egypt (in MEPC 85/7/24) proposes a maritime technology access, transfer and localization mechanism (MTATLM) for developing States to operationalize technology cooperation under the draft IMO Net-Zero Framework, noting that many developing States face barriers to acquiring, financing, operating and sustaining emerging technologies. The mechanism would link technology-needs assessment, provider-recipient matchmaking, demonstration, commercial transfer, training, localization and post-deployment monitoring. It would cover key technology areas, including renewable and low-GHG electricity, OPS, green hydrogen, ammonia and e-fuels, bunkering and storage, MRV/certification and port infrastructure. Performance would be measured by technologies and capabilities transferred, deployed, operated and locally sustained, rather than by workshops or training alone.

Section 7: Life Cycle Assessment (LCA) Guidelines

7.1: Onboard Carbon Capture and Storage (OCCS)

OG analysis

It is important to note that OCCS technologies are still speculative and not yet operational. Furthermore, they require significant additional energy to run, weakening their contribution to GHG emissions reduction. Most critically, they extend the life of fossil fuels and are capital intensive and therefore do not contribute to a just and equitable energy transition. Investing in costly OCCS technology and retrofits will lock fleets into fossil fuel dependency for years to come, hampering shipping's decarbonisation. Redirecting investment to long-term, scalable and truly low emission fuels, energy sources and technologies is more aligned with the IMO's goal of achieving a just and equitable decarbonisation of the shipping industry.

The **Republic of Korea *(in MEPC 85/7/6)*** proposes a framework for recognising and accounting for GHG reductions from OCCS, addressing the timing gap between annual ship GFI calculations and subsequent verification of permanent CO_2 sequestration. It proposes two pathways:

1. Recognition only once permanent sequestration has been independently verified

OR

2. Conditional recognition when CO_2 is transferred ashore, provided an eligible, fully traceable downstream storage chain is in place, followed by reconciliation against the final verified quantity.

Both approaches would account for emissions and losses throughout the chain, including transport, storage and potential leakage. The proposal also requires batch-level tracking, mass-balance accounting where CO_2 from different ships is mixed, clear allocation of responsibilities between shipowners and downstream operators, and safeguards against over-crediting and double claiming. Under conditional recognition, any shortfall would be deducted from a subsequent, unfinalised compliance year's GFI, with retrospective adjustments possible in cases of fraud, deliberate double claiming or material errors.

China ***(in MEPC 95/7/29)*** comments on the ROK's OCCS proposal, broadly supporting further work while raising concerns about its conditional pre-recognition and reconciliation arrangements. China argues that carrying differences between provisionally recognised and finally verified CO_2 sequestration quantities into subsequent compliance years would complicate GFI calculations, while retroactively cancelling GFI compliance statements could create legal and administrative uncertainty, particularly if ships change ownership or flag, and undermine investment certainty for OCCS. It also considers it inappropriate for shipowners to remain exposed to downstream risks, such as CO_2 losses or failure of permanent storage, after custody of captured CO_2 has been transferred ashore. China therefore presents three possible approaches: **(1)** ending both accounting and responsibility at the ship; **(2)** extending accounting to permanent sequestration using IMO-approved default values, while ending the shipowner's responsibility at custody transfer; **(3)** or extending both accounting and responsibility to final storage, as proposed by Korea. China favours the first two options, particularly the second as a means of preserving life-cycle accounting and environmental integrity without imposing responsibility on shipowners for processes beyond their control.

ICS (in MEPC 85/7/10) presents the findings of a review it commissioned into OCCS, especially as an interim way to reduce GHG emissions while ZNZs reach maturity, and a discussion of key policy issues. The review examines different types of OCCS, their maturity, their suitability for different ship types, and their strengths and challenges. The review suggests that OCCS can contribute significantly to GHG reductions and should be considered a group of technologies each with different best uses, rather than a single technological pathway. The review underscores the importance of monitoring, reporting and verification of OCCS, as well as the clarification of a number of legal and regulatory uncertainties that could block the deployment of OCCS. The submission advocates for the creation of an IMO mechanism through which carbon captured onboard can be reflected within compliance calculations, and for a technology-neutral approach across all IMO working groups considering OCCS, focusing instead on environmental outcomes, life cycle emissions performance and verification requirements.

OG analysis

It is important to note that, while OCCS is sometimes framed as an interim solution with urgency stressed around its inclusion and regulation, OCCS is not yet a functioning technology, as the ICS submission notes. The submission highlights that the most mature OCCS pathway, chemical absorption and mineralisation, depends on facilities not available to two thirds of the global fleet. OCCS can also be used to divert attention and resources away from transitioning fleets onto true ZNZs. Caution is therefore urged around the consideration of OCCS.

7.2: Default emissions factors

Default values are used to calculate the GHG intensity of marine fuels on a well-to-tank (WtT), tank-to-wake (TtW), and overall well-to-wake (WtW) basis. All submissions request scientific review by the GESAMP-LCA Working Group before inclusion in the LCA Guidelines. Whilst the proposals do not change the GFI standard itself, they impact how fuels are assessed for compliance in practice.

