

# THE SHIPPING SECTOR AND GHG EMISSIONS: THE INITIAL STRATEGY FOR A ZERO-CARBON PATHWAY

## Executive Summary - Please Do Not Circulate\*

### The Shipping Sector

The International Maritime Organization (IMO) defines international shipping as shipping between ports of different countries, as opposed to *domestic shipping*, and excludes military and fishing vessels.<sup>1</sup> By this definition, the same ship may be engaged in both international and domestic shipping operations. International shipping carries most of the global trade by volume (around 80%).<sup>2</sup> Shipping has proven to be one of the most efficient means of transportation for bulk commodities worldwide when compared to other modes of transport.<sup>3</sup>

The shipping sector has its own dedicated international organization. The International Maritime Organization (IMO) was created in 1948 under the United Nations as their inter-governmental regulatory body. The IMO is mandated to promote maritime safety, efficiency of navigation, prevention and control of marine pollution from ships.<sup>4</sup> The Maritime Environment Protection Committee (MEPC), created in 1996, is the IMO body responsible for developing environmental policies, including on greenhouse gas (GHG) emissions from ships.

### Shipping and Climate Change

Shipping in absolute terms is a substantial emitter of CO<sub>2</sub>, but it is the most carbon efficient means of transportation for bulk commodities worldwide.<sup>5</sup> Ships transport most of world trade, but only account for around 2.2% of the world's total CO<sub>2</sub> emissions.<sup>6</sup> Nevertheless, in absence of further regulation, GHG emissions from international maritime shipping will continue to rise. It is estimated that GHG emissions from shipping are likely to increase from 50% to 250% by 2050, if no action is taken.<sup>7</sup>

### Initial IMO Strategy on Reduction of GHG Emissions from Ships

In April 2018, the shipping sector announced the important commitment to reduce GHG emissions in international shipping. The aims and ways to achieve this goal are described in the 2018 *Initial IMO Strategy on Reduction of GHG Emissions from Ships* (Initial Strategy).<sup>8</sup> Importantly, the Initial Strategy relates to *international* shipping emissions.

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<sup>1</sup> Domestic shipping refers to shipping between ports of the same country, Second International Maritime Organization (IMO) Green House Gas (GHG) Study 2009.

<sup>2</sup> Maritime Transport Report 2018, United Nations Conference on Trade and Development (UNCTAD), p.23.

<sup>3</sup> Branislav Dragoviš, Ernestos Tzannatos, Vassilis Tselentis, Amalia-Venera Todorut, 'Energy Efficiency in the Shipping Sector – A Case Study' (2016), University of Targu Jiu, Economy Series, 2 Special Issue, p.58.

<sup>4</sup> Article 1 (a), Convention on the International Maritime Organization (IMO Convention).

<sup>5</sup> Ibid, p.5490.

<sup>6</sup> Compared to 2.8% in 2007. See in this report a comparison in terms of GHG emissions between different modes of transport International Chamber of Shipping, Delivering CO<sub>2</sub> Emission Reductions International Shipping is Part of the Solution 2015, on GHG emissions, see also International Chamber of Shipping Reducing CO<sub>2</sub> Emissions to Zero: The 'Paris Agreement for Shipping,' 2018, p.4.

<sup>7</sup> See, also, Hughes, Dr Edmund. 'Recent developments at IMO to address GHG emissions from ships' (2016) 2, available on <<http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/UN%20Joint%20side%20event%20presentation.pdf>>.

<sup>8</sup> MEPC's 72<sup>nd</sup> session, held in London from 9-13 April 2018, which involved Member States, UN bodies including the UNFCCC, inter-governmental organizations and NGOs, the Committee adopted Resolution MEPC.304(72) on *Initial IMO*

