OPPORTUNITY GREEN

IMO Briefing: 22nd Session of the Intersessional Working Group on Reduction of Greenhouse Gas Emissions from Ships

August 2026

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Summary

ISWG-GHG 22 will cover several crucial technical topics central to advancing the decarbonisation of international shipping.

Key discussions at ISWG-GHG 22 will focus on the four proposed options for legal amendments to MARPOL Annex VI; the continued development of draft implementation guidelines for the Net-Zero Fund; verification guidelines for fuel intensity thresholds; definitions and reward guidelines for ZNZ fuels; and the Life-cycle Assessment (LCA) Framework. A central point of discussion will be ensuring that they support a just and equitable transition, particularly for climate vulnerable and developing countries, while providing transparency, predictability, and clear investment signals for industry.

Constructive progress made at ISWG-GHG 22 could encourage further support of the NZF at MEPC 85 in December 2026.

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.

List of Abbreviations

CCS	Carbon Capture and Storage
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: Outcomes of the April 2026 IMO Meetings

1.1 21st Session of the ISWG-GHG

The technical meetings of ISWG-GHG 21 (20-24 April 2026) made progress on the implementation guidelines underpinning the Net-Zero Framework (NZF)[1], including for the Greenhouse Gas (GHG) Fuel Intensity (GFI) regulatory mechanism, verification of fuel consumption data, wind propulsion, Sustainable Fuel Certification Schemes (SFCS), and zero- and near-zero (ZNZ) emission fuels, technologies and energy sources. The Working Group also considered the proposed Net-Zero Fund, including its governance and potential approaches to revenue disbursement, as well as possible measures to address food security.

The meeting also advanced the Life Cycle GHG Assessment (LCA) framework, including consideration of recommendations from the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP)- LCA Working Group on methodological issues and proposed default well-to-wake (WtW) emission values[2]. This was particularly relevant to establish how different fuels should be assessed under the 2024 LCA Guidelines.

1.2 84th Session of the Marine Environment Protection Committee (MEPC)

Held immediately after ISWG-GHG 21 was the first substantive political discussion of the NZF following the decision to adjourn the 2nd Extraordinary Session (ES.2) in October 2025.

Member States revisited the question of how to move forward with the Framework and considered various alternative approaches, notably proposals from Argentina[3], Liberia, and Japan[4]. However, these proposals did not attract sufficient support to displace the NZF. The Argentina proposal received substantially more backing that Japan's, but support remained concentrated amongst States already opposed to the NZF.

In the end 59 of the 106 States that took the floor supporting the NZF as the basis for further work, which represented continued significant support for the Framework approved in April 2025. Beyond the NZF, MEPC 84 finalised the Terms of Reference for the 5th IMO GHG Study, including improvements intended to address inconsistencies between previous emissions estimates and the IMO's WtW approach and to make greater use of data from the IMO Data Collection System. The Committee also began the second phase of the Carbon Intensity Indicator (CII) review, considering possible changes to the CII metric, the Ship Energy Efficiency Management Plan (SEEMP) requirements and its relationship with the NZF, although no major conclusions were reached on these issues.

Section 2: Key issues to be discussed at ISWG-GHG 22 (1-4 September 2026)

2.1 Proposed legal amendments to MARPOL Annex VI

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[1] International Maritime Organization, 2025, Circular Letter No.5005: Draft revised MARPOL Annex VI, available at: IMO DOCS

[2] UCL Energy Institute, 2026, An overview of the discussions from IMO's 84th Marine Environment Protection Committee

[3] Argentina, Liberia, Panama, document MEPC 84/7/38, available on IMO Docs

[4] Japan, document MEPC 84/7/49, available on IMO Docs

2.1.1 Mandatory universal levy

Tuvalu's proposal ***(in Circular Letter No.5215)*** 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% (see table 2). This means that direct compliance with the GFI would require zero emissions. Because direct compliance is increased to zero emissions, there is no window for Surplus Units (SUs) to be issued, and these are therefore eliminated. Therefore, any emissions above zero would be priced through the purchase of Remedial Units (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 basis. The price of tier 2 emissions (above the base threshold) remains at USD 380 per tonne CO_2eq.

OG analysis: This proposal is positive for both rapid emissions reductions and a just and equitable transition[5]. The increased price of all emissions serves as a strong market signal and a direct incentive for shipowners to transition to ZNZ fuels. It also reduces the viability of false solutions like LNG and biofuels and instead incentivises true ZNZs such as wind propulsion (WPS) and e-fuels. Increased revenues being collected into the Net-Zero Fund from the sale of more, and more expensive, RUs, will mean increased flows to both ZNZ rewards, further increasing the incentive and capacity of ships to transition, and to developing countries to advance a just and equitable transition.

Tuvalu's proposal offers the strongest chance for meeting the goals of the 2023 IMO GHG strategy, the Paris Agreement and States' international legal obligations[6], as well as providing the strongest support to a just and equitable maritime transition. However, as a substantively similar version of this proposal did not garner sufficient support in April 2025, Tuvalu is prepared to support the NZF 'as is' as a compromise.

2.1.2 Net-Zero Framework 'as is'

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

OG analysis: The NZF provides a strong foundation to build further climate ambition and support a just and equitable transition[7]. It would lead to concrete emissions reductions and represents a balance between ambition and conservativism that is widely considered to be

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[5] Dr. Christiaan De Beukelaer, 2025, We Must Stop Subsidising Fossil Fuels and Tax Them Instead: A Shipping Levy is the Best Way to Get Serious This Year, available at: https://static1.squarespace.com/static/68e6ae733b9cf960924400c3/t/6939fe320d079c3c7368fb7e/1765408306795/We+Must+Stop+Subsidising+Fossil+Fuels+and+Tax+them+Instead-+A+Shipping+Levy+is+the+Best+Way+to+get+Serious+this+Year.pdf

[6] International Court of Justice, 2025, Obligations of States in respect of Climate Change, available at: https://www.icj-cij.org/case/187; International Tribunal for the Law of the Sea, 2024, Advisory Opinion on Climate Change and International Law, available at: https://www.itlos.org/fileadmin/itlos/documents/cases/31/Advisory_Opinion/C31_Adv_Op_21.05.2024_orig.pdf; Inter-American Court of Human Rights, 2025, Advisory opinion concerning State obligations in response to the climate emergency, available at: https://www.corteidh.or.cr/docs/opiniones/seriea_32_en.pdf

[7] Opportunity Green, 2025, IMO Net-Zero Framework: opportunities for ambitious action, available at: https://opportunitygreen.org/shipping/briefings/imo-net-zero-framework/

the only politically viable option. This proposal represents a hard-fought multilateral agreement that enjoyed majority support during ES.2 before the decision was taken to adjourn. It is also expected to generate some US $10bn per year[8] from carbon pricing which will be split between ZNZ rewards and supporting resilience measures in climate vulnerable countries.