The **IMO Secretariat *(in MEPC 85/7/4)*** reports on the fourth meeting of the GESAMP-LCA Working Group which reviewed proposed WtT and TtW emission factors for LNG, biomethane, biodiesel, renewable diesel (HVO), ammonia and ethanol, alongside wider methodological issues under the IMO's 2024 LCA Guidelines. The Group recommended an initial WtT default factor of 18.0 gCO_2eq/MJ for fossil LNG and 32.1 gCO_2eq/MJ for LNG produced using fossil point-source CO_2 and renewable hydrogen. It also identified satisfactory values for several other pathways, including biomethane from waste and residues (31.1 gCO_2eq/MJ), soybean-based biodiesel (23.6 and 25.0 gCO_2eq/MJ), HVO from used cooking oil (11.9 and 14.0 gCO_2eq/MJ), sugarcane ethanol (21.2 gCO_2eq/MJ), and various ammonia production pathways. Several reviews remain incomplete, including palm-oil-based biodiesel, certain ammonia pathways and onboard blue hydrogen production. On methodology, the Group recommended further work on fuel pathway coding, CCS/CCU and onboard carbon capture accounting, and TtW emissions from multi-fuel engines. It also considered approaches to indirect land-use change (ILUC), proposing draft amendments to the LCA Guidelines and further work on yield increases, unused land and operationalising an ILUC risk-based management framework. The Group will also develop an internal database of emission factors to support more robust and representative global defaults and may develop its own proposals where sufficient scientific evidence exists.

The Secretariat (in MEPC 85/7/4) reports on the fourth meeting of the GESAMP-LCA Working Group, held 29th June to 3rd July 2026. The working group reviewed and provided recommendations regarding proposed WtW and TtW default emissions factors for a number of fuel pathways. The group also continued discussions on refining the methodology for emission quantification in the LCA guidelines and reviewed the outcomes of intersessional work.

7.2.1: Fossil-derived fuels, including Liquefied Natural Gas (LNG)

OG analysis

Emissions from LNG can vary substantially depending on the supply chain, the engine technology used onboard ships, and efforts to control methane leakage in the supply chain and slippage at the point of combustion. Because methane is a powerful GHG, even small variations in leakage can drastically impact the climate profile of a fuel. Overall, the climate benefits of LNG use are negligible at best and, in some cases, it can be worse than the use of traditional fuel types. For the WtT phase, only default emission factors are permitted to be used for calculating the emissions of fossil LNG, while for the TtW phase, actual values can be used. In both cases, it is critical that default emission factors reflect the conservative (i.e. high) range of available estimates to minimise the risk of under-reporting. For the TtW phase, conservative default values also serve to incentivise improved performance, which can be demonstrated using actual emission factor values.

For the WtT phase, only default emission factors are permitted for calculating emissions from fossil-derived fuels, while for the TtW phase, actual values can be used. It is therefore critical that default emission factors reflect the conservative (i.e. high) end of available estimates, taking account of the full range of relevant supply-chain emissions, to minimise the risk of under-reporting. For the TtW phase, conservative default values also provide an incentive for operators to improve performance, which can be demonstrated through the use of actual emission factor values.

The **Russian Federation *(in MEPC 85/7/21)*** proposes revising the 2024 IMO LCA Guidelines to remove the prohibition on using verified actual WtT emission factors for fossil-fuel supply chains, arguing that allowing actual values for non-fossil fuels but not fossil fuels creates a methodologically inconsistent and discriminatory approach. It also argues that a single global default factor fails to reflect regional differences in fossil-fuel extraction, processing and transport, potentially overestimating emissions from lower-carbon supply chains and underestimating those from higher-carbon ones, while providing little incentive to improve fossil-fuel production efficiency. Russia therefore proposes extending the use of regional-specific data to all fuel pathways, introducing regional default factors in place of a single global value, and asking the GESAMP-LCA Working Group to assess approaches such as market-weighted averages, medians, data-quality criteria and periodic updates. It stresses that these changes would not alter the existing reference GHG intensity of 93.3 gCO_2eq/MJ, but would, in its view, improve the methodological neutrality and accuracy of the LCA framework.

Djibouti, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Somalia and Yemen (in ISWG-GHG 23/4/12) propose amending the 2024 LCA Guidelines to allow verified actual WtT emission values to be used for purely fossil fuel pathways, removing what they consider to be an unjustified methodological distinction between fossil and non-fossil fuels. Specifically, they propose amending paragraphs 4.1 and 10.4 to recognise geographic variation in fuel pathway emissions without distinguishing between fuel origins, and to allow actual WtT values for all fuel pathways, subject to the existing calculation, third-party verification and certification requirements. This would also remove the requirement to use default emission factors for the fossil component of blended fuels, bringing it into line with the existing rules for calculating blended fuel emissions under paragraph 3.13. The co-sponsors argue that this would improve methodological consistency and allow fossil fuel producers to demonstrate better-than-default emissions performance. They emphasise that the amendments would not change the LCA system boundaries, GFI reference value of 93.3 gCO_2eq/MJ, sustainability screening requirements or target-

setting architecture, nor would they affect the ongoing GESAMP-LCA Working Group work on developing representative global default WtT emission factors for fossil fuels. They ask the Working Group to agree that the current exclusion is methodologically inconsistent and approve the proposed amendments for submission to the Committee for adoption.

OG analysis

Although framed as a call for methodological neutrality, the proposals above from the Russian Federation and Djibouti et al risk weakening the integrity and ambition of the IMO's fuel-accounting framework by making it easier for fossil-fuel pathways to claim lower emissions through actual or region-specific WtT values, without demonstrating that these changes deliver meaningful absolute emissions reductions. Allowing actual values for fossil fuels could also create significant verification and comparability challenges, particularly where supply chains are complex, data availability varies and independent assurance is limited. Replacing a common global default with regional factors risks introducing further inconsistencies and opportunities for favourable accounting, while shifting attention towards refining the carbon intensity of fossil fuels rather than accelerating the transition away from them. Crucially, more favourable accounting for some fossil-fuel supply chains does not make fossil fuels compatible with the IMO's decarbonisation objectives, it could instead reduce the regulatory incentive to adopt genuinely ZNZ emission fuels. Any review should therefore prioritise robust, conservative and comparable accounting, with safeguards against selective reporting and no weakening of incentives to transition away from fossil fuels.