Table 1: IMO Initial Strategy

IMO Initial Strategy	
<b>Aims and Vision</b>	To reduce CO2 emissions per transport work, <sup>9</sup> as an average across international shipping by at least 40% by 2030, and at least 50% by 2050 compared to 2008.
<b>Vision</b>	IMO remains committed to reducing GHG emissions from international shipping and, as a matter of urgency, aims to phase them out as soon as possible in this century.
<b>Levels of Ambition</b>	<p><b>Level 1</b> Carbon intensity of the ship to decline through implementation of further phases of the energy efficiency design index (EEDI) for new ships.</p> <hr/> <p><b>Level 2</b> <b>carbon intensity of international shipping to decline</b> To reduce CO2 emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008.</p> <hr/> <p><b>Level 3</b> <b>GHG emissions from international shipping to peak and decline</b> To peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008 whilst pursuing efforts towards phasing them out as called for in the vision as a point on a pathway of CO2 emissions reduction consistent with the Paris Agreement temperature goals.</p>
<b>Guiding Principles</b>	Principles of non-discrimination and no more favorable treatment; Principle of Common but Differentiated Responsibilities
<b>Candidate Measures</b>	<p><b>Short-term (between 2018-2023)</b> Short-term measures involve improvements of the existing energy efficiency framework (i.e. EEDI and SEEMP), and future review of EEDI regulations.</p> <hr/> <p><b>Mid-term (between 2023 and 2030)</b> Mid-term measures include an agreed implementation strategy for the actual uptake of the NAPs.<sup>10</sup> They should also include operational energy efficiency measures for both new and existing ships.</p> <hr/> <p><b>Long-term measures (beyond 2030)</b> Long-term measures involve the development and use of zero-carbon or fossil-free fuels. The aspiration is to achieve decarbonization of the shipping sector in the second half of the century.</p>

### Implementing the IMO Initial Strategy

The MEPC aims to finalize the IMO Initial Strategy by 2023, guided by the follow-up actions listed in the Initial Strategy<sup>11</sup> (table below). MEPC has invited proposals from IMO member States and other stakeholders on candidate short-term measures (submitted to MEPC 74 2019) and proposals for mid and long-term measures (to be submitted to MEPC 75 2020).<sup>12</sup> The agreed candidate measures under MEPC 74 in the coming years will define how the Initial Strategy will be ultimately implemented.

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*Strategy on reduction of GHG emissions from ships* (Initial Strategy). P.1. The Initial Strategy is expected to be revised in 2023, Initial Strategy, para 3, p.2.

<sup>9</sup> Gram of CO2 per tonne-nautical mile gCO2/tnm, Rightship “Calculating and Comparing CO2 Emissions from the Global Maritime Fleet” (2013) 2.

<sup>10</sup> Initial Strategy, para 4.8, p.9.

<sup>11</sup> IMO Initial Strategy, MEPC 72/17/Add.1 Annex 11, p.10.

<sup>12</sup> The MEPC 73 invited concrete proposals on candidate short-term measures to the next Committee session, MEPC 74 (May 2019), <http://www.imo.org/en/MediaCentre/MeetingSummaries/MEPC/Pages/MEPC-73rd-session.aspx>

Table 2: Follow-up Actions for the Development of a Revised Strategy in 2023

Follow-up Actions Towards the Development of the Revised Strategy in 2023	
Spring 2018 (MEPC 72)	Adoption of the Initial Strategy including, inter alia, a list of candidate short-, mid- and long-term further measures with possible timelines, to be revised as appropriate as additional information becomes available.
January 2019	Start of Phase 1: Data collection (Ships to collect data).
Spring 2019 (MEPC 74)	Initiation of Fourth IMO GHG Study using data from 2012-2018.
Summer 2020	Data from 2019 to be reported to IMO.
Autumn 2020 (MEPC 76)	Start of Phase 2: data analysis (no later than autumn 2020) Publication of Fourth IMO GHG Study for consideration by MEPC 76.
Spring 2021 (MEPC 77)	Secretariat report summarizing the 2019 data pursuant to regulation 22A.10. Initiation of work on adjustments on Initial IMO Strategy, based on Data Collection System (DCS) <sup>13</sup> data.
Summer 2021	Data for 2020 to be reported to IMO.
Spring 2022 (MEPC 78)	Phase 3: Decision step Secretariat report summarizing the 2020 data pursuant to regulation 22A.10.
Summer 2022	Data for 2021 to be reported to IMO.
Spring 2023 (MEPC 80)	Secretariat report summarizing the 2021 data pursuant to regulation 22A.10 <b>Adoption of Revised IMO Strategy, including short-, mid- and long-term further measure(s), as required, with implementation schedules.</b>