2.1.3 NZF with delayed GHG Fuel Intensity targets

Brazil's submission ***(in Circular Letter No.5214)*** 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.

Brazil also clarifies that the legal text would not include any levy or tax but instead operate through a flexible compliance mechanism allowing ships to meet targets through direct emission reductions or by using compliance units, including those linked to financial contributions. Brazil also suggests replacing the Net-Zero Fund with a lighter 'facility' model, which instead of maintaining a comprehensive governance and management structure, would be designed through accredited implementing institutions.

OG analysis: The proposal may make adoption of the NZF more acceptable to a broader range of Member States by reducing early compliance burdens and increasing cost predictability. However, this flexibility comes at the expense of weaker short-term incentives for investment in ZNZ fuels, making it harder to achieve the IMO's 2030 fuel use targets. The delayed trajectory could also allow LNG to remain a viable compliance option for longer, as less stringency in the initial years would reduce the pressure on ships to move rapidly away from fossil-based fuels. In addition, modelling by IMarEST[9] suggests that the softer start/harder finish scenario Brazil proposes, produces the highest rate of biofuel demand growth in the late 2030s. Although the proposal seeks to compensate through steeper GFI reductions in the 2040s, this approach would nevertheless result in higher cumulative emissions and therefore may also reduce alignment with a 1.5°C pathway under the Paris Agreement and could be viewed as reducing the urgency of mitigation efforts at a time when States are increasingly expected under international law to take timely and effective measures to address climate change.

In addition, although an IMO 'facility' could still receive revenues from Tier 2 RUs, substantial revenue generation would likely be postponed until around 2032, meaning that climate

[8] Transport & Environment, 'IMO Net-Zero Framework: Assessing the impact of the IMO's draft Net-Zero Framework' (Briefing, April 2025) https://www.transportenvironment.org/uploads/files/Impact-of-the-IMOs-draft-Net-ZeroFramework-April-2025.pdf accessed 29 October 2025; and, Smith, T, Frosch, A., Fricaudet, M., Majidova, P., Oluteye, D.,Baresic, D. & Rehmatulla.

[9] See a more complete summary of IMarEST's submission to ISWG-GHG 22 on modelling the four proposed legal amendments on page 10 of this brief.

vulnerable developing States would be left without financial support to ensure a just and equitable transition.

2.1.4 Removal of the economic element

Liberia's proposal ***(in Circular Letter No.5213)*** outlines a substantially different model to the NZF, centered on a fuel standard combined with tradable compliance credits, banking and borrowing of SUs, thereby creating what is effectively a carbon market for international shipping. Compliance would be achieved primarily through trading mechanisms rather than mandatory payments into a Net-Zero Fund. The proposal also links future increases in greenhouse gas GFI stringency to periodic assessments of the affordability, availability, and scalability of commercially viable fuels.

OG analysis: This approach risks significantly weakening investment signals for truly sustainable 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, these risks encourage continued reliance on fossil fuels, liquified natural gas (LNG), and biofuels which are unable to deliver the emissions reductions needed to achieve the IMO's 2023 GHG Strategy targets or put international shipping on a pathway consistent with the Paris Agreement.

In addition, removing the Net-Zero Fund eliminates a practical mechanism for financing a just and equitable transition. Without dedicated revenue collection and equitable redistribution 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 [10] . It would also drastically reduce the sector's contribution to mobilising finance for developing countries and weaken alignment with States' broader obligations to cooperate in addressing climate change and its impacts.

[10] Opportunity Green, 2026, Why we need the economic element in the IMO Net-Zero Framework, available at: https://opportunitygreen.org/shipping/briefings/need-economic-element-in-imo-net-zero-framework/

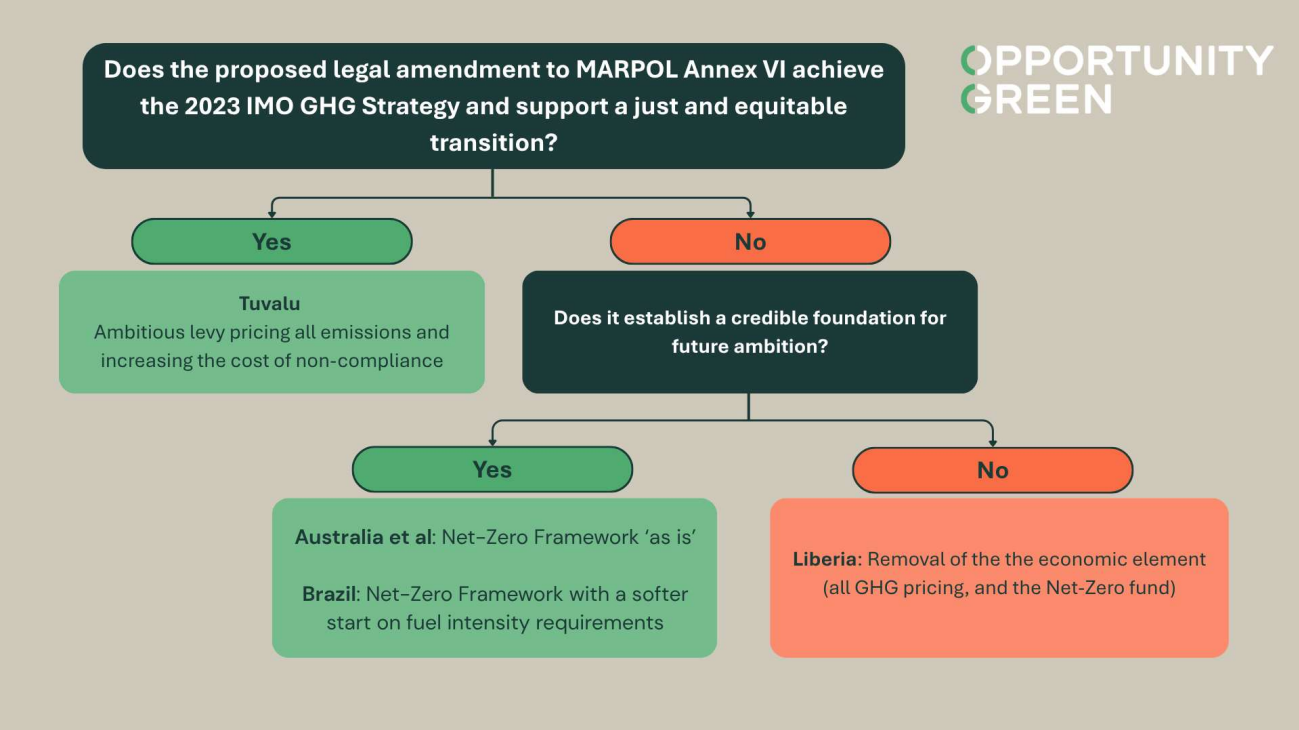

FIGURE 1: PROPOSED LEGAL AMENDMENTS TO MARPOL ANNEX VI AND THEIR ALIGNMENT WITH CLIMATE AMBITION AND A JUST AND EQUITABLE TRANSITION