The **Clean Shipping Coalition (CSC)** ***(in MEPC 85/7/33)*** argues that the proposed 18.0 gCO_2eq/MJ WtT default emission factor for fossil LNG should be treated as an initial estimate, not a settled value, and calls for it to be supported by a transparent, conservative and globally representative evidence base. Drawing on evidence that upstream methane emissions can vary significantly between facilities and regions, and may be higher than inventory-based estimates suggest, CSC cautions against deriving a global default from a narrow sample of lower-emitting suppliers or supply routes. It highlights the need to account for fugitive and vented methane, explain how uncertainty and differences between measured and modelled data are handled, and enable meaningful scrutiny even where some underlying information is commercially confidential. CSC also calls for a clear process to periodically review and, where necessary, revise both the WtT default factor and the existing tank-to-wake methane-slip factors as better measurement evidence becomes available.

Norway, with support from ICS, INTERTANKO, CLIA and SGMF ***(in MEPC 85/7)*** submits proposed WtT and TtW default GHG emission factors for seven LNG production pathways and different LNG engine technologies, to inform implementation of the NZF. The proposed WtT factor for conventional fossil LNG is 16.65 gCO_2eq/MJ (GWP100), while the six additional synthetic LNG pathways range from 15.37 to 51.05 gCO_2eq/MJ, depending on the source of CO_2 (fossil point-source capture, direct air capture or biogenic point-source capture) and hydrogen (renewable electricity or industrial by-product hydrogen). Notably, the proposed factors for some synthetic LNG pathways are substantially higher than for conventional fossil LNG. For TtW emissions, Norway proposes factors of 60.1–65.1 gCO_2eq/MJ (GWP100) for fossil and synthetic LNG, depending on engine type and

technology, falling to 4.2–9.2 gCO_2eq/MJ when accounting for biogenic carbon in the fuel. The proposals also introduce additional engine categories and distinguish between different engine configurations, including those using low-pressure exhaust gas recirculation and variable compression ratios. The proposed factors are derived from a third Sphera lifecycle assessment commissioned by SGMF, conducted in accordance with the IMO's 2024 LCA Guidelines and relevant ISO standards.

WWF, Pacific Environment and CSC *(in ISWG-GHG 23/4/15)* argue that fugitive and vented methane emissions from LNG carriers must be properly accounted for under the IMO's 2024 LCA Guidelines, as the relevant TtW fugitive emissions parameter is currently set to zero despite evidence that actual emissions are significant. They highlight that methane escapes through leaks in cargo-handling and fuel-supply systems, as well as venting boil-off gas (BOG) during operations such as tank emptying and preparation for drydocking. Evidence includes a 2026 study by Queen Mary University of London, which measured 189 tonnes of methane vented during a single LNG carrier's preparation for drydocking (equivalent to over 5,600 tonnes of CO_2e), alongside eight fugitive leaks emitting nearly 1 kg of methane per hour. The submitters also identify perverse incentives in current reporting rules: BOG combusted in gas combustion units (GCUs) counts towards reported fuel consumption and emissions, whereas vented methane is treated as cargo loss and is not reported, potentially making venting appear preferable to combustion or reliquefaction. Given the substantial variability of fugitive and vented emissions between vessels and operating conditions, they argue that ship-specific actual emission factors would be more accurate and provide a direct incentive to reduce emissions than a single default factor. They therefore propose inviting submissions on how LNG carriers can demonstrate actual fugitive emission factors, including through the development of measurement and monitoring guidelines, and forwarding the evidence to the GESAMP-LCA Working Group to inform its work on appropriate emission factors.

A few submissions focus on specific exhaust-related issues:

Reiterating their paper MEPC 84/10/4, ***WWF, Pacific Environment and CSC (in MEPC 85/5/2)*** illuminate the risk of emissions being displaced under Regulation 4 of MARPOL Annex VI, especially from air to water in the context of EGCS and propose a goal-based environmental standard to safeguard against this.

(In MEPC 85/3/2), the Secretariat invites the Committee to consider, with a view to adoption, proposed amendments to the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOx Tehnical code), following their approval at MEPC 84. ***Canada et al.*** comment on this submissions ***in MEPC 85/3/11***, suggesting a number of editorial and technical improvements as well as consequential clarifications that will enable a clear understanding and consistent application of the draft amendments. ***Iran (in MEPC 85/3/14)*** proposes an amendment to the definition of gas fuel in the proposed amendment to align with the corresponding harmonised draft definitions under other IMO mandatory instruments including SOLAS and the IGF Code. ***Denmark et al. (in MEPC 85/5/1)*** propose text intended to provide guidance for the implementation of the approved amendments to the NOx Technical Code to its users. Guidance is given on rational emissions control strategy and the related not-to-exceed zones; test cycles; and multiple engine operation profiles.

(in MEPC 85/5/3), FOEI, WWF, Pacific Environment and CSC summarise the findings of the September 2026 Pacific Environment report 'On ever thinner ice: Reducing Black Carbon demands urgent action'. The paper finds that climate tipping points are alarmingly closer or exceeded; that sea ice loss is weakening the food chain for fish and marine mammals; that the Atlantic Meridional Overturning Circulation is under threat; that warm-water coral reefs are under increasing threat, and that positive tipping points give glimmers of hope. The submission reiterates the ICJ's advisory opinion on climate change obligations and proposes requiring ships operating in and near the Arctic to use 'polar fuels' that produce less black carbon.

In comment to this submission, ***Pacific Environment and CSC (in MEPC 85/5/4)*** also refer to UNEP's 'Emissions Gap Report 2025' and 2026 report 'Limiting overshoot: navigating exceedance of 1.5C and pathways towards return'. The submission highlights key messages from these reports that they consider to be of particular relevance to the Committee's work and the need to reduce short-lived climate pollutants such as black carbon and methane.

