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Agenda item 7

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## REDUCTION OF GHG EMISSIONS FROM SHIPS

### Preparations for the Fifth IMO GHG Study: incorporating structural uncertainties in global production and trade patterns and impacts on maritime emissions

Submitted by OECD

#### SUMMARY

*Executive summary:* This document draws attention to the importance of considering structural uncertainties related to demand for maritime trade in the terms of reference for the Fifth IMO GHG Study.

*Strategic direction, if applicable:* 3

*Output:* 3.2

*Action to be taken:* Paragraph 10

*Related documents:* MEPC 82/7/3; MEPC 81/7/8, MEPC 81/7/21, MEPC 81/16; MEPC 80/INF.10; MEPC 74/18/Add.1 and ISWG-GHG 15/2/6

#### Introduction

1 In recent years, multiple crises such as the COVID-19 pandemic, the Russian invasion of Ukraine, the blockage of the Suez Canal or Panama Canal caused supply shortages, raising awareness of the fragility of global supply and logistics chains and their international dependencies. Both companies and policy makers express rising concerns about supply resiliency, with strategies ranging from diversification of suppliers globally, upstream agreements with trusted partners, development of circular economy principals to reduce the pressure on resources, reuse and recycle materials, and, in some cases, efforts to locate production facilities and suppliers closer to customers.

2 In some OECD economies, there has also been an increase in socio-economic, industrial or trade policies to develop industrial jobs and activities, including those compatible with a circular and zero-emission economy, and associated local trades and activities through local content requirements, supporting regional economic growth and living standards' increase; reinforce the security of supply regarding targeted critical value chains, in particular related to the energy transition; and reduce carbon emissions of production and

consumption.<sup>12</sup> In addition, there will likely be changes in shipping routes due to climate change (related to drought and opening of the northern routes), and the impact of geopolitical tensions on availability of routes and costs, leading to price increases and volatility.

3 These policies and changes could have an important impact on the future of trade volumes, trade spatial configuration and relations, which directly impacts the maritime transport demand, the maritime transport offer, technological choices and emissions, as well as newbuilding and retrofitting of the fleet. As these structural changes could impact the sector's emissions, a workshop entitled "Preparing the 5th GHG study: analysing structural changes in global production and trade patterns and impacts on maritime emissions" was held on 17 June 2024, under the EU-funded research project NDC Aspects, to gather views of the scientific community who investigated this question. It gathered ten maritime experts from ITF-OECD, UCL/UMAS, Tsinghua University, E3 Modelling/Ricardo, Tyndall Centre/University of Manchester and IDDRI/Sciences Po.

### Approaches and lessons for the Fifth IMO GHG Study

4 Distinguishing maritime demand by goods and trading relations is important because it could enable an analysis of past or possible future structural shifts in global traded commodities and in trading relations that will influence levels of GHG emissions.

5 Energy commodities represent about 45% of all tonnes transported and about 38% of all maritime activity (in tonne-kilometers). Traffic will be heavily transformed due to the global energy shift towards zero-emission energy systems necessary to align with the Paris Agreement. There are many studies analysing this structural shift of our global energy system, and impacts on energy products, production localization and trade, which can be used to draw differentiated maritime demand scenarios for energy commodities.<sup>34</sup>

6 Non-energy commodities represent about 55% of all tonnes transported and about 62% of all maritime activity (in tonne-kilometers). They are typically transported over longer distances than energy commodities. Non-energy commodities transported over 10,000 km represent 50% of all tonnes of non-energy commodities and 75% of all their maritime activity. Changes in trade patterns affecting the volumes or trade distances of non-energy commodities could therefore have an important impact on maritime emissions and therefore require a more structured analysis.<sup>5</sup> There are important issues related to future patterns of agricultural supply and demand, notably in relation to bulk goods.<sup>6</sup>

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<sup>1</sup> UNCTAD. (2020). *World Investment Report 2020: International production beyond the pandemic*. [https://unctad.org/system/files/official-document/wir2020\\_en.pdf](https://unctad.org/system/files/official-document/wir2020_en.pdf)

