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REDUCTION OF GHG EMISSIONS FROM SHIPS

An Examination of Mid-Term Measures: Opportunities for Improvement and Agreement at the Global Level

Submitted by the World Shipping Council

SUMMARY

Executive summary: This document examines the principal mid-term measures under consideration by the Committee, identifies cross-cutting issues relevant to numerous proposals, and proposes three suggestions for consideration by the Working Group on Reduction of GHG Emissions from Ships and the 79th Session of the Committee.

Strategic direction, if applicable: 3

Output: 3.2

Action to be taken: Paragraph 14

Related documents: MEPC 78/7, MEPC 78/7/5, MEPC 77/7/4, MEPC 76/7/12, ISWG-GHG 12/3, ISWG-GHG 12/3/1, ISWG-GHG 12/3/2, ISWG-GHG 12/3/3, ISWG-GHG 12/3/5, ISWG-GHG 12/3/6, ISWG-GHG 12/3/7, ISWG-GHG 12/3/9, ISWG-GHG 12/3/10, ISWG-GHG 12/3/12, ISWG-GHG 12/3/13, ISWG-GHG 12/3/15, ISWG-GHG 12/3/16, ISWG-GHG 12/3/17, ISWG-GHG 12/INF.2, ISWG-GHG 12/INF.3, ISWG-GHG 12/INF.4, and ISWG-GHG 12/INF.5.

INTRODUCTION

1 At the closure of ISWG-GHG 12 the Chairman invited Member States and observers to explore possibilities for building on the proposals made to ISWG-GHG 12 and MEPC 78 with a view to exploring possible paths forward for the Committee. This paper responds to this invitation and is organized into three sections. The first section outlines five important issues discussed by the Committee that arise in the discussion of mid-term measures and how the current proposals address these issues. Section two builds on the critical pathways identified in MEPC 78/7 and identifies cross-cutting issues applicable to multiple proposals and related challenges to be addressed. The final section (Section three) offers three

suggestions for the Committee's consideration as it works to build common ground in developing an appropriate and effective set of regulatory measures to phase out GHG emissions in the commercial maritime sector.

Section 1

2 The Committee and GHG Working Group are considering a number of mid-term measure proposals that outline different approaches to address the GHG challenge. We consider four different approaches to achieve GHG emission reductions in shipping that have been presented to ISWG-GHG 12 or earlier sessions of the Committee or GHG Working Group. The four proposed approaches include: 1) a GHG emissions / fuel levy / feebate approach, (see MEPC 78/7/5, MEPC 77/7/4, MEPC 76/7/12, and related documents, 2) a GHG Fuel Standard (see ISWG-GHG 12/3/3, ISWG-GHG 10/5/3, and related papers), 3) a funding/reward system based on the relative performance benchmarking proposal made in ISWG-GHG 12/3/9, and 4) emissions trading (see ISWG-GHG 12/3/13, MEPC 77/7/16). Also annexed to this document is a brief summary of the four approaches as well as a brief set of bullets describing the strengths and challenges associated with each approach.

3 While the proposals referenced above outline different approaches to reducing GHG emissions across the fleet, we highlight five important issues in paragraphs 4 - 8 and how these issues are addressed in the current set of proposals before the Committee.

4 **Establishment of a financial mechanism:** Three of the four approaches (levy / feebate concept, emissions trading, and the benchmarking proposal) establish explicit financial mechanisms. A GHG levy and emissions trading both establish a carbon / GHG price for emissions from international shipping. The benchmarking proposal establishes financial costs on ships rated as E or D under the CII framework, and offers funding for capacity building, R&D, and a variable reward for ships receiving A and B ratings under the CII. The GHG Fuel Standard (GFS) proposal does not create a carbon price or financial mechanism, but relies on an expected market response from fuel producers and suppliers, as well as shipowners and operators that would need to order and operate ships capable of using fuels that meet the respective standards.

5 **Mechanisms for an Equitable