7.2.2: Biofuels

OG analysis

The climate and sustainability impacts of biofuels vary considerably depending on the feedstock used, production processes and, critically, whether indirect land-use change (ILUC) and wider land-use impacts are accounted for. Although biofuels are often presented as a renewable, lower-carbon alternative to fossil fuels, they are not inherently sustainable or carbon-neutral. Their production can drive deforestation, habitat and biodiversity loss, soil degradation, water stress and competition with food production, while land-use change can release substantial quantities of stored carbon. When full lifecycle emissions, including ILUC, are taken into account, some biofuels can have a higher GHG intensity than the fossil fuels they are intended to replace . Furthermore, reliance on crop-based biofuels risks diverting agricultural land and resources from food production, with implications for food security and livelihoods . It is therefore critical that the emissions accounting methodology captures the full lifecycle impacts of biofuels, including robust and conservative estimates of ILUC, rather than relying on direct production and combustion emissions alone. Default emission factors should reflect the higher end of credible emissions estimates to avoid systematically understating the climate impacts of biofuels and creating incentives for fuel pathways that are neither genuinely low-carbon nor sustainable.

China *(in MEPC 85/7/7)* presents supplementary WtT GHG emission data for fatty acid methyl ester (FAME) produced from used cooking oil (UCO), arguing that its specific waste-feedstock characteristics and collection, pretreatment, and supply-chain processes warrant further assessment under the IMO's 2024 LCA Guidelines. Four reference calculations produce WtT emission factors ranging from 9.48 to 13.96 gCO_2eq/MJ, but China does not propose a new global default value, recognising that further geographically representative data and independent evidence are needed. It recommends that future revisions of the LCA Guidelines consider incorporating the proposed UCO-based FAME pathway description and reference data, clarify the accounting boundary and verification requirements for UCO as a waste feedstock, and gather additional data across regions, production facilities and supply chains, including international transport. The proposal focuses exclusively on WtT emissions and does not seek to modify tank-to-wake (TtW) emission factors.

The **United States** proposes default WtT and TtW GHG emission factors for three marine fuel pathways for inclusion in the 2024 IMO LCA Guidelines: soybean-based renewable diesel, first-generation corn-based ethanol and soybean-based biodisel.

- For soybean-based renewable diesel ***(in MEPC 85/7/13)***, the proposed WtW emission factors range from 36.18 to 37.32 gCO_2eq/MJ, comprising WtT values of 35.01–36.15 gCO_2eq/MJ and a TtW value of 1.17 gCO_2eq/MJ.
- For corn-based ethanol ***(in MEPC 85/7/14)***, the proposed WtW values range from 34.70 to 35.79 gCO_2eq/MJ, comprising WtT values of 34.57–35.67 gCO_2eq/MJ and a TtW value of 0.12 gCO_2eq/MJ.
- For soybean-based biodiesel (in MEPC 85/7/12) the proposed WtW values range from 30.55 to 31.87 gCO_2eq/MJ, comprising WtT values of 25.39–26.71 gCO_2eq/MJ and a TtW value of 5.16 gCO_2eq/MJ.

All submissions use the GREET 2024 model and assess three production scenarios reflecting variations in electricity sources and production or supply-chain conditions. The WtT assessments cover feedstock cultivation, processing, fuel production and transportation, but exclude potential land-use-change emissions; the renewable diesel and ethanol submissions also exclude potential indirect land-use-change (ILUC) emissions. The assessments treat biogenic CO_2 as carbon neutral. The proposed TtW factors draw on existing IMO marine diesel oil and methanol emission factors, assuming comparable engine and fuel characteristics rather than relying on direct marine engine data for each biofuel.

China *(in MEPC 85/7/28)* argues that further classification of biomass-based fuel pathways should be guided by principles agreed by Member States before GESAMP-LCA WG proceeds with detailed categorisation, warning that increasingly granular or inconsistent categories could create data gaps, regional rather than globally applicable default values, longer review cycles and higher administrative costs. It favours prioritising pathways and characteristics that are clearly defined and relevant to industry implementation, including sustainability attributes such as used cooking oil, while simplifying some crop-based pathways until IMO sustainability standards, including ILUC criteria, are further developed. China also opposes secondary adjustments to IMO-approved global default emission factors based on parameters such as electricity-grid emissions or fuel transport, arguing that approved defaults should already be representative and conservative, and that further adjustments would add complexity and potentially exceed the GESAMP-LCA WG's mandate. Finally, it questions the proposed Medium-ILUC risk classification, arguing that it is conceptually unclear to define an inherently unobservable and unverifiable risk category using verifiable criteria such as direct land-use safeguards and feedstock traceability, and calls for further methodological clarification.

Argentina *(in MEPC 85/7/18)* proposes a WtW default GHG emission factor for FAME produced in Argentina, for inclusion in the 2024 IMO LCA Guidelines. The proposed default is 22.78 gCO_2eq/MJ using GWP100 (or 26.19 gCO_2eq/MJ using GWP20), comprising a WtT factor of 17.38 gCO_2eq/MJ and a TtW factor of 5.41 gCO_2eq/MJ (GWP100). The assessment uses country-specific agricultural and industrial data, covering three consecutive crop seasons (2023/24, 2024/25 and projected 2025/26), and accounts for soybean cultivation, processing, biodiesel production and transportation to the Greater Rosario port complex. Argentina selects the highest of the three WtW results as its proposed default, with the variation between cases (21.96–22.78 gCO_2eq/MJ) attributable to differences in agricultural production. Direct land-use change and soil carbon accumulation are excluded. The TtW factor relies on methane and nitrous oxide emission factors adopted by analogy with other liquid marine fuels, rather than direct engine measurements for soybean FAME.