2.2 Comments on the proposed amendments to MARPOL Annex VI

Norway *(in ISWG-GHG 22/2/3)* concludes that Liberia's proposed amendments to MARPOL Annex VI are not aligned with the IMO 2023 GHG Strategy, as it removes the economic element of the NZF, including the option to purchase RUs and the Net-Zero Fund, thereby weakening the Framework's ability to provide cost-effective compliance, support a just and equitable transition, and incentivise the uptake of ZNZ fuels, technologies, and energy sources. Norway also argues that linking the GFI trajectory to commercially available fuels, based on affordability, availability, and scalability criteria would fail to deliver the 2030 and 2040 emission reduction checkpoints, provide an insufficient demand signal for low-GHG fuels, and risk locking in fossil fuels. Furthermore, Norway raises concerns that the proposal to remove the definition of ZNZs and the reward mechanism supporting their uptake weakens compliance by removing the RU option in favour of borrowing and banking SUs. Norway also objects to Liberia's proposed introduction of a 'Commercially Viable Fuel' concept, which could be considered legally inappropriate as it would allow commercial market conditions to determine regulatory obligations. Norway concludes that a robust technical element with a defined GFI reduction trajectory, combined with an effective economic element remains essential to provide regulatory certainty, support investment, and deliver a just and equitable transition.

Kiribati et al *(in ISWG-GHG 22/2/7)* urge Member States to adopt the NZF at MEPC 85 (or the resumed 2nd Extraordinary Session (ES.2)) without further delay, arguing that failure to do so would undermine both IMO's credibility and global climate action. While reaffirming their preference for a mandatory universal levy, the co-sponsors recognise the importance of securing a globally agreeable solution and therefore the NZF 'as it' is the limit of compromise they are willing to accept.

The **Solomon Islands *(in ISWG-GHG 22/2/6)*** outlines that ISWG-GHG 22 must remain within its mandate to develop measures in line with the IMO 2023 GHG Strategy, rather than reopening or revising the Strategy itself. The paper stresses that proposals seeking to adjust the Strategy's targets according to fuel costs, availability or uptake, or to remove direct revenue raising mechanisms, go beyond the Working Group's mandate. The Solomon Islands concludes that only papers *MEPC 84/7/36* by Fiji et al, *MEPC 84/7/37* by Brazil, and the work on implementation guidelines are consistent with the Strategy and therefore appropriate for consideration under ISWG-GHG's mandate.

The Institute of Marine Engineering, Science and Technology (IMarEST) *(in ISWG-GHG 22/2/2)* presents modelling and analysis of the four proposed MARPOL Annex VI amendment options circulated in 2026, assessing their expected impacts on shipping, transport costs, and their ability to deliver the objectives of the IMO 2023 GHG Strategy. Finding that the proposal by Tuvalu on the NZF as a levy delivers the greatest emissions reductions, driven by stronger incentives, increased uptake of biofuels in the 2030s and transition to e- and blue ammonia in the 2040s. The NZF 'as is' provides a lower cost pathway and generates revenues to support the transition but does not meet the 2030 and 2040 interim checkpoints of the IMO 2023 GHG Strategy. Brazil's proposal results in higher cumulative emissions due to delayed implementation and weaker early incentives, while Liberia's proposal is unlikely to deliver emissions reductions consistent with the IMO 2023 Strategy due to weaker fuel intensity trajectories and limited incentives for ZNZ uptake.

Austria et al *(in ISWG-GHG 22/2/1)* emphasise that the final mid-term measures should: (1) result in emission reductions on a WtW basis, gradually increasing over time, consistent with reaching net-zero GHG emissions by or around 2050, (2) establish a predictable, increasing, and certain demand for sustainable fuels, energy sources and technologies, including ZNZs, (3) allow effective enforcement of compliance options while providing flexibility to ships to support a smooth and cost-effective transition, (4) create long-term regulatory certainty for capital investment with a clear date of entry into force, (5) provide a flexible compliance mechanism that maintains a level playing field between ships that meet the fuel standard and those that rely on other compliance mechanisms, (6) provide the necessary means to allow countries, particularly Small Island Developing States (SIDS) and Least Developed Counties (LDCs), to support the energy transition of shipping while addressing disproportionally negative impacts, including on food security.

Saudi Arabia and United Arab Emirates *(in ISWG-GHG 22/2/10)* propose a set of guiding principles for developing revised mid-term GHG reduction measures arguing that the current draft NZF lacks sufficient consensus, technical maturity and operational readiness following the adjournment of its adoption at ES.2. The sponsors call for any future framework to remain consistent with the IMO 2023 GHG Strategy, while being based on consensus, evidence-based decision making and consideration of the differing circumstances of Member States. Saudi Arabia and UAE argue that quantitative elements of the NZF, including the costs of SUs and RUs should not be arbitrarily determined, but should reflect evidence on sectoral realities, the maturity and availability of technologies and fuels, and the needs of developing countries by safeguarding international trade, food, energy, and economic development. The proposal also

explicitly opposes centrally determined market elements such as fixed or administered carbon prices, suggesting that costs could shift onto consumers.

Furthermore, **Saudi Arabia and UAE *(in ISWG-GHG 22/2/11)*** argue that the NZF could create uneven economic and trade impacts because compliance costs will be distributed differently depending on freight market conditions, commodity demand and route distance. The proposal highlights that longer voyages generally incur higher fuel-related compliance costs, potentially disadvantaging remote, long-haul and trade-dependent economies, while tight freight markets could amplify costs through reduced shipping capacity and higher rates. Overall, the sponsors call for alternative approaches that avoid structurally disadvantaging particular States or trade patterns.

