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REDUCTION OF GHG EMISSIONS FROM SHIPS

Comments on the report of the third meeting of GESAMP-LCA Working Group

Submitted by Pacific Environment and CSC

SUMMARY

Executive summary:	This document comments on the report of the third meeting of the GESAMP Working Group on Life Cycle GHG Intensity of Marine Fuels (GESAMP-LCA WG) (MEPC 84/7/16) and highlights the potential issues arising from the possible methodological refinements to the 2024 LCA Guidelines identified by GESAMP-LCA WG with respect to finding ways forward for addressing the default well-to-tank (WtT) GHG intensity of fossil LNG. The document advises that the Organization should continue moving forward with single, conservative, global default emission factors for purely fossil fuel pathways and proposes that the Committee provide guidance to GESAMP-LCA WG accordingly and as requested.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 16
Related documents:	Resolutions MEPC.377(80) and MEPC.391(81); ISWG-GHG 17/3; MEPC 83/7/28; MEPC 84/7/15 and MEPC 84/7/16

1 This document is submitted in accordance with the provisions of paragraph 6.12.5 of the *Organization and method of work of the Maritime Safety Committee and Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ.5/Rev.6) and provides comments on document MEPC 84/7/16, containing the report of the third meeting of GESAMP-LCA WG.

Introduction

2 The report of the second meeting of GESAMP-LCA WG (MEPC 84/7/15), has proposed that the Committee endorses GESAMP-LCA WG's uniform understanding of "representativeness" and "conservativeness" for the assessment of well-to-tank (WtT) default emission factors, as described in paragraph 6.3 of the second report.

3 According to the elaborations in paragraph 6.3.5 of the second report, the default WtT emission factor should be calculated under conservative approaches, and selecting the highest number of at least three proposed default emission factors for the same fuel pathway is a conservative approach. Further, the Group clarified that this conservative assumption is needed to allow operators to demonstrate lower actual GHG intensity. While this is true for tank-to-wake (TtW) fossil LNG, demonstrating lower actual WtT GHG intensity is "not applicable for purely fossil pathways" under the 2024 LCA Guidelines (paragraph 10.4).

4 Regarding GESAMP-LCA WG's evaluation of WtT LNG emission factors, it also states in its third meeting report that "the Group acknowledged that the inherent regional variability (for instance, in terms of methane leakages, transport distances and modes) and uncertainties made it challenging at this stage to recommend a single representative and conservative value" (MEPC 84/7/16, annex, paragraph 5.3.4).

5 One of the options identified by GESAMP-LCA WG for a possible way forward is modifying the 2024 LCA Guidelines with a view to methodological refinements outlined below:

.1 identification of a conservative global value;

.2 determination of a representative global value based on market mix;

.3 identification of a value range or more global default values; and

.4 identification of regional values.

6 In the paragraphs below, the co-sponsors state why option .1 "identification of a conservative global value" offers the best option to progress towards a "representative and conservative" value of WtT default fossil pathway emission factors.

Discussion

7 Launched at COP26, the Global Methane Pledge set an interim target to reduce methane emissions by 30% by 2030 compared to 2020 levels. However, global methane emissions have been on the rise between 2020 and 2025, with many regions reporting lower-than-actual emissions, and little or no measured (rather than modelled) data is used to report methane emissions in most parts of the world.[1]

8 During COP30, the Global Methane Status Report 2025 was unveiled, finding that meeting the 2030 target required raising ambition quickly.[2]

9 LNG, like traditional fossil fuels, emits carbon dioxide (CO_2) when combusted. However, LNG fuel systems also leak methane (CH_4) across the supply chain and from onboard combustion systems, including methane slip from engines. Because methane is a significantly more potent greenhouse gas than CO_2 (nearly 80 to 85 times stronger on a 20-year "global warming potential basis"), even relatively small releases can materially affect lifecycle GHG intensity.

[1] International Energy Agency (2025) – Global Methane Tracker 2025, Key Findings https://www.iea.org/reports/global-methane-tracker-2025/key-findings

[2] United Nations Environment Programme (UNEP, 2025), *Ministers urge decisive methane action as global report shows progress, warns of gaps*, Press Release, 17 Nov 2025, https://www.unep.org/news-and-stories/press-release/ministers-urge-decisive-methane-action-global-report-shows-progress

10 Methane emissions from international shipping are rising faster than the global average, increasing almost 180% between 2016 and 2023, driven by the sudden surge in LNG's use as a maritime fuel.[3] Because of the rapid increase in usage, reducing fugitive emissions and slip might not be enough to start reducing emissions.[4] Even in a scenario with 100% uptake of bio- or e-LNG, absolute methane emissions from international shipping are expected to double by 2030 compared to 2019.[5] Moreover, upstream methane emissions are systematically underreported due to unmeasured super-emitter events.[6] [7]

Why the Organization should move forward with a single conservative global default value

11 The potential way forward identified in GESAMP-LCA WG's third report (MEPC 84/7/16, annex, paragraph 5.3.5.2.1 on "identification of a conservative global value") is the most suitable option of the alternatives presented in paragraphs 5.3.5.2.2 through 5.3.5.2.4. Below, the co-sponsors provide further reasoning on the drawbacks associated with the other options presented by GESAMP-LCA WG.