CLIA, IPIECA, RINA and SGMF *(in MEPC 85/7/26)* support the GESAMP-LCA Working Group's proposal to develop an internal database of lifecycle emission factors from published literature and, where sufficient evidence exists, to prepare its own proposed default factors for the Committee's consideration. They argue that this could accelerate the completion of Appendix 2 of the 2024 LCA Guidelines, which covers more than 100 fuel pathways, and provide greater certainty for industry investment and compliance planning. However, they call for clear methodological safeguards to ensure that literature-derived values receive the same scientific scrutiny as Member State submissions. These should include transparent criteria for selecting and assessing studies; consistent pathway definitions and comparable system boundaries, assumptions and GWP factors; clear treatment of outdated, incomplete or overlapping evidence; and consideration of independently verified actual emissions data. They also call for the database and supporting information to be accessible to Member States and international organisations, with the Group explaining how it selects, adjusts, weights and averages evidence when recommending default factors. Finally, they propose a structured review process, with defined intervals and criteria for updating approved factors, and clarity on how revised values would apply to existing compliance assessments under future MARPOL Annex VI requirements.

IBIA (in MEPC 85/INF.10) proposes a biofuel blend checklist for FAME-based biofuels, which it hopes will help ship operators to address and mitigate the different and additional operational risks which accompanies the increased use of biofuel blends as a marine fuel.

Noting GESAMP-LCA WG's conclusion that the existing mixed 1st, 2nd and 3rd generation feedstock category was insufficiently specific and recommended a new categorization and fuel pathway code for methane produced from waste and residues feedstocks, ***INTERTANKO et al. (ISWG-GHG 23/4/4)*** propose a progressive, evidence-based approach to further biofuel feedstock categorization, rather than establishing a separate fuel pathway for every individual feedstock, while recognizing that broader considerations regarding biomass categorization may arise across different fuel pathways. It proposes an initial differentiation of waste and residues feedstocks and invites the Group to provide direction on further categorization, including its application to default and actual values and associated fuel pathway codes. It also recognized the feedstock dependency of avoided emissions and their potential material impact on manure- and organic-waste-based pathways.

7.3: Land use change

OG analysis

Although direct land use change (DLUC) is considered under the LCA Guidelines, indirect land-use change (ILUC) is not unaccounted for, as it is difficult to quantify. However, there is consensus that if ILUC emissions were captured, the carbon intensity of biofuels would be significantly impacted. Whilst biofuels can currently be used to comply with the NZF, first generation biofuels, including virgin palm oil, are associated with high ILUC emissions that could lead to a net increase in emissions comparable to fossil fuels . This underscores the need for robust guardrails to exclude high-ILUC-risk feedstocks, ensuring that compliance does not incentivise fuels that compromise achieving 1.5°C as well as a just and equitable transition. Importantly, ILUC cannot be directly measured and is therefore challenging to quantify. Because of this, ILUC cannot be adequately addressed by project- or regional-specific accounting, because the impacts of ILUC can occur far from the site of a biofuels project. Instead, a global, risk-based approach should be preferred.

Pacific Environment et al *(in MEPC 85/7/32 and MEPC 85/7/33)* argue that the proposed ILUC risk classification methodology needs to establish clear links between risk categories and measures to mitigate their environmental impacts, supported by a robust, transparent, and global assessment framework. They contend that the proposed medium-ILUC risk category could effectively reclassify food- and feed-crop-based biofuels as eligible without addressing ILUC, since DLUC safeguards and supply-chain traceability do not prevent market-driven displacement of agricultural production beyond individual project boundaries. They therefore recommend complementing project-level safeguards with global, feedstock-specific assessments drawing on economic modelling, geospatial and remote-sensing data, trade and production statistics, and scientific literature, informed by approaches used under EU, ICAO and California frameworks. They recommend excluding high-ILUC risk feedstocks from IMO compliance altogether and introducing a cap or conservative emissions penalty for medium-ILUC risk feedstocks. For low-ILUC risk classification, the sponsors propose aligning with ICAO's CORSIA methodology, strengthened by dynamic yield baselines and additionality tests to ensure that increased feedstock production genuinely exceeds business-as-usual levels and avoids market-mediated land expansion. They also recommend excluding broadly defined 'unused land' from eligibility, recognising only abandoned or degraded land, and periodically reassessing certified projects to ensure they continue to deliver additional production. The framework should establish a baseline before significant maritime biofuel uptake, cover all feedstocks through mutually exclusive risk categories, and regularly reassess risks as global agricultural markets and biofuel demand evolve.

The **United States *(in MEPC 85/7/25*)** opposes the GESAMP-LCA Working Group's proposed ILUC risk classification framework in its current form, which would classify all feedstocks as high risk by default, reduce them to medium risk where production is traceable and meets specified sustainability criteria, and classify certain wastes, residues, yield-increase practices and unused-land production as low risk. The U.S argues that feedstock type, production practices and traceability alone do not reliably capture the market effects that drive ILUC, for example, demand for tallow or used cooking oil can indirectly incentivise agricultural expansion and deforestation, while yield increases or cultivation on supposedly unused land may also encourage land conversion. Instead, it proposes a regional, evidence-based approach using agricultural-driven forest carbon emissions intensity to identify high land-use-change-risk regions, with biofuel projects sourcing feedstocks outside those regions classified as low risk. The approach would use publicly available, annually updated data and assess risk at project level. The U.S asks MEPC not to adopt the proposed framework or consider associated policy measures, such as feedstock caps, bans and penalties, until the classification methodology is further developed; it invites GESAMP-LCA to consider its regional approach alongside global and project-level indicators.

OG analysis

The U.S' approach risks being too narrow to capture the full dynamics of ILUC. Classifying projects sourcing outside regions with the highest historical agricultural-driven forest emissions as low risk could overlook displacement effects, emerging agricultural frontiers and market-mediated land-use change occurring beyond currently identified hotspots. Historical forest-loss data may also lag behind new demand pressures, while a regional classification cannot necessarily establish that a particular biofuel project causes no indirect land conversion. Importantly, the proposal could create a relatively permissive route for biofuels to qualify as low risk without adequately accounting for indirect impacts across interconnected commodity markets. A robust framework should therefore combine regional deforestation indicators with feedstock- and project-level assessments of market effects, traceability and land-use safeguards, rather than treating geographic origin as a sufficient proxy for low ILUC risk.