OG analysis: The potential for disproportionate trade impacts on remote economies, including SIDS and LDCs, is an important consideration in adopting the NZF. However, this is not a sufficient argument for inaction, as failure to adopt the Framework would prolong shipping's reliance on fossil fuels, exposing vulnerable countries to volatile fuel and freight costs and increasingly severe climate impacts. Evidence indicates that the economic impacts of GHG pricing on final import costs are relatively limited[11], while the IMO's own impact assessment found that impacts on SIDS and LDCs could be reduced through targeted revenue disbursement[12]. Member States should therefore adopt an ambitious NZF alongside equitable revenue distribution mechanisms to address disproportionate trade impacts and support a just transition.

Norway *(in ISWG-GHG 22/2/5)* assesses the cost implications of the NZF against 2008, the base year for the IMO 2023 GHG Strategy, rather than only against a business as usual (BAU) scenario. Using Scenario 24 of the IMO Comprehensive Impact Assessment, which most closely resembles the approves Framework, Norway estimates that total transport costs could be 81% higher than BAU by 2050. However, shipping's average fuel cost per tonne-mile fell by 52% between 2008 and 2023, due to improved energy efficiency and lower real fuel prices. Even with the shift to more expensive low-GHG fuels, Norway projects that fuel cost per tonne-mile in 2050 would still be 18% below the 2008 level. The paper also notes that similar or higher fuel cost level occurred in 2008, 2001-14, and 2022.

In addition, **Norway *(in ISWG-GHG 22/2/4)*** uses the first year of EU FuelEU Maritime implementation to argue that flexible compliance mechanisms should be retained in the NZF. In 2025 around 91% of reporting ships used pooling, over 30% banked surplus compliance, 1.6% borrowed, and only 305% ended with a deficit requiring a penalty. Norway suggests that this demonstrates that pooling, banking, and trading can provide cost effective fleet-level compliance while allowing available low-GHG fuels to be used where they are most practical.

[11] Rojon, I., Lazarou, N.J., Rehmatulla, N. and Smith, T., 2021. The impacts of carbon pricing on maritime transport costs and their implications for developing economies. Marine Policy, 132, p.104653.

[12] 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

2.3 Textual revisions to the Net-Zero Framework

China *(in ISWG-GHG 22/2)* proposes possible textual revisions to the draft amendments to MARPOL Annex VI relating to the NZF, without prejudice to the Framework's final design. The adjustments include: (1) reformulating the calculation of attained annual GFI in more general terms, by expressing it as the ratio of total net GHG emissions on a well-to-wake (WtW) basis to the total amount of energy used by that ship in a calendar year, while preserving the concept of emissions per unit of energy, (2) broadening provisions on promoting the uptake of ZNZ emission technologies and fuels by referring to wider incentive measures such as calculation-based incentives or support measures, rather than only annual financial rewards, (3) using the bracketed term 'IMO Net-Zero [Fund] [Facility]' so as not to prejudge its legal nature, governance arrangements, or operational modalities, (4) making corresponding changes to reporting, verification, and Statement of Compliance to align them with the proposed formulations for attained annual GFI and the promotion of ZNZ uptake, to ensure consistency.

OG analysis: Replacing explicit financial rewards with vague incentive measures risks weakening the certainty that sufficient and predictable finance will be available to make ZNZs competitive.

Section 3: Consideration of draft guidelines and other policy instruments

3.1 GHG Fuel Intensity (GFI)

OG analysis: The primary objective of the NZF must remain the achievement of absolute GHG emissions reductions across the international shipping sector to achieve net zero by 2050. Absolute emissions reductions provide a clearer and more direct measure of climate progress than approaches based on avoided emissions, which rely on assumptions about a what emissions would otherwise have occurred, risking overstating the reductions achieved without delivering equivalent real-world emissions reductions. The NZF should prioritise absolute GFI requirements and ensure that any rewards are based on verifiable reductions in actual lifecycle GHG emissions.

China *(in ISWG-GHG 22/3/1)* examines a ZNZ incentive multiplier as a potential alternative or complementary mechanism to support ZNZ uptake where monetary rewards under the NZF may be limited. The multiplier would adjust the calculation of attained GFI by giving additional compliance value to ZNZ fuels, improving their competitiveness without directly weakening the GFI targets. China suggests that the multiplier could provide transitional flexibility when ZNZ supply is constrained, while encouraging greater uptake when supply increases, particularly when combined with SUs. The paper proposes a cost-gap methodology to determine annual multiplier values based on fuel prices and GFI targets, concluding that the mechanism could incentivise ZNZ deployment while limiting market distortion or overcompensation.

China and Norway *(in ISWG-GHG 22/3/6)* propose updates to the 2022 Administration Verification Guidelines to establish how ships' compliance with Chapter five of MARPOL Annex VI and the GFI requirements would be verified. The sponsors introduce a two-stage process:

- Stage 1 would verify the data reported by ships, including the attained and target annual GFI, GFI compliance balance, and where relevant, emissions avoided using ZNZ technologies and fuels, before verified information is transferred to the IMO GFI Registry;
- Stage 2 confirms the ship's compliance outcome and payment of the annual administration fee before a Statement of Compliance is issued.

Administrations may require supporting evidence such as fuel lifecycle labels, IMO-recognised SFCS documentation, emissions factors, energy-use data and records demonstrating compliance with the GFI Data Collection Plan. The proposal also establishes a 5% material discrepancy threshold, provides for verification of ZNZ eligibility and rewards, and sets out procedures for correcting discrepancies before data are entered into the Registry.

Several elements remain unresolved and are therefore bracketed, notably onboard carbon capture, verification and netting of ZNZ rewards, while the treatment of material discrepancies identified after data have already been submitted to the Registry or a Statement of Compliance issued remains under development.

OG analysis: It is important to note that verification guidelines themselves do not determine whether a fuel is truly sustainable, rather they verify compliance against GFI, LCA, ZNZ, and certification rules that are eventually agreed. This creates a policy risk if the underlying rules give favourable GFI treatment to fossil fuels, LNG, or biofuels, and robust verification could effectively legitimise those fuels and divert investment away from ZNZ fuels. The treatment of 'avoided emissions' is significant as such calculations underpin potential ZNZ rewards and must reflect genuine, additional lifecycle GHG reductions rather than reductions arising from weak baselines, incomplete upstream accounting, or the reclassification of existing emissions. LNG's lifecycle assessment needs to capture methane emissions and slip, while biofuels require robust accounting of feedstock, land-use change (both direct and indirect) and other quantitative and qualitative sustainability impacts. Therefore, verification must be tied to stringent, scientifically robust lifecycle emission factors and sustainability requirements, ensuring that GFI values accurately reflect full lifecycle emissions.