### What are the Challenges Ahead?

#### *Alternative Fuels: Are we there yet? If not, when?*

The current major challenge for international shipping is to achieve decarbonization of the industry. Shipping companies already have a strong incentive to reduce fuel consumption (and consequent CO2 emissions) as bunker fuel represents the largest cost for ship operators.<sup>14</sup> However, as the sector points out, the ultimate goal of zero emissions can only be delivered with genuine zero-carbon fuels.<sup>15</sup> The use of zero carbon fuels for deep sea voyages is the biggest challenge as international voyages emit more GHG emissions compared to domestic voyages.<sup>16</sup> There is also the issue of infrastructure lock-in; there is very little time to make major changes to how ships are powered and operated.

Although alternative fuels are being developed and tested, they are far from being ready for wide-spread deployment in the global fleet. Alternative fuels include batteries, biofuels, hydrogen, ammonia, liquid natural gas (LNG) and nuclear energy. Each of these options has particular tradeoffs, poses safety and security concerns, and involves infrastructure costs. For example, alternative fuels will require new

<sup>13</sup> In 2016, the IMO created a global CO2 Data Collection System (DCS) to measure emissions from ships, MEPC 70 (October 2016) adopted by resolution MEPC.278(70), which became mandatory from March 2018, adopted by resolution MEPC.278(70). As per this resolution, from calendar year 2019, ships of 5,000 gross tonnage and above (representing approximately 85% of the total CO2 emissions from international shipping) are required to collect consumption data per type of fuel oil they use (para. 15).

<sup>14</sup> Improving fuel efficiency is the industry's greatest economic priority being a ship operator's largest cost, International Chamber of Shipping, *Delivering CO2 Emission Reductions International Shipping is Part of the Solution 2015*.

<sup>15</sup> International Chamber of Shipping *Reducing CO2 Emissions to Zero: The 'Paris Agreement for Shipping'*, 2018, p.10.

<sup>16</sup> Interview with the Marine Environment Division (MEP) of the International Maritime Organization, June 2019.

bunkering infrastructure, which may take another 30 years to be delivered.<sup>17</sup> The question then is: how far are we in achieving safe, low-carbon and reliable alternative fuels for the shipping sector?

*What is Required in terms of Technical and Financial Assistance?*

Another challenge is making the required technology, infrastructure and capacity to deploy alternative fuels available to all countries. The IMO recognizes the needs of developing countries regarding capacity building and technical cooperation<sup>18</sup> and has adopted resolutions to address this concern.<sup>19</sup>

Although some shipping companies (e.g. MERKS) are investing in research and development (R&D), most shipowners are small and medium-sized enterprises that do not have R&D capacity. At the country level, IMO member States are required to develop National Action Plans.<sup>20</sup> However, even if they develop good NAPs, will they have the technical and financial capacity to implement them? The changes needed for achieving a zero-carbon global fleet will involve high amounts of funding. Who will pay for this? Will the financial burden be on shipping companies, developed countries, or international institutions?

*Global, Reliable and Standardized GHG Data Collection and Reporting System: Do we have one?*

Due to the highly mobile, transnational nature of the shipping sector, it has proven technically difficult to allocate maritime emissions per country.<sup>21</sup> Errors in calculating fuel consumption (and related GHG emissions) open up the potential for problems in a future emissions reduction regulatory framework.<sup>22</sup> As an interim measure, IMO has adopted, in 2016, a global CO<sub>2</sub> Data Collection System (DCS) to measure emissions from ships,<sup>23</sup> which became mandatory from 2019.<sup>24</sup> Ships of 5,000 gross tonnage and above (representing approximately 85% of the total CO<sub>2</sub> emissions from international shipping) are required to collect consumption data per type of fuel oil they use.<sup>25</sup>

The challenges ahead will be to set up a robust and global methodology for ships to measure GHG emissions (not only CO<sub>2</sub>), establish a standardized reporting system and a reliable verification process to monitor compliance. While the IMO-DCS is a good first step, further work will be required to create a global system to accurately measure international maritime GHG emissions.

