

Note by the International Maritime Organization (IMO) to the sixty-third session of the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA 63) Belém, Brazil, 10-15 November 2025

Agenda item 13

"Methodological issues: emissions from fuel used for international aviation and maritime transport"

UPDATE ON IMO'S WORK TO ADDRESS GHG EMISSIONS FROM INTERNATIONAL SHIPPING

SUMMARY

The International Maritime Organization (IMO) contributes to international action to address climate change by regulating greenhouse gas (GHG) emissions from international shipping.

Since SBSTA 62 in June 2025, IMO held an extraordinary session of its Marine Environment Protection Committee (MEPC/ES.2) and its Intersessional Working Group on Reduction of GHG Emissions from Ships met once (ISWG-GHG 20).

This note is an update of the IMO submission to SBSTA 62 and focusses on the latest developments on various GHG-related workstreams at IMO.

Update on the draft IMO Net-Zero Framework

1 As presented in previous IMO submissions to SBSTA, the Marine Environment Protection Committee (MEPC) of the IMO, and its Intersessional Working Group on Reduction of Greenhouse Gas (GHG) Emissions from Ships (ISWG-GHG), have been developing a 'basket of mid-term GHG reduction measures', aimed at delivering on the reduction targets of the 2023 IMO GHG Strategy. These draft measures, referred to as the 'IMO Net-Zero Framework', comprise a technical element, namely a global marine fuel standard regulating the phased reduction of a marine fuel's GHG intensity and a GHG emissions pricing mechanism. The text of the draft amendments to MARPOL Annex VI on the IMO Net-Zero Framework was approved by MEPC 83 (April 2025), with a view to adoption at the second extraordinary session of MEPC (MEPC/ES.2) in October 2025.

2 During the second extraordinary session of MEPC (MEPC/ES.2), held in October 2025 to consider the adoption of the draft amendments introducing the IMO Net-Zero Framework in MARPOL Annex VI, the Committee agreed to adjourn the session for a period of one year. The adjournment will enable further efforts to forge broader consensus, reconcile remaining differences, and respond to the concerns of Member States, including any necessary adjustments and supporting measures.

3 Following the terms of reference approved by MEPC 83, ISWG-GHG 20 held the week following the extraordinary session made progress on the development of implementing

provisions of the draft IMO Net-Zero Framework, with a view to provide further clarifications on technical and operationalization aspects of the framework and address some of the concerns expressed. This work was made subject, and without prejudice to, the adoption of amendments on the IMO Net-Zero Framework, following the adjournment of the Marine Environment Protection Committee Extraordinary Session.

4 During the discussions, the Group considered the way forward in relation to developing draft guidelines related to fuel certification; zero or near-zero GHG emission technologies and fuels (ZNZs) and reward; IMO Net-Zero Fund; the GHG Fuel Intensity (GFI) calculation and GFI compliance approaches; and IMO GFI Registry.

5 To facilitate consideration at the next session, for various guidelines, the Group invited all those having submitted drafts to consider jointly whether there is a way to merge respective drafts, and develop consolidated draft guidelines, with placeholders for further text to be developed, to be submitted to ISWG-GHG 21, scheduled to meet in April 2026 before MEPC 84.

Life cycle GHG intensity assessment (LCA) of marine fuels

6 As presented in previous IMO submission to SBSTA, MEPC 80 (July 2023) adopted *Guidelines on life cycle GHG intensity of marine fuels* (LCA Guidelines), allowing for a Well-to-Wake (WtW) calculation, including Well-to-Tank (WtT) and Tank-to-Wake (TtW) emission factors, of total GHG emissions related to the production and on-board use of marine fuels. These Guidelines are a key implementation instrument for the IMO Net-Zero Framework providing a robust international framework to assess the GHG intensity and sustainability of marine fuels with the overall objective of reducing GHG emissions within the boundaries of the energy system of international shipping and preventing a shift of emissions to other sectors.

7 MEPC 81 (March 2024) adopted *2024 Guidelines on life cycle GHG intensity of marine fuels* (2024 LCA Guidelines), including amendments on a revised calculation for default emission factors and new templates for their submission; and established a Working Group on Life Cycle GHG Intensity of Marine Fuels under the UN's Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP-LCA WG).