Malaysia *(in MEPC 85/7/34)* argues that any ILUC risk methodology under the NZF should be dynamic, evidence-based and non-discriminatory, rather than relying solely on fixed, category-wide or regional classifications. It contends that verified sustainability improvements, including certification, traceability, land-use monitoring and enforceable land-management commitments, should allow specific feedstocks and production pathways to demonstrate reduced or low-ILUC risk, subject to robust scientific evidence, transparent criteria and safeguards against leakage, displacement and double counting. Citing its experience in World Trade Organization (WTO) disputes concerning the EU's high-ILUC risk classification of palm-oil-based biofuels, Malaysia emphasises the need for current data and objectively verifiable, consistently applied criteria. It also highlights the potential importance of sustainably produced drop-in fuels for existing ships in South-East Asia, particularly where vessel conversion or access to alternative-fuel bunkering infrastructure is constrained.

OG analysis

A dynamic methodology must not allow certification or improvements at individual production sites to obscure the wider, indirect effects of increased demand for biofuel feedstocks. In particular, measures to prevent deforestation or land conversion within certified supply chains do not necessarily address displacement of existing agricultural production into other areas, which is central to ILUC risk. Any methodology must therefore assess actual and consequential land-use impacts across the wider supply chain, rather than treating sustainability certification as sufficient evidence of low-ILUC risk. Malaysia's emphasis on the availability of drop-in fuels for existing ships also risks conflating technical compatibility and fuel availability with environmental sustainability: the fact that a fuel can be used in existing vessels does not establish that it delivers genuine lifecycle GHG reductions. The GESAMP-LCA WG should ensure that any flexibility to recognise improved production practices is underpinned by independently verified, additional and measurable emissions reductions, while retaining precautionary default values where robust evidence is unavailable.

Brazil *(in ISWG-GHG 23/4/6)* proposes how the IMO should manage biofuels once classified as high-, medium- or low- ILUC risk. It recommends treating the categories as a traffic-light system:

- High-ILUC-risk projects would be ineligible to count towards IMO decarbonisation targets
- Medium-risk projects would be eligible subject to restrictions. For medium-risk biofuels, Brazil presents two options: introduce caps immediately for the period up to 2028–2030, or defer caps until after 2030, reflecting expected short-term constraints on production and certification.
- Low-risk projects would be fully eligible.

Brazil suggests an indicative range of 0.9–2.2 EJ per year for a potential 2030 cap, based on projected shipping biofuel demand, including both low- and medium-ILUC-risk fuels. Brazil proposes initially setting caps through a qualitative assessment of shipping demand, fuel supply and decarbonisation targets, followed by more detailed analysis using existing ILUC studies and dedicated IMO research informed by the Fifth IMO GHG Study. It calls for regular review of any caps, with a first review no later than 2030, and further work by the GESAMP-LCA Working Group to develop the methodology and incorporate the proposed categories into the 2024 LCA Guidelines.

7.4: Food Security

Pacific Environment et al ***(in MEPC 85/7/16)*** highlight the potential food-security risks of increased demand for food- and feed-based biofuels under the NZF, arguing that these impacts must be assessed separately from those arising from higher maritime transport costs. They cite estimates that shipping could require up to 140 billion litres of virgin vegetable-oil-based biofuels by 2035, potentially tripling global vegetable oil prices (+175%) and adding approximately US$26 billion annually to food costs for African consumers. The submission draws on research linking first-generation biofuel expansion to higher agricultural commodity prices, increased competition for land, water and fertilisers, and reduced food affordability, with disproportionate impacts on low-income populations and net food-importing developing countries, particularly LDCs and SIDS. It therefore asks MEPC to commission a dedicated assessment of the food-price and food-security impacts of shipping's demand for food- and feed-based biofuels under the NZF, and to treat these as a distinct potential disproportionate negative impact (DNI) when developing safeguards. The authors stress that existing safeguards, such as restrictions on high-ILUC feedstocks and caps on foodcrop biofuels, may only partially mitigate these risks.

7.5: Sustainable Fuel Certification Schemes

Where Chain of Custody (CoC) models focus on how fuel attributes are tracked through the supply chain, SFCS is the system that verifies and certifies those attributes.

The **Russian Federation** ***(in MEPC 85/7/20)*** proposes five principles to guide the IMO Guidelines for recognising SFCS: **(1)** non-discriminatory access and transparency, ensuring recognition is based on objective sustainability criteria and that decisions can be justified and appealed; **(2)** equal conditions for all stakeholders, so fuel producers and certification bodies across IMO Member States have fair access to the process; **(3)** sufficient preparation time, arguing that the previously discussed timetable would allow only around three and a half months to develop schemes and submit applications, potentially favouring already-established certification bodies; **(4)** standardised, measurable sustainability criteria and certification requirements, to enable mutual recognition and avoid market fragmentation; and **(5)** clear procedures for granting, suspending and withdrawing recognition, including notification and opportunities to remedy deficiencies.

Brazil, Canada, Singapore, the UK, IPIECA and RINA ***(in ISWG-GHG 23/4)*** present updated draft guidelines for IMO recognition of SFCS, covering WtT emissions and fuel sustainability. The proposals strengthen oversight, non-compliance reporting and supply-chain traceability, requiring certified fuel claims to remain linked to physical quantities and preventing double counting. They introduce mass-balance requirements, including site-level accounting, balancing periods of no more than three months, no negative balances and seven-year record retention. However, the mass-balance provisions remain subject to further refinement, particularly for interconnected infrastructure. The document also proposes five-year recognition periods, procedures for reviewing and revoking certification schemes, and annual reporting to the IMO. Further work is needed on traceability, data reporting and the composition and resourcing of the SFCS Assessment Group. The co-sponsors recommend interim adoption at MEPC 85, followed by further development through a correspondence group towards final guidelines at MEPC 86.

