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REDUCTION OF GHG EMISSION FROM SHIPS – FOCUS ON ECONOMIC ELEMENTS WITH REFERENCE TO INDUSTRY 4.0

An Equity Assessment of the IMO Net-Zero Framework for Maritime Decarbonisation: Examining Financial Adequacy and Support Mechanism for SIDS and LDC

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SUMMARY

Executive summary:	This document analyses the equity dimensions of the IMO Net-Zero Framework for maritime decarbonisation, focusing on financial adequacy, trade impacts, and access mechanisms for Small Island Developing States (SIDS) and Least Developed Countries (LDCs). It highlights disparities in shipping costs and proposes governance and funding reforms to ensure an inclusive, just transition for all economies.
Strategic direction, if applicable:	2 and 5
Output:	15
Action to be taken:	Paragraph 15
Related documents:	MEPC-E-2, MEPC 83, IMO Net-Zero Framework, CORSIA, EU ETS Maritime Expansion, Adaptation Fund, Paris Agreement.

Introduction

1 Shipping underpins 80–90 percent of global trade and contributes nearly 3 percent of global GHG emissions. Yet it remains one of the hardest sectors to decarbonize. The IMO's forthcoming Net-Zero Framework seeks to align maritime transport with the Paris Agreement, coupling carbon pricing with a new IMO Climate Fund. For the first time, international shipping could possess a unified financial mechanism to drive global decarbonisation — if designed inclusively.

2 Small Island Developing States (SIDS) pay an average of 12.6 percent of their import value in shipping costs, compared with just 2.5 percent for developed economies — a five-fold disparity that shapes the price of every bag of rice and barrel of fuel they import. As the IMO prepares to roll out its Net-Zero Framework, the stakes for these economies extend beyond emissions: it is a question of survival.

Background

3 Adopted under MEPC 83, the Framework will introduce a levy on marine GHG emissions beginning 2026. Revenues, estimated at US $10–12 billion annually, will feed an IMO Fund to support technology, fuel-infrastructure upgrades, and adaptation in developing states.
4 This design echoes the aviation sector's CORSIA and the EU ETS Maritime expansion but is unique in scope and global reach. Unlike these regional or sector-specific mechanisms, the IMO Fund is intended to redistribute resources worldwide — a formidable test of climate equity.
5 Despite its promise, the current financial architecture risks reproducing inequality. Modelling in MEPC-E-2 shows that while projected Fund revenues reach US $10–12 billion per year, SIDS and LDCs require US $40–60 billion annually to meet combined decarbonisation and adaptation needs.

Discussion

6 Without differentiated pricing or guaranteed access, vulnerable nations could face higher freight costs, stranded infrastructure, and worsening debt. The transition to net-zero shipping must not become a net-loss transition for those least responsible for emissions.
7 Quantitative analysis in MEPC-E-2 highlights sharp trade-cost asymmetries:

Group	Transport Cost (% of Import Value)
Developed	2.5
Developing	4.3
LDC	8.7
SIDS	12.6

Each 1 percent rise in freight costs depresses trade volumes by 0.3–0.5 percent, amplifying vulnerability. Food-security models show imported staples could rise 5–8 percent in retail price, while fuel costs increase 10 percent — outcomes that extend beyond economics into human development.
8 The decarbonisation pathway hinges on alternative fuels. MEPC-E-2 compares four leading candidates:

Fuel Type	Emission Reduction vs HFO	Relative Cost (HFO=1.0)	Key Barriers
Green Hydrogen	95–100%	3.5×	Cryogenic storage
Green Ammonia	90–95%	2.8×	Toxic handling
E-Methanol	50–60%	1.3–1.5×	Feedstock availability
Bio-Methanol	40–50%	1.2–1.4×	Land-use competition

9 SIDS and LDCs face structural disadvantages: insufficient storage capacity, absence of hazardous-material protocols, and limited port electrification. Building an ammonia-ready terminal costs US $50–70 million; full green-fuel hubs exceed US $100 million. However, if SIDS achieve 30 percent fleet renewal using e-methanol or bio-methanol by 2040, cumulative emissions reductions could reach 35 Mt CO_2, with fuel-cost savings of US $1.2 billion by 2050.
10 MEPC-E-2 quantifies the looming "double-finance" challenge: adaptation + fuel transition. 15 percent of SIDS ports already face severe flooding; by 2100 that rises to 85 percent without protection. Retrofits cost US $25–50 million per port; adding clean-fuel capacity doubles that to US $50–100 million.

11 Equity requires not only money but governance. MEPC-E-2 recommends a Direct-Access Window within the IMO Fund, mirroring the Adaptation Fund's approach. A Weighted Allocation Formula based on climate vulnerability, trade dependence, and port exposure could ensure transparent distribution — a critical lesson drawn from CORSIA's limited inclusivity.

Proposal

12 The following reforms are proposed to ensure that the IMO Net-Zero Framework functions as an equitable, globally just transition mechanism:

(1) Scale Up the IMO Fund and Prioritize SIDS/LDCs

Current IMO Fund revenues (US $10–12 billion/year) are insufficient. The Fund should be scaled to US $30–40 billion/year, with at least 50 percent ring-fenced for SIDS and LDCs to cover adaptation and green transition needs.

(2) Introduce Differentiated Carbon Pricing

Flat carbon pricing is inequitable as SIDS pay five times more in shipping costs than developed nations. Differentiated pricing should reflect vulnerability and trade dependency.

(3) Establish Direct-Access Funding for SIDS/LDCs

Create a Direct-Access Window within the IMO Fund to provide faster, fairer access to finance for vulnerable nations, modelled on the Adaptation Fund mechanism.

(4) Invest in Climate-Resilient and Green Port Infrastructure

Up to 85 percent of SIDS ports face flooding risk by 2100; retrofits cost US $50–100 million per port. Investment in resilient port design and green fuel infrastructure is essential.

(5) Expand Technical Support and Knowledge Transfer

Scale up technical cooperation, training, and technology transfer to build SIDS/LDC capacity for fuel transition, port modernization, and sustainable maritime operations.

Implementation Pathway

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2025–2026: Finalize levy rates and governance structure.
2027: Launch Direct-Access Window pilot in five SIDS/LDCs.
2028–2030: Operationalize green port programmes and fuel corridors.
2030+: Mid-term review of fund performance and equity outcomes.

14 These reforms align with precedents such as the Adaptation Fund's direct-access model, CORSIA's monitoring framework, and EU ETS revenue mechanisms. Embedding similar transparency tools within the IMO ensures consistency, equity, and interoperability across global frameworks.

Action requested of the Committee / Sub-Committee

15 The Committee / Sub-Committee is invited to:

- consider the information provided in paragraphs 1 to 14;
- endorse the proposed financial and governance reforms to ensure equity in maritime decarbonisation;
- establish a working group or correspondence group to examine differentiated pricing models and direct-access mechanisms; and
- take action as appropriate.