8 The GESAMP-LCA WG was tasked to provide the best possible scientific and technical assessment of issues related to the implementation of the LCA Guidelines, such as methodological refinement of the emission quantification to ensure the integrity of the data provided, refine and explore indicators and approaches under the sustainability themes/aspects, and methodological requirements with regard to certification.

9 The first report of the GESAMP-LCA WG was submitted to MEPC 83 and based on the recommendation of the Group, the Committee approved the *Methodology for submission, scientific review and recommendation of proposed default emission factors by GESAMP-LCA WG* (MEPC.1/Circ.916) and invited further nominations of experts.

10 The Group is currently composed of 13 experts, acting in their individual capacity, and met in June/July and November 2025 to review proposals for default emission factors and methodological issues in the LCA Guidelines. The report of these second and third sessions will be considered by MEPC 84. ISWG-GHG 20 considered proposed amendments to the IMO LCA methodology and noted that there was interest in advancing the development of sustainability themes/aspects in the LCA Guidelines, in particular environmental themes/aspects, including indirect land use change (ILUC), and invited interested Member

States and international organizations to submit, at a future session, proposed amendments to the Guidelines or draft terms of reference for the LCA correspondence group.

Fifth IMO GHG Study

11 To support evidence-based decision-making when addressing GHG emissions from international shipping, IMO regularly conducts [studies](#) to estimate global emissions from the sector and project possible developments. The [Fourth IMO GHG Study](#) was published in 2020, providing emission inventories, carbon intensity trends as well as emission projections for global shipping.

12 ISWG-GHG 21 and MEPC 84 will further consider and finalize the draft terms of reference for the Fifth IMO GHG Study based on progress made during ISWG-GHG 20 to inform, inter alia, the review of the 2023 IMO GHG Strategy.

Development of the necessary safety regulatory framework allowing safe handling of future marine fuels on board of ships

13 IMO's Maritime Safety Committee (MSC), established at its 108th session (May 2024), a Correspondence Group on the Development of a Safety Regulatory Framework to Support the Reduction of GHG Emissions from Ships using New Technologies and Alternative Fuels (GHG Safety), to capture detailed information on new technologies and alternative fuels previously listed, and to assess safety obstacles and gaps in existing regulations for the use of these new technologies. To further develop this framework, MSC 109 (December 2024), established a Working Group on Development of a Safety Regulatory Framework to Support the Reduction of GHG Emissions from Ships Using New Technologies and Alternative Fuels (GHG Safety).

14 As reported to MSC 110 (June 2025), the Correspondence Group on GHG safety identified 51 existing barriers and gaps with current IMO regulation that might delay the use of alternative fuels (e.g. biofuels, methanol, ammonia, hydrogen, etc.) and emerging technologies (e.g. fuel cells, battery energy storage, wind propulsion, air lubrication, onboard carbon capture, etc.), and made 32 recommendations to address these issues, some of which are already being implemented.

15 MSC 110 updated the list of regulatory gaps, endorsed detailed recommendations to address them and assigned specific tasks to the Sub-Committee on Carriage of Cargoes and Containers (CCC), Sub-Committee on Ship Design and Construction (SDC) and Sub-Committee on Ship Systems and Equipment (SSE). More specifically, MSC 110:

- .1 clarified when requirements of the IGC Code or/and IGF Code are applicable to gas carriers using their cargo as fuel, and instructed CCC to develop related guidelines;
- .2 instructed CCC to give high priority to onboard carbon capture and storage (OCCS, OCCU)-related gaps and barrier;
- .3 instructed SSE to give priority to tasks regarding new interim guidelines for the safety of ships using battery energy storage system (BEES) (lithium-ion batteries, supercapacitor energy storage technology, swappable traction lithium-ion battery containers) and updates to the International Code for Fire Safety Systems (FSS Code), regarding alcohol fires;

- .4 instructed SDC to update the Code of Safety for Nuclear Merchant Ships (Resolution A.491(XII)) to account for advances in technology that have occurred since the code initially came into force, and develop Interim Guidelines for the Safety of Ships Using Wind Propulsion and Wind Assisted Power; and
- .5 agreed to inform ISO about existing gaps related to hydrothermal liquefaction (HTL) fuel, pyrolysis fuel, Fischer-Tropsch (FT) diesel, and ammonia, within the framework of "ISO/TC 8 on Ships and Marine Technology".