Iran ***(in ISWG-GHG 23/4/1)*** proposes targeted safeguards to complement the draft SFCS Guidelines, calling for recognised schemes to support training and knowledge-sharing

and for the SFCS Assessment Group to enable meaningful participation by developing-country experts, including SIDS and LDCs. It supports time-limited extensions or remote audits where certification is delayed through no fault of the operator, provided equivalent assurance is maintained and core requirements on GHG accounting, traceability and verification are upheld. Iran also argues that private certification requirements should not become de facto barriers to IMO fuel eligibility, and that only social and economic sustainability criteria formally agreed by the IMO should be mandatory. Iran proposes proportionate data governance, including data minimisation, protection of commercially sensitive information and avoiding duplicate reporting across IMO systems. Finally, Iran calls for legal certainty for good-faith users, arguing that revocation of a recognised scheme should not automatically invalidate previously issued certificates or proofs of sustainability; retroactive invalidation should be exceptional, supported by clear and compelling evidence of fraud or material invalidity, and subject to due process. Iran recommends that these safeguards be incorporated alongside continued work on interconnected infrastructure, reporting and cross-checking, and the SFCS Assessment Group.

Pacific Environment ***(ISWG-GHG 23/4/2)*** submits a study by Nanyang Technological University comparing existing biofuel and e-fuel certification schemes, including ISCC, RSB, the EU Renewable Energy Directive, CORSIA and national schemes in Brazil, California and the United States, to inform the IMO's SFCS framework. The study finds that International Sustainability & Carbon Certification (ISCC) dominates voluntary biofuel certification and identifies feedstock fraud, particularly virgin crop oils misrepresented as waste-based feedstocks such as used cooking oil and palm oil mill effluent. It compares chain-of-custody models, finding physical segregation the most stringent, while mass balance permits mixing with sustainability attributes tracked through accounting and book-and-claim fully separates those attributes from the physical fuel. It highlights the importance of audits, plausibility checks and additional verification, including chemical fingerprinting, to detect fraud and strengthen traceability. The study also identifies significant differences in lifecycle GHG accounting: while most schemes cover WtW emissions, CORSIA and U.S schemes include ILUC, whereas the EU RED does not; low-ILUC-risk certification can exempt certain crop-based feedstocks from quantitative ILUC emissions and other restrictions. It recommends further development and cost-benefit assessment of fuel fingerprinting for the NZF, alongside stronger traceability measures, including a centralised database of fuel transactions to prevent double counting, and a risk-based approach to limiting or phasing out high-risk crop feedstocks to protect ecosystems and food security.

7.6: Sustainability aspects of marine fuels

Djibouti, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Somalia and Yemen ***(in ISWG-GHG 23/4/11)*** propose to remove sustainability theme/aspect 2 (carbon source) from the Fuel Lifecycle Label (FLL) framework. They argue that its safeguards are already addressed through existing quantitative GHG accounting requirements and further contend that the objective of preventing increased GHG intensity from fossil energy sources is already captured by the WtW methodology, making a separate qualitative carbon-source criterion duplicative and potentially discriminatory by allowing certification schemes to exclude fuel pathways with equivalent verified lifecycle emissions performance. The proposed amendments are limited to Section 7 (Sustainability) and Table 1 of the Guidelines, with consequential renumbering of the remaining sustainability themes; they do not change the WtT, TtW, or WtW calculation methodologies, fuel pathway codes or other parts of the FLL.

Pacific Environment, CSC and EDF *(in ISWG-GHG 23/4/13)* argue that the 2024 IMO LCA Guidelines must retain and strengthen their quantitative sustainability criteria for water, air, soil, waste and chemicals, and conservation (aspects 6–10), rather than replacing them with a general requirement to comply with national regulations. They argue that regulatory standards and enforcement vary between jurisdictions and cannot provide a consistent basis for assessing fuel pathways, potentially encouraging production and bunkering in countries with weaker safeguards and shifting environmental and health burdens onto local communities. Using ammonia and crop-based biofuels as examples, they highlight how different production and emissions controls can produce significantly different impacts, as ammonia's lifecycle reactive nitrogen emissions could be up to 66% lower or 185% higher than Very Low Sulphur Fuel Oil (VLSFO), while excessive fertiliser use in biofuel production contributes to nitrogen pollution. These impacts extend beyond GHG emissions to air quality, public health, biodiversity and ecosystems, and may undermine the wider environmental benefits of shipping's energy transition. They therefore propose identifying ways to strengthen and operationalise aspects 6–10, using the planetary boundaries framework to assess marine fuel lifecycle impacts against the Earth system's safe operating space.

CSC (in ISWG-GHG 23/4/14) summarises the outcomes so far from the Correspondence Group on Further Development of the LCA Framework (the CG) on "other social and economic sustainability themes/aspects of marine fuels", noting their three rounds of discussion and areas of consensus, including human rights and food security, as well as reiterating their previous submission emphasising that applying these themes/aspects to methane-based fuels would likely deem them incompatible with ZNZ pathways. Noting the proposal (by Brazil in ISWG-GHG 21/3) to reform the CG, CSC responds to the Chair's recommendation that Member States and international organisations propose a structured way forward. CSC invites the Working Group to recommend to the Committee that the five widely agreed social and economic sustainability themes/aspects of marine fuels be included in the LCA guidelines, and encourages the Committee to consider the inclusion of quantitative research and data in the assessment of these criteria under the 2024 LCA Guidelines.