Liberia and Panama *(in ISWG-GHG 22/3/10)* propose developing guidelines to enable ships to receive SUs for verified annual GHG emissions reductions achieved through operational and technological energy efficiency improvements, within the existing GFI framework. Eligible measures could include voyage and operational optimisation, hull and propeller improvements, wind assisted propulsion, air lubrication, fuel cells, solar power and onboard carbon capture and storage (OCCS). The guidelines would establish common requirements for additionality, verification, transparency, avoidance of double counting and reporting, while using existing IMO monitoring processes where possible.

OG analysis: This proposal would weaken the NZF's incentive to drive the structural transition away from fossil fuels, as allocating SUs for operational and technological energy efficiency improvements on traditional fuel types could reduce demand for ZNZ fuels, if for example OCCS could generate credits that can substitute for fuel-based compliance.

Saudi Arabia *(in ISWG-GHG 22/3/7)* proposes developing guidelines to determine which fuels qualify as commercially viable under Liberia's alternative framework outlined in Circular Letter No.5213. Within Liberia's proposal availability incudes, a minimum 4% global marine fuel market share, sufficient port coverage across at least five of seven maritime regions and a maximum 2,500 nautical mile distance between bunkering locations; affordability requires production costs at origin to be no more than 100% above the global average price of conventional marine bunker fuel; and scalability considers current market share and projected ten-year growth. Saudi Arabia proposes that the IMO begin developing the methodology and gathering necessary data.

3.2 The Net-Zero Fund

Liberia *(in ISWG-GHG 22/2/8)* suggests that the proposed NZF's financial compliance mechanisms raise concerns about environmental effectiveness, economic impacts, fiscal implications, administrative complexity, impacts on international trade and energy security, and practical implementation of a NZF that relies on financial transactions as a primary compliance mechanism. Liberia argues that levy, or contribution-based compliance mechanisms, could allow ships to continue emitting above prescribed targets provided they make a payment, which Liberia considers inconsistent with MARPOL Annex VI's historical emphasis on enforceable technical and operational standards. Liberia, therefore, supports the GFI-based framework proposed in document *MEPC 84/7/38*, which proposes replacing the NZF with a market-based approach to adjusting the GFI trajectory - explicitly removing the economic element. The country also notes concerns regarding the treatment of different fuels, technologies and emissions-reduction approaches, the possible underestimation of economic impacts on freight markets and developing States, the fiscal and taxation implications of cross-border financial flows, the governance and administration of financial transactions, and the institutional implications of establishing and operating a global funding mechanism under the auspices of IMO. Against this background, Liberia considers that the approach proposed in document *ISWG-GHG 22/2/9*, by Liberia and Panama, provides an alternative that remains consistent with MARPOL Annex VI's established performance-based regulatory framework while avoiding many of the legal, administrative and economic uncertainties identified above.

OG analysis: This proposal, whilst raising concerns on the economic impacts of the NZF on SIDS and LDCs, fails to demonstrate how the GFI-based alternative would ensure that climate vulnerable developing countries receive adequate financial support for a just and equitable transition. The Net-Zero Fund provides an important mechanism for mobilising and equitably redistributing climate finance towards SIDS and LDCs facing greater capacity and transition challenges. Therefore, removing this key mechanism would make support less certain and could limit developing countries' ability to invest in mitigation and resilience measures. Liberia also does not outline how it would deliver the emissions reductions required by the IMO 2023 GHG Strategy and much less alignment with the 1.5C target under the Paris Agreement.

Brazil, Democratic Republic of Congo, Kenya, Soloman Islands, and Tuvalu *(in ISWG-GHG 22/3/13)* provide a draft set of governing provisions for the proposed Net-Zero Fund following informal intersessional discussions and is intended as a basis for further negotiation. The proposed framework would establish the Fund as a financially autonomous mechanism

operating under MARPOL Annex VI, with responsibility for receiving, managing, and disbursing revenue generated under the NZF.

A central feature is the proposed balance between ZNZ rewards and support for a just and equitable transition. Funding for the latter would support capacity building, technical assistance, policy and regulatory support, infrastructure and other resilience projects, with priority given to developing countries, especially SIDS and LDCs, and to addressing disproportionate negative impacts (DNI), including on food security. The text suggests equity safeguards to prevent resources being concentrated among higher-capacity recipients, including possible minimum allocation floors for SIDS and LDCs, alongside dedicated readiness and project preparation support. It also proposes grants as the default financing instrument for capacity building, adaptation, readiness, DNI-related support, and states that co-financing should not be a barrier for developing countries. Overall, the document seeks to establish a transparent and equitable institutional architecture for the Fund.

Several issues remain explicitly open, including whether the mechanism should ultimately be a Fund or Facility, the composition of its Governing Board, and the precise allocation of revenue between different purposes.

Kiribati, Naoero (Nauru), Palau, Tuvalu and Vanuatu *(in ISWG-GHG 22/3/14)* argue that the Net-Zero Fund is a core functional component of the NZF and must be developed alongside the GFI and ZNZ guidelines. The proposal sets out detailed arrangements for the Fund's establishment, governance, revenue allocation and access, with a strong focus on ensuring developing countries, particularly SIDS and LDCs receive adequate and accessible support. It proposes a twenty-one Member Governing Board with equal representation of SIDS/LDCs, other developing countries and developed countries; simplified access and readiness support; dedicated windows for port, infrastructure and DNI, including food security and transport costs; and direct budgetary support where appropriate. Importantly it proposes allocating at least 51% of available revenue to a just and equitable transition, alongside SIDS/LDC allocation floors and anti-concentration safeguards.

OG analysis: This proposal is particularly significant because it addresses both procedural equity (who has influence over Fund decisions and who can access resources) and distributive equity (who receives financial support and for what purposes). Its explicit recognition of SIDS and LDC capacity constraints also challenge funding models that can unintentionally disadvantage the countries most in need by requiring sophisticated project pipelines and extensive fiduciary capacity[13]. The effectiveness of the Fund will ultimately depend on the scale and predictability of revenues generated by the NZF, therefore reinforcing the broader argument that maintaining a binding economic mechanism is critical if the NZF is to deliver meaningful support for a just and equitable transition.

[13] Xian-Chun TA, An ZE, Chen-Xu WA, Chao-Yang DE, Chao FE, Xiang GA, De-Ke ZH, Shuang LI, Yan-Fei YE. Climate finance challenges and solutions for global climate change. Advances in Climate Change Research. 2026 Apr 30.