.1 The suggestion in paragraph 5.3.5.2.2 of setting default values based on a market mix would underestimate the significantly higher emissions of super-emitters at the upper end of leakage rates to benefit from lower system-wide averages. If the default value based on the market mix underestimates the true emissions, there is no mechanism to correct it upward. Conversely, producers of non-fossil alternatives are burdened with proving their actual lower emissions. Considering that actual emission factors are not applicable for purely fossil fuel pathways, a conservative default is necessary to prevent fossil pathways from receiving an unearned competitive advantage over non-fossil pathways.

.2 A regional approach in paragraph 5.3.5.2.4 is unsuitable given that LNG is a highly fungible commodity. Once it is injected into major storage hubs and regasification terminals, the molecules become indistinguishable. Tracing the regional origin of specific energy units to a ship's tank requires continuous chain-of-custody certification, an administrative burden that would defeat the purpose of a simplified default factor that enables accurate forecasting and safer investment.

.3 The third option in paragraph 5.3.5.2.3, "identification of a value range" or "more global default values", would serve as a similar option to setting regional values or allowing actual WtT emission factors. Bunker suppliers and ship operators would inevitably select the lowest available default

3 Xiaoli Mao et al., *Greenhouse Gas Emissions and Air Pollution from Global Shipping, 2016–2023* (International Council on Clean Transportation, 2025), 2016–23, https://theicct.org/publication/greenhouse-gas-emissions-and-air-pollution-from-global-shipping-2016-2023-apr25/

4 Bernard Vuskovic et al., "Fostering Sustainable LNG Bunkering Operations: Development of Regulatory Framework," *Sustainability* 15, no. 9 (2023): 7358, https://doi.org/10.3390/su15097358

5 Bryan Comer et al., *Comparing the Future Demand for, Supply of, and Life-Cycle Emissions from Bio, Synthetic, and Fossil LNG Marine Fuels in the European Union* (International Council on Clean Transportation, 2022), https://theicct.org/publication/lng-marine-fuel-sep22/

6 Ramón A. Alvarez et al., "Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain," *Science* 361, no. 6398 (2018): 186–88, https://doi.org/10.1126/science.aar7204

7 Stuart N. Riddick and Denise L. Mauzerall, "Likely Substantial Underestimation of Reported Methane Emissions from United Kingdom Upstream Oil and Gas Activities," *Energy & Environmental Science* 16, no. 1 (2023): 295–304, https://doi.org/10.1039/D2EE03072A

emission factor to maximize reported emission reductions and minimize compliance costs. This would create a new de facto default emission factor set at a lower emissions intensity unless additionality requirements or actual emissions data were required.

12 Furthermore, in each scenario where multiple WtT emission factors are available, the market will re-route low-emission LNG from those basins exclusively to ships subject to strict GHG pricing, while redirecting highly polluting LNG to less-regulated stationary power sectors or non-compliant/non-regulated shipping routes. This "regulatory arbitrage" dynamic is already apparent in regions with stricter environmental regulations[8] and is the reason for the EU's Carbon Border Adjustment Mechanism (CBAM). By creating stronger incentives to sort LNG by emissions category, this approach could push emissions out of the sector, despite the *2023 IMO Strategy on reduction of GHG emissions from ships* (resolution MEPC.377(80), paragraph 4.7) explicitly stating that mid-term GHG reduction measures, taking into account the LCA Guidelines, should prevent a shift of emissions to other sectors. Atmospheric methane emissions could remain unchanged, but appear to decline as emissions were reallocated along ships, routes, and sectors subject to different regulations.

13 Finally, providing special treatment for fossil LNG with higher GHG intensity conflicts with the approach for assigning WtT emission factors in paragraph 9.3 of the 2024 LCA Guidelines, and the prohibition on using actual emission factors for fossil fuels in paragraph 10.4 of the 2024 LCA Guidelines.

14 To drive actual decarbonization, the co-sponsors recommend that the Organization agree on a single, conservative, global default emission factor, such as the 75% of global LNG supply GHG intensities, which a recent submission[9] estimated at approximately 27.95 gCO_2eq/MJ, using IPCC AR5 100-year global warming potentials, consistent with the 2024 LCA Guidelines.

Proposal

15 Based on the information above, and in response to GESAMP-LCA WG's request for guidance in paragraph 6.2 of document MEPC 84/7/16, the co-sponsors propose that the Committee instruct GESAMP-LCA WG to continue working towards recommending a single, conservative, global WtT default emission factor for all fossil pathways, including the "LNG_f_SLP_gm" fuel pathway code, taking into account the information provided in this document.

Action requested of the Committee

16 The Committee is invited to note the information provided in this document, particularly the proposal in paragraph 0, and to take action as appropriate.

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8 Melike Bildirici et al., "Climate Policy Uncertainty, Environmental Regulatory Arbitrage, and Internal Carbon Leakage in the European Union: Fourier ARDL and Causality Analyses," *Journal of the Knowledge Economy* 16, no. 3 (2025): 13776–810, https://doi.org/10.1007/s13132-025-02690-0

9 MEPC 83/7/28 (Pacific Environment et al.), Key considerations to determine the well-to-tank (WtT) emission factor for liquefied natural gas (LNG) in the 2024 Guidelines on Life Cycle GHG Intensity of Marine Fuels (2024 LCA Guidelines).