16 Following MSC 110, CCC 11 (September 2025) finalized draft interim guidelines for the safety of ships using hydrogen as fuel, with a view of approval by MSC 111 (May 2026).

17 In terms of training for seafarers on ships using alternative fuels and new technologies, the Sub-Committee on Human Element, Training and Watchkeeping (HTW), at its eleventh meeting (February 2025) developed generic interim guidelines, applicable across the whole industry and relevant to all alternative fuels and new technologies, and agreed to develop individual sets of fuel/technology-specific interim guidelines, aligned with the safety provisions developed by other IMO bodies.

18 MSC 110 approved the *Generic interim guidelines on training for seafarers on ships using alternative fuels and new technologies* (STCW.7/Circ.25) and noted the results of a [study](#) on the identification of specific competences for seafarers on ships using alternative fuels and energy systems that was commissioned by the European Maritime Safety Agency (EMSA). The Committee referred the study to the Correspondence Group on Development of Training Provisions for Seafarers on Ships Using Alternative Fuels and New Technologies, established by HTW 11, for its consideration in the ongoing development of the Interim Guidelines.

Capacity-building, technical cooperation and other supporting activities

19 IMO supports developing countries, in particular SIDS and LDCs, in addressing GHG emissions from international shipping through its Technical Cooperation (TC) programs, a dedicated TC fund and a wide portfolio of projects dedicated to climate action. In addition, the [IMO multi-donor GHG Trust Fund](#), established in 2019, continues to fund important projects and studies supporting the implementation of the 2023 IMO GHG Strategy and inform decision making on IMO's GHG reduction measures.

20 The [IMO Future Fuels and Technology \(FFT\)](#) project, funded by the Republic of Korea, supports IMO regulatory discussions on GHG reduction measures from international shipping at MEPC and its subsidiary bodies. To achieve its goal, the FFT Project conducts global studies/research to support IMO Member States' evidence-based decision-making; provides easy and free-of-charge access to the latest information on zero and near-zero marine fuels and technologies through a dedicated online portal (futurefuels.imo.org); and promotes communication and knowledge sharing to foster cooperation and collaboration among stakeholders to achieve the targets of the 2023 IMO GHG Strategy. The FFT Project organized a Technical Seminar on Onboard Carbon Capture and Storage (OCCS) Systems in September 2025, to enhance the understanding of the latest developments in OCCS technology, infrastructure readiness and relevant environmental, safety and human element perspectives, and will organize a second Technical Seminar on Biofuels in the margins of the IMO Pollution Prevention and Response (PPR) Sub-Committee in February 2026.

21 The [GreenVoyage2050 Programme](#) is in its Phase II (2024-2030) with over USD 27 million across the Programme in funding from the Governments of Denmark, Finland, France, Germany, the Netherlands and Norway. Under this phase, the Programme will be expanded annually through an open call inviting new partner countries. In 2025, nine countries joined the Programme and are receiving targeted support, i.e. Bangladesh, Egypt, Ghana, Mexico, and Nigeria are advancing the development of National Action Plans (NAPs) for Green Shipping, while India, Indonesia, Türkiye and Viet Nam are conducting feasibility studies for pilot projects. Strategic partnerships have also been strengthened, including collaboration with the GIZ's International PtX Hub, to advance the uptake of alternative fuels. In parallel, the Programme is developing a new grant facility to co-fund innovative low- and zero carbon pilot projects in developing countries. The Programme is also conducting a study on the potential supply and demand of alternative marine fuels in Jamaica, which will culminate in a regional roundtable to drive cooperation and investment for the maritime energy transition in the Caribbean. Through its Global Industry Alliance (GIA) to Support Low Carbon Shipping, the Programme is developing practical tools (including a Wind Propulsion Technology Guide based on real-world user experience, and a questionnaire for alternative fuel producers) and is collaborating with the Port of Tema (Ghana) on just-in-time arrival of ships to reduce emissions and improve port efficiency. The Programme has also launched dedicated youth outreach activities to raise awareness of maritime decarbonization and inspire future leaders, while also developing a study to identify and explore green career pathways for women in the sector.