3.4 Zero- and Near-Zero Fuels (ZNZs)

3.4.1 Rewards

Norway et al *(in ISWG-GHG 22/3)* propose that ZNZ rewards should be calculated based on the quantity of verified GHG emissions avoided using ZNZ fuels or technologies, compared against the MARPOL Annex VI fossil fuel reference value, with reward rates determined either through an IMO-defined rate or a reverse auction mechanism. The modules introduce possible differentiated rewards for certain ZNZ categories, including higher incentives for early-stage technologies and potentially for ZNZ pathways supporting a just and equitable transition. They also establish methodologies for calculating avoided emissions, eligibility criteria, monitoring, reporting, verification requirements, and procedures for distributing rewards through the Net-Zero Fund, including options to offset compliance payments or carry forward unpaid rewards where funding is insufficient. The proposal further outlines a competitive reverse auction system where ships bid for reward rates, with funding allocated to the lowest-cost bids, aiming to maximise ZNZ uptake while ensuring transparency and efficient use of available revenues.

China *(in ISWG-GHG 22/3/2)* outlines a cost-gap methodology for determining a fixed annual reward rate for ZNZ fuels and technologies under the NZF and assesses the associated funding requirements. The methodology calculates rewards based on the additional cost of using ZNZs compared with a lower-cost compliance pathway (assumed to be fossil fuel blended with biodiesel) and the verified GHG emissions avoided. Using this approach, China estimates an indicative reward rate of around \$300 USD/tCO_2eq in 2029t, gradually declining towards phase-out by 2035 as ZNZ costs fall. The paper examines the interaction between ZNZ rewards and SUs, concluding that allowing ZNZ users to generate SUs would primarily incentivise further emission reductions rather than create significant overcompensation. China also estimates that ZNZ rewards could require approximately \$50.4 bn USD between 2029-2035, compared with around \$77 bn USD in projected Tier 1 Remedial Unit revenues, suggesting funding availability is manageable but would require flexible arrangements such as multi-year balancing, carrying forward unpaid rewards, and netting mechanisms.

China *(in ISWG-GHG 22/3/3)* sets out a proposed mechanism for netting verified ZNZ rewards against a ship's GHG emissions pricing contribution under the NZF. Netting is presented as a financial settlement mechanism, not an alternative compliance pathway. Therefore, ships would still need to address any GFI compliance deficit through the required RUs, but a verified ZNZ reward could be used to offset the corresponding GHG pricing payment. ZNZ and GFI data would be reported and verified together, with the verified information transferred to the GFI Registry. The Registry would then support compliance balancing and netting, while the Fund would receive any remaining contribution and pay any residual ZNZ reward. If the ZNZ reward is greater than the contribution, the latter could be fully settled through netting and the remaining reward would remain payable by the Fund, potentially in a later year or through future netting. The paper argues that netting does not change the aggregate amount of GHG pricing contributions or verified ZNZ rewards but instead avoids unnecessary two-way financial transfers.

The proposal also clarifies the institutional roles: ships/companies calculate GFI and ZNZ-related information; Administrations verify; the IMO GFI Registry records data and facilitates

settlement; and the proposed Net-Zero Fund manages contributions and outstanding rewards. Once the relevant contribution is settled, including through netting, the corresponding RUs would be generated and recorded in the ship's account. A residual ZNZ reward would not need to be paid before a ship can receive its Statement of Compliance. China also outlines that cumulative ZNZ reward requirements for 2029-2035 could be around 65% of projected Tier 1 RU contribution revenue and argues that multi-year financial planning and inter-annual balancing would allow rewards to be fully settled.

OG analysis: Although this paper claims netting does not reduce aggregate contributions or rewards, it changes the flow and timing of funds, as a ship can use its verified ZNZ reward to settle a pricing obligation rather than making the corresponding payment to the Fund and receiving the reward separately. This makes transparency around the Registry's accounting particularly important. More broadly, the proposal's assumption that projected Tier 1 revenues will be sufficient to cover ZNZ rewards should not be treated as guaranteed, especially given uncertainty around fuel uptake, GFI stringency and revenue levels. The provision allowing unpaid rewards to be carried forward could also create a gap between the recognition of a reward and its actual receipt. For developing countries, this reinforces the need for predictable and adequately funded Net-Zero Fund disbursements, rather than relying on netting as a substitute for ensuring sufficient overall finance for a just and equitable transition.

IMarEST ***(in ISWG-GHG 22/3/4)*** examines two main issues in the further development of the ZNZ reward guidelines: (1) carry-forward arrangements for unpaid ZNZ rewards and (2) the design of JET-eligible ZNZ rewards. On the first point, the organisation argues that allowing unpaid rewards to be carried into future years does not eliminate uncertainty for shipowners or investors, rather it shifts the uncertainty from the amount of reward received in a given year to the timing of when the reward will actually be paid. Using scenario modelling, IMarEST finds that where ZNZ uptake grows and reward demand exceeds available revenues, carry-forward liabilities can accumulate substantially and persist for years. Reward payments first need to be discounted in 2035 and by 2040 a residual carry-forward liability of around $21 billion remains, potentially taking until 2044 to clear if reward revenues are maintained. IMarEST therefore concludes that carry-forward may reduce the expected reward rate and extend the period over which the Fund remains liable, rather than providing the predictability needed to support investment in ZNZ fuels and technologies.

The paper also considers JET-eligible rewards and notes that prioritising revenues for ZNZ rewards could reduce the revenues available for JET-related disbursement, particularly under the proposed netting of rewards approach. IMarEST also identifies several possible ways to define JET eligibility, including ships servicing JET-eligible countries, ships owned or flagged in those countries, port calls, operations within designated areas, and ZNZ production or bunkering in JET-eligible countries. IMarEST suggest that a port-call based approach is the most directly connected to concerns around transport costs and technological exclusion, while support for ZNZ production or bunkering could help address infrastructure and technology gaps. However, IMarEST explicitly acknowledges that a ZNZ reward mechanism alone cannot comprehensively address the needs of climate vulnerable countries and that additional deployment of funds would be needed to achieve a just and equitable transition.

3.6 Other proposed draft guidelines

3.6.1 Disproportionately negative impacts (DNI)

The **Democratic Republic of Congo (DRC) and the Maritime Organization for Eastern, Southern, and Northern Africa (MOESNA)** ***(in ISWG-GHG 22/3/11)*** argue that the NZF currently lacks an operational definition or threshold for identifying DNI on States. While the impact assessment procedure assesses the effects of proposed measures, it does not establish when those impacts become disproportionate, creating a gap in implementing draft regulations 41 and 43 on just and equitable transition support and food security. They therefore propose developing dedicated DNI guidelines intersessionally, with an objective, transparent, and reproducible methodology to identify affected States and quantify the scale of harm.