*How to reconcile key principles and avoid market distortions?*

Shipping is a commercial activity and any regulatory measures will have an impact on international trade. For example, measures to reduce GHG emissions, such as speed optimization, optimised routing, improved fleet planning and other logistics-based measures, are likely to have an impact on the overall logistical supply chain.<sup>26</sup> As such, the Initial Strategy requires that the proposal for candidate measures be accompanied by an impact assessment on the commercial (and other) impacts for countries.

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<sup>17</sup> International Chamber of Shipping Reducing CO<sub>2</sub> Emissions to Zero: The ‘Paris Agreement for Shipping,’ 2018, p.10.

<sup>18</sup> Initial Strategy, para 5, p.10.

<sup>19</sup> For example, MEPC 65 (May 2013) adopted resolution MEPC.229(65) on Promotion of technical co-operation and transfer of technology relating to the improvement of energy efficiency of ships.

<sup>20</sup> Initial IMO Strategy on Reduction of GHG Emissions from Ships, IMO Resolution MEPC.304(72), para 4.

<sup>21</sup> Lister, René Taudal Poulsen and Stefano Ponte, ‘Orchestrating Transnational Environmental Governance in Maritime Shipping’ (2015) 34 Global Environmental Change, p.188.

<sup>22</sup> Ibid.

<sup>23</sup> MEPC 70 (October 2016) adopted, by resolution MEPC.278(70), amendments to MARPOL Annex VI to introduce the data collection system for fuel oil consumption of ships.

<sup>24</sup> This provision has been added by the Amendments to MARPOL Annex VI on Data collection system for fuel oil consumption of ships, adopted by resolution MEPC.278(70), entered into force on 1 March 2018.

<sup>25</sup> Initial Strategy, para 1.3, p.4.

<sup>26</sup> Harilaos N. Psaraftis, Christos A. Kontovas, ‘Balancing the Economic and Environmental Performance of Maritime Transportation’ (2010) 15 (D) *Transportation Research*, p.458.

Future candidate measures agreed under the IMO will also need to consider and reconcile key legal principles, for example the IMO principle of non-discrimination or ‘equal treatment,’ and the United Nations Framework Convention on Climate Change (UNFCCC) principle of Common But Differentiated Responsibility (CBDR). The International Chamber of Shipping (ICS) argues that the CBDR principle cannot be practically applied directly to individual ships without the danger of significant ‘carbon leakage’.<sup>27</sup> For example, if developing countries are given favorable treatment in relation to GHG reduction measures based on the CBDR principle, shipowners from developed countries may choose to change their ships’ registration to obtain the same favourable treatment (i.e. practice known as ‘flags of convenience’).

The use of market-based mechanisms (MBM) is one of the most controversial among the candidate measures proposed under the Initial Strategy.<sup>28</sup> ICS remains skeptical of MBMs as a means to incentivize CO<sub>2</sub> reduction.<sup>29</sup> Despite the industry’s reservations, particularly in relation to a future emissions trading scheme, its view is that the IMO should be the forum for this discussion and its preference is for a bunker fuel levy, rather than an emissions trading scheme.<sup>30</sup> There is also discussion on introducing a price on carbon<sup>31</sup> emitted by ships. This could be an incentive for shipowners to use low-carbon fuels, which are still more expensive than fossil fuels.

From a broad perspective, there are in practice three ways to tackle GHG emissions in shipping: (1) to improve the energy efficiency of ships, (2) to reduce carbon intensity of fossil fuels (or use alternative fuels) and (3) to reduce consumer demand. This third solution involves behavioural changes on the part of individuals to buy goods and services with a sense of awareness of their carbon footprint. Shipping has always been a cheap mode of transport. We can ask whether goods should become pricier to reflect the health and environmental externalities associated with international shipping?

*What are the regulatory changes needed to achieve the 50% by 2050 target?*

To implement the Initial Strategy and achieve the 50% by 2050 target, the IMO may need to adopt new regulations, or amend existing ones, particularly the International Convention for the Prevention of Pollution from Ships (MARPOL). If new regulatory measures are adopted, these are some questions that require attention: what legal obligations are needed and who do they apply to (e.g. shipowners, individual ships, or member states)? Who will monitor GHG emissions from ships? Will flag states report on GHG emissions? What happens in situations of non-compliance?