22 The [Global Maritime Technology Cooperation Centres Network \(GMN\)](#) project, funded by the European Union, is currently in its second phase (€10 million, 2024–2027), with a primary focus on implementing technology demonstration pilot projects aimed at GHG emissions from ports and vessels. The GMN Phase II project supports developing countries, particularly LDCs and SIDS, in meeting the IMOs energy efficiency and GHG reduction targets. During the first year of implementation, stakeholder engagements and site visits were conducted to develop implementation plans for selected technology demonstration projects. These include piloting a port call data-sharing solution at two ports in Namibia; deploying a vertical-axis wind turbine to enhance the renewable energy mix in port operations in St. Kitts and Nevis; installing a marine battery system to pilot a ZEROe RoPAX vessel in Barbados; implementing advanced hull coating solutions for target vessels in Trinidad and Tobago; and introducing an AI-driven fuel optimization and performance management system onboard a ferry in Mexico. Two additional pilot projects will be identified in Latin America and the Pacific regions by 2026. Through a series of in-person and online capacity-building activities, the project also promoted awareness of financing options for maritime decarbonization and the integration of SDG 5 (Gender Equality) into maritime decarbonization initiatives.

23 The [Sustainable Maritime Transport Training Programme \(GHG-SMART\)](#), funded by the Republic of Korea (USD4.5 million, 2020 to 2026), supports SIDS and LDCs with the implementation of the 2023 IMO GHG Strategy through capacity-building in maritime decarbonization, with annual training cycles comprised of theoretical and practical sessions and study visits complemented with post-training scholarships at the [World Maritime University](#). Since 2022, around 80 professionals from 47 SIDS and LDCs from Africa, Asia and the Caribbean and Pacific regions have been trained on relevant regulatory, policy, technological and financial aspects of maritime decarbonization. Full scholarships for Master's in Maritime Energy Management at the World Maritime University have been awarded to participants from Zambia, Uganda, Grenada and The Gambia so far under a model Recognition scheme to facilitate post training learning opportunities and professional development. The programme is currently in the process of operationalizing an alumni network of maritime professionals trained in maritime decarbonization from SIDS and LDCs to further strengthen international and regional collaboration. The project is further strengthening the training modules including a dedicated study on climate finance in maritime decarbonization.

24 The [SMART-C GHG Project](#) (2023-2027, USD4 million, supported by the Republic of Korea) is providing tailor-made support to Viet Nam and the Philippines for development of their National Action Plans and implementation of the 2023 IMO GHG Strategy, while also benefiting other ASEAN countries through regional activities.

25 IMO has also addressed specific needs through its dedicated Technical Cooperation Fund. Under the IMO Integrated Technical Cooperation Programme (ITCP) it has supported countries during the reporting period to establish a "Baseline Training Framework for Seafarers in Decarbonization with the Maritime Just Transition Task Force", followed up by a Seminar on training of seafarers on ships using alternative fuels and new technologies. Furthermore, under the ITCP, IMO also started to support development of a Green maritime corridor pre-feasibility study and inclusion in National Action Plan for Barbados and is undertaking the development of a manual on MARPOL Annex VI - How To Do It (foreseen to be finalized by December 2025).

26 The [Voluntary Multi-Donor Trust Fund \(VMDTF\)](#), established in March 2023 to assist the in-person attendance of developing countries, especially SIDS and LDCs, in IMO meetings, specifically MEPC and ISWG-GHG, as well as other meetings related to GHG matters. For MEPC/ES.2 and ISWG-GHG 20, the attendance of representatives from 36 countries was funded through the trust fund.