7.7: Other topics under the LCA Framework

Türkiye *(in MEPC 85/7/5)* proposes exploring life cycle costing and social life cycle assessment as complementary tools to inform implementation of the 2023 IMO GHG Strategy and support a just and equitable transition. A review of 214 studies identified significant methodological gaps, particularly in maritime-specific social assessments, while existing cost estimates vary considerably depending on fuel pathway, ship type, route and regional context. Türkiye therefore proposes first mapping existing IMO, ILO and UNEP methodologies, followed by voluntary pilot assessments to test non-mandatory cost-reporting templates and proportionate screening of social risks, including labour conditions, occupational safety, skills and impacts on local communities. Importantly, these tools would remain separate from the 2024 LCA Guidelines: they would not alter GHG intensity calculations, fuel eligibility, compliance requirements or the scope of the Fuel Lifecycle Label (FLL). MEPC is invited to recognise economic and social considerations as complementary evidence in impact assessments and just-transition work and invite further proposals before considering any additional guidance or regulatory action.

RINA (in ISWG-GHG 23/4/5) reports the outcome of an informal working group established following document ISWG-GHG 20/2/29 (Norway et al.) and proposes amendments to the Fuel Lifecycle Label (FLL) in the 2024 LCA Guidelines for the purpose

of further development and discussion. The FLL is revised to cover well-to-tank (WtT) emissions only, to take the form of a standardized electronic template, and to accompany all bunkering including those of fossil fuels. The proposed amendments to the 2024 LCA Guidelines affect principally sections 8 (FLL) and 11 (elements subject to verification/certification), with section 12 proposed for deletion, and are set out in the annex. The document also raises for further consideration whether use of the FLL should be made mandatory, and the need for a centralized database to support verification.

CEA (in ISWG-GHG 23/4/7) comments on the draft terms of reference for the Sustainable Fuel Certification Schemes Assessment Group (SFCS AG) (document MEPC 84/WP.5 on the report of ISWG-GHG) 21. The submission outlines gaps that might enable potential fraud pathways, including feedstock misrepresentation, duplication of environmental attributes, misstatement of lifecycle emissions, and changes through trading chains. It subsequently proposes targeted amendments to strengthen technical oversight of Sustainable Fuel Certification integrity. The submission calls for effective detection, investigation, corrective action and enforcement within the wider framework. CEA invites the Committee to determine the appropriate bodies and arrangements within relevant mandates and legal frameworks, noting that resource implications require further assessment.

Section 8: Air pollution prevention

WWF, Pacific Environment and CSC *(in MEPC 85/5/2)* propose a technology-neutral environmental standard under MARPOL Annex VI requiring alternative compliance arrangements approved under Regulation 4 to achieve the same environmental outcome as using compliant low-sulphur fuel, reducing air pollution without transferring pollutants into the aquatic environment. They argue that exhaust gas cleaning systems can meet sulphur limits while transferring pollutants, including metals, into discharge water, and that this pollution transfer is not adequately addressed by the existing equivalency framework. They propose two ways to demonstrate compliance: **(1)** a zero-discharge approach, retaining Exhaust Gas Cleaning System wash water on board for delivery to reception facilities or other approved management; or **(2)** a pollutant-free discharge approach, allowing discharge only where specified pollutants are shown to be absent before dilution, using objective thresholds and accredited laboratory testing. The proposed standard would require an amendment to Regulation 4 and apply to both existing and future installations, with phased implementation based on installation dates to account for investment recovery. The co-sponsors invite feedback ahead of developing a more detailed proposal for PPR 14.

Friends of the Earth International, WWF, Pacific Environment and CSC *(in MEPC 85/5/3)* argue that the IMO should urgently regulate black carbon (BC) emissions from ships operating in and near the Arctic, highlighting their contribution to Arctic warming, ice loss and wider climate and ecosystem disruption. Drawing on a September 2026 report, they point to growing risks to the Greenland ice sheet, permafrost, Arctic marine food webs and wider ocean circulation systems, and argue that reducing BC emissions is an important near-term climate intervention. They also invoke the 2025 ICJ Advisory Opinion on climate change obligations, arguing that States have duties under international law to take preventive and precautionary measures to address foreseeable climate harm, including by regulating private-sector emissions. The co-sponsors support the proposed Arctic polar fuel measure submitted to PPR 13, which would require ships operating in a sufficiently broad Arctic area to use cleaner fuels, such as distillates, that

produce substantially less BC than heavier residual fuels. They urge Member States to agree the measure's geographic scope urgently, give PPR 14 the mandate to advance the proposed regulation, and aim to submit it to MEPC 86 for approval.

Pacific Environment and CSC *(in MEPC 85/5/4)* highlights UNEP's warning that global warming is likely to exceed 1.5°C within the next decade, emphasising that overshoot must not be treated as safe or acceptable and that the global goal remains returning to below 1.5°C as rapidly as possible. It argues that achieving an 'overshoot, peak and decline' pathway requires immediate and deep emissions reductions, including cuts to short-lived climate pollutants such as methane and black carbon, followed by sustained decarbonisation to at least net zero and, ultimately, sustained net-negative CO_2 emissions. Carbon dioxide removal will be necessary alongside emissions reductions, not as a substitute, and requires robust governance to manage associated risks and trade-offs. The submission stresses that every fraction of warming avoided and every year spent above 1.5°C reduced will limit climate risks and damages, while highlighting the need for urgent adaptation, stronger societal resilience, and equity and justice at the centre of the response, particularly to protect vulnerable communities. It urges the Committee to consider these findings across its work on air pollution prevention, ship energy efficiency and GHG emissions reduction, with particular attention to reducing shipping's black carbon emissions and their impacts on the Arctic.

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This paper was written by Panos Spiliotis on behalf of Opportunity Green. Any omissions or errors are the fault of the authors alone.

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