Future regulatory measures agreed under the IMO for reducing GHG emissions will need to be implemented by states. However, even in the case of an established legal instrument like MARPOL, the ratification and implementation record by states is uneven. Some states have not ratified MARPOL, some have ratified MARPOL but not incorporated it in domestic law, while others have incorporated MARPOL, but not all of its amendments.<sup>32</sup> Future GHG regulations adopted by the IMO are likely to face similar challenges.

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<sup>27</sup> Aaron Strong critically analyses the friction between the IMO principle of non-discrimination or ‘equal treatment,’ and the UNFCCC principle of CBDR, Aaron L Strong, Tackling Greenhouse Gas Emissions from the International Maritime Industry” Chapter 15 in GF. Gresh (ed) Eurasia’s Maritime Rise and Global Security (2018).

<sup>28</sup> International Chamber of Shipping Reducing CO<sub>2</sub> Emissions to Zero: The ‘Paris Agreement for Shipping,’ 2018, p.7.

<sup>29</sup> Ibid, p.13.

<sup>30</sup> International Chamber of Shipping Reducing CO<sub>2</sub> Emissions to Zero: The ‘Paris Agreement for Shipping,’ 2018, p.8.

<sup>31</sup> See, Funke, Franziska and Linus Mattauch, Why is carbon pricing in some countries more successful than in others? Available on <https://ourworldindata.org/carbon-pricing-popular>;

Roberts, David. The 5 most important questions about carbon taxes, Available on <<https://www.vox.com/energy-and-environment/2018/7/20/17584376/carbon-tax-congress-republicans-cost-economy>> accessed on 01 September 2019.

<sup>32</sup> Interview with the Marine Environment Division (MEP) of the International Maritime Organization, June 2019.

*Is the current maritime governance structure good enough?*

The maritime shipping sector is the most international sector with ships highly diverse in type, size and usage constantly changing flags, and using ports across different countries. Shipping involves stakeholders both on land and in the water, who are subject to different laws, values, norms and cultures.<sup>33</sup> Given this complexity, it is difficult to create a singular clear-cut strategy or measures fit-for-all.<sup>34</sup> Imposing common standards for a highly dynamic and transnational sector is in itself a challenge.

Partly due to the complex nature of international maritime shipping, it might be difficult to make all countries equally engaged in the discussion and come to an agreement regarding future GHG-related measures and ultimate decarbonization of the industry. The buy-in of all countries is a key concern for the effective implementation of the Initial Strategy. The IMO leadership will now be tested. Will it be able to achieve agreement on the candidate measures and drive the required changes within a limited timeframe? The IMO, as the sector's regulator, should play a role of 'orchestrator'<sup>35</sup> in engaging several actors in achieving common goals. However, IMO has been criticised for failing to play this role or not moving quickly enough.<sup>36</sup> This is one of the reasons why Europe took the lead in adopting a regulation to reduce GHG emissions, independently from the IMO.<sup>37</sup>

Even if the IMO successfully engages stakeholders, there are limits to what it can do, as the authority to enforce IMO regulations and standards rests with the member states, who have varied capacity and political will to enforce the law. The state-centric model in maritime governance has often been criticized for being outdated and failing to address the challenges of a sector that is predominantly industry dominated.<sup>38</sup>

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<sup>33</sup> Mia Mahmudur Rahim, Md. Tarikul Islam, Sanjaya Kuruppu, 'Regulating Global Shipping Corporations' Accountability for Reducing Greenhouse Gas Emissions in the Seas' (2016), p.160.

<sup>34</sup> Apollonia Miola, Marleen Marra, Biagio Ciuffo, 'Designing a Climate Change Policy for the International Maritime Transport Sector: Market-Based Measures and Technological Options for Global and Regional Policy Actions' (2011) 39 Energy Policy, p.5495.

<sup>35</sup> Lister (note 21), p.185.

<sup>36</sup> Michael Roe, *Maritime Governance, Speed, Flow, Form, Process* (Springer, 2016), p.3.

<sup>37</sup> Interview with the European Commission Directorate-General for Climate Action (DG CLIMA) in Brussels, June 2019.

<sup>38</sup> *Ibid*, p.32.