<sup>2</sup> Hsu et al. (2022). *Keeping Your Friends Closer: Friend-shoring in Response to Regional Value Content Requirements*. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4246225](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4246225)

<sup>3</sup> Jones, C., Bullock, S., Ap Dafydd Tomos, B., Freer, M., Welfle, A., and Larkin, A. 2022. *Shipping's role in the global energy transition. A report for the International Chamber of Shipping*. Tyndall Centre for Climate Change Research, University of Manchester. <https://tyndall.ac.uk/news/new-shipping-emissions-report/>

<sup>4</sup> Conor Walsh, Nicholas-Joseph Lazarou, Michael Traut, James Price, Carlo Raucci, Maria Sharmina, Paolo Agnolucci, Sarah Mander, Paul Gilbert, Kevin Anderson, Alice Larkin, Tristan Smith, Trade and trade-offs: Shipping in changing climates, *Marine Policy*, Volume 106, 2019, 103537, ISSN 0308-597X, <https://doi.org/10.1016/j.marpol.2019.103537>

<sup>5</sup> Tsanakas N., Giannelos G., Tsiropoulos I., Briand Y. (2024). Chapter 7 – The global maritime sector under deep decarbonization, NDC Aspects report. [https://www.ndc-aspects.eu/sites/default/files/2024-07/NDCAspects\\_D2.3\\_Chapter7\\_InternationalMaritime.pdf](https://www.ndc-aspects.eu/sites/default/files/2024-07/NDCAspects_D2.3_Chapter7_InternationalMaritime.pdf)

<sup>6</sup> OECD-FAO. (2024). *OECD-FAO Agricultural Outlook 2024-2033*, OECD Publishing, Paris/FAO, Rome, <https://doi.org/10.1787/4c5d2cfb-en>

7 Voyage-based calculations for historical emissions and future projections are recommended to better reconnect technological changes of ship motorization and fuels with maritime demand transformations in terms of commodities, routes, and distances. A new advanced bottom-up method using AIS (automatic identification system) data to estimate emissions and integrating it with trade data was developed by Prof. Huan Liu and her team at Tsinghua University.<sup>7</sup> This method is accurate to provide an understanding of historical maritime CO<sub>2</sub> emissions associated to the goods transported and trading partners, and to build alternative demand scenarios.

8 Given the recent changes presented in the introduction and related uncertainties, the Fifth IMO GHG Study could focus on demand projections and impact on the maritime sector, by incorporating advanced datasets and methods. This would address existing inconsistencies within estimates of future emissions that embed assumptions regarding the decarbonization of shipping, without embedding assumptions regarding the broader global industrial, trade and energy transition towards carbon neutrality. By reviewing and building different pathways for the future of traded commodities and trade relationships compatible with country development and climate objectives,<sup>8</sup> and translating these into consequences for maritime transportation and ship demand and supply, this scientific study could inform future policy discussions at IMO in the perspective of the IMO GHG Strategy revision by 2028.

### Proposal

9 The Committee is invited to include in the terms of reference for the Fifth IMO GHG Study both, under the part on "Inventory of GHG emissions from international shipping 2019-2024" and the part under "Scenarios for future international shipping emissions 2024-2050", an explicit note to further analyse the relationship between maritime emissions and the nature of traded goods (energy and non-energy), as well as the change in trading relations and distances.

### Action requested of the Committee

10 The Committee is invited to consider the information provided in this document and the proposal set out in paragraph 9 and take action as appropriate.

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<sup>7</sup> Wang, X.T., Liu, H., Lv, Z.F. et al. (2021). Trade-linked shipping CO<sub>2</sub> emissions. *Nat. Clim. Chang.* 11, 945–951 <https://doi.org/10.1038/s41558-021-01176-6>

<sup>8</sup> Halim, R.A.; Kirstein, L.; Merk, O.; Martinez, L.M. (2018). Decarbonization Pathways for International Maritime Transport: A Model-Based Policy Impact Assessment. *Sustainability* 2018, 10, 2243. <https://doi.org/10.3390/su10072243>