OG analysis: This proposal would strengthen the equity and accountability architecture of the NZF by creating a consistent basis for identifying which States should receive targeted support.. DRC emphasises that vulnerability should be assessed beyond broad categories, to capture differences in remoteness, trade structures, import dependence and food security. Most notably, the methodology would assess both increased import costs and impacts on exports, allow for ex-ante and ex-post assessment, transparently account for data gaps, and record unmet financial needs where identified impacts are not fully addressed. It will be important that any guidelines are developed in the spirit of supporting ambitious climate action.

3.6.2 Food security

Brazil ***(in ISWG-GHG 22/3/8)*** proposed developing guidelines to operationalise draft Regulation 43 of the NZF, which requires the IMO to address, avoid, remedy and mitigate DNI of the Framework on food security, particularly in countries vulnerable to food insecurity. Brazil argues that this should be linked directly to the just and equitable transition funding window under draft Regulation 41, which explicitly identifies food security as an area for support. As the IMO lacks the mandate and institutional capacity to address food security directly, Brazil suggests exploring a partnership with the Global Alliance Against Hunger and Poverty as an implementation mechanism, and that the IMO assess the legal and operational feasibility of such an arrangement without creating excessive administrative barriers.

3.6.3 Essential Goods Flexibility Mechanism (EGFM)

Kuwait ***(in ISWG-GHG 22/3/5)*** proposes developing an EGFM as part of the implementation guidelines for whatever mid-term GHG reduction measures the MEPC ultimately adopts. The proposal is explicitly framed as an implementation tool rather than a change to the substance of the measures. Kuwait claim that it would provide a transparent and consistent process for applying flexibility to the transport of narrowly defined categories of essential goods where uninterrupted maritime transport is considered necessary for essential societal functions. Eligible goods could include food and agricultural commodities, livestock feed and food ingredients, pharmaceuticals, medical equipment, vaccines and humanitarian supplies, and energy commodities or fuels needed for critical infrastructure, as well as renewable energy equipment and infrastructure. The paper envisages eligibility criteria, emissions methodologies, verification, reporting, transparency, periodic review and IMO oversight, with verification potentially supported by recognised organisations, classification societies, cargo documentation, electronic reporting, flag States and port State control. It does not specify how

the flexibility would actually operate within the different mid-term measures, nor does it set out a quantified exemption, discount, or alternative compliance obligation. Instead, Kuwait asks the Working Group to begin developing the guidelines and determine the detailed methodology later. The paper also outlines that the mechanism should preserve the environmental effectiveness and overall integrity of the mid-term measures and that flexibility should only be applied where justified.

OG analysis: This paper provides insufficient safeguards to demonstrate that flexibility would be targeted at genuine vulnerability. If implemented, there is a strong likelihood that it would result in broad and material exemptions from the NZF. Without a tightly defined eligibility methodology there is a risk that flexibility could weaken the incentive to reduce emissions from shipping serving climate vulnerable countries, rather than addressing the underlying affordability and transition challenges. A stronger approach to a just and equitable transition would be to ensure that any flexibility or financial support for carrying essential goods is coupled with measures that address the underlying barriers to decarbonisation, including by accelerating access to genuinely sustainable fuels and technologies, as opposed to allowing the transport of essential goods to remain dependent on fossil fuels, with detrimental impacts on developing countries, especially SIDS and LDCs.

3.6.4 Energy Consumption Index (ECI)

Brazil *(in ISWG-GHG 22/3/12)* has revised its proposed ECI following insufficient support at MEPC 84. The ECI now functions solely as a voluntary cross-checking tool for verifying fuel consumption data reported under the IMO Data Collection System (DCS), rather than as an alternative. It compares fuel use with consumption expected from the ship's operational profile; values close to one indicate consistency, while deviations above 10% would trigger further review. A voluntary case study involving four ships found that the tool could identify both consistent reporting and discrepancies requiring investigation. Brazil proposes incorporating the ECI into the 2024 SEEMP Guidelines.

Section 4: The Life-Cycle Assessment (LCA) Framework

4.1 Certification, Traceability, and Verification Frameworks

4.1.1 Sustainable Fuel Certification Schemes (SFCS)

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.

Brazil and RINA *(in ISWG-GHG 22/3/9)* *set* out an intersessional work plan to further develop IMO guidelines for recognising SFCS and reporting certification activities. It focuses on three areas: (1) Strengthening traceability and chain-of-custody requirements, including mass-balance approaches; (2) Refining the procedures for applying for and recognising SFCS, including consideration of criteria for revocation and the establishment of a SFCS Assessment Group; (3) Developing reporting requirements covering data use, verification, protection, and anonymisation. The work draws on existing certification schemes, ISO standards and experience from ICAO's CORSIA system, with a draft to be developed for ISWG-GHG 23 and MEPC 85.

Brazil *(in ISWG-GHG 22/INF.3)* presents a working prototype of a shared digital registry to support the SFCS, particularly the traceability of sustainable marine fuels under the NZF. It aims to address current gaps in linking sustainability documentation across the fuel value chain, verifying ship-reported data and preventing duplication or double counting across Administrations. The registry would link sustainability documents from the originating producer through intermediaries to the ship, maintain a continuous batch chain, connect sustainability records to the Fuel Lifecycle Label (FLL) and bunker delivery note, and automatically flag inconsistencies. It would use permissioned access to protect commercially sensitive information and is designed to be neutral on the eventual Chain of Custody (CoC) model, including physical segregation, mass balance, or book and claim.

4.1.2 Chain of Custody Models

To strengthen the credibility and implementation of the NZF, a structured approach to fuel supply chain traceability is proposed, through robust CoC systems.

China *(in ISWG-GHG 22/INF.2)* examines the book and claim CoC model, particularly its application to renewable electricity used for onshore power supply (OPS) and presents it as a potential model for the IMO's SFCS. Under book and claim environmental attributes are separated from the physical flow of the product- renewable energy certificates can be issued, traded, and retired independently of the physical electricity itself. China argues that this could address the geographical mismatch between renewable electricity generation and ship/port demand, while avoiding unnecessary transport of sustainable fuels or electricity-related attributes. The paper notes that the 2024 LCA Guidelines already allow Power Purchase Agreement's (PPAs) with a GHG intensity and recognised Guarantees of Origin to be used to certify an actual electricity value for OPS and argues that that excluding book and claim from the SFCS could therefore make these provisions difficult to implement. China acknowledges that book and claim create risks around double counting, traceability, system boundaries and inconsistent registration systems, but suggest that these can be addressed through central/interoperable registries, unique certificate identifiers, validity periods, audit trails, verification and documentation. The country concludes that this CoC approach is feasible for renewable electricity used in OPS before potentially expanding to other ZNZ fuels.

OG analysis: The central policy consideration is that book and claim models separate environmental attributes from the physical fuel consumed by a ship., This can help scale up sustainable fuel production where physical distribution infrastructure is limited, including by supporting smaller and emerging producers. However, the separation creates a need for particularly robust verification, documentation, and registry systems to ensure that certificates represent additional, genuinely attributable and scientifically robust GHG reductions and are not double counted[14]. Without these safeguards, there is a risk that book and claim could enable paper-based compliance without delivering the intended real world emissions reductions.

[14] Environmental Defense Fund, 2025, Chain of custody considerations within the recognition framework for Sustainable Fuel Certification Schemes (SFCS), ISWG-GHG 21/INF.3, available on IMO Docs.

4.1.3 Fuel Lifecycle Label (FLL)

Saudi Arabia and the United Arab Emirates *(in ISWG-GHG 22/4/1)* call for the removal of sustainability theme/aspect 2 (carbon source) from the FLL framework under the 2024 LCA Guidelines. The countries argue that the existing LCA methodology determines lifecycle GHG performance through system boundaries, process energy inputs and verified carbon fate, rather than the origin of the carbon itself. In their view, retaining a separate qualitative carbon source indicator risk conflating carbon origin with actual emissions outcomes, duplicating elements already covered by the quantitative LCA methodology and creating ambiguity or discriminatory treatment between fuels with equivalent lifecycle GHG performance. They therefore advocate an outcome based, fuel and technology neutral framework focused on emissions rather than carbon sources.

OG analysis: This proposal could weaken the FLL's ability to distinguish between fuels with similar reported GHG intensities but different upstream sustainability and climate risks, including whether carbon is sourced from fossil, biogenic, or other sources. Relying exclusively on quantitative GHG performance may therefore be insufficient if carbon source information is important for assessing long term fossil fuel dependence and land use impacts. Particularly, removing the indicator could make it easier for fossil-derived carbon to qualify based on lifecycle emissions alone, depending on how the underlying accounting rules treat those emissions. This proposal does not itself establish that outcome but removing the qualitative safeguard could reduce transparency around that carbon source.

4.5 Default emission 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.

Saudi Arabia and United Arab Emirates *(in ISWG-GHG 22/4/2)* propose revisiting the treatment of WtT emissions from conventional fossil fuels under the 2024 LCA Guidelines, as currently they allow verified actual WtT emission values for non-fossil fuel pathways but explicitly exclude them for purely fossil fuel pathways. The countries argue that this creates a methodological inconsistency meaning that a single global default emission factor could overestimate emissions from lower-emitting supply chains while underestimating those from higher-emitting ones. The paper therefore proposes fossil fuel pathways should be permitted to use actual, pathway-specific WtT values under the same calculation, certification and verification requirements already applied to non-fossil fuels, pointing to CORSIA as evidence that certified actual fossil-fuel lifecycle values can be incorporated into an international regulatory framework.

4.5.1 Avoided emissions

The **United States *(in ISWG-GHG 22/4)*** argues that avoided livestock methane emissions should be included in the WtT GHG calculations for manure-based renewable natural gas (RNG) to LNG and RNG to compressed natural gas (CNG) pathways under the 2024 LCA Guidelines.

The proposal concerns biogas captured from manure lagoons through anaerobic digesters and subsequently upgraded into RNG. The U.S suggests that there is a well-established precedent for crediting avoided methane emissions in cap and trade and clean transportation fuel programmes, and that doing so is compatible with the attributional approach of the 2024 LCA Guidelines. The country considers that if direct land-use change (DLUC) emissions and avoided emissions through carbon capture and storage (CCS) are included in the existing WtT system boundaries, then there is logical basis for treating avoided livestock methane in the same way.

OG analysis: This proposal risks overstating the climate benefits of manure-based fuel by treating avoided methane emissions as a credit without sufficiently accounting for the full lifecycle of emissions , and to what extent they are offset by the avoided emissions. Biogas from manure requires refining to become biomethane, which can be used in existing gas infrastructure. Further refining to convert this to LNG or CNG will likely increase the footprint of the fuel. Anaerobic digestors are also prone to leakage during digestion and biogas handling, which can increase the GHG intensity of the process[15]. The proposal also fails to consider ILUC or the wider consequences of increasing demand for livestock manure-based feedstocks. This is particularly important to note given methane emissions from manure management are small – 3% of all global methane emissions and approximately 6.5% of agricultural methane emissions[16]. As a result, the avoided emissions may not be very high. Crediting avoided methane could make gas-based fuels appear low-carbon and prolong the use of LNG technologies and infrastructure. It also risks creating perverse incentives within the livestock sector, as increased demand for manure as a feedstock could boost intensive agricultural practices. This is cause for concern as already around 40% of methane emissions come from the agriculture sector, primarily from enteric fermentation in ruminant livestock. Without robust, mandatory monitoring, reporting, and verification, there is a risk that avoided emissions are calculated from assumptions rather than measured reductions.

4.6 Land-use change

Suadi Arabia and United Arab Emirates *(in ISWG-GHG 22/4/3)* argue that gaps in the 2024 LCA Guidelines methodology could undermine comparability and environmental integrity across fuel pathways. Indirect land-use change (ILUC) is currently assessed through a qualitative, risk-based approach without quantified emissions being assigned to individual pathways, while direct land-use change (DLUC) and soil-carbon parameters remain set at zero pending further methodological guidance. The co-sponsors suggest that these gaps could lead to emissions being underestimated or certain fuel pathways receiving excessive credit. The proposal calls for the GESAMP-LCA Working Group to develop options for quantified default ILUC factors for relevant feedstocks, using conservative values and periodic review; establish a workplan and timeline for operationalising ILUC; and consider the symmetric use of verified actual WtT values across all fuel pathways, subject to robust certification and verification.

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[15] Olczak, M., 2026, Majority of methane emissions from European biogas plant supply chains could be eliminated at no net cost, available at: https://www.nature.com/articles/s44458-026-00065-3

[16] World Resources Institute, 2025, Opportunities for methane mitigation in agriculture, available at: https://files.wri.org/d8/s3fs-public/2025-02/opportunities-methane-mitigation-agriculture.pdf?VersionId=WTCnIgnw7ktdUcbayS3Xl0pKHZ3s_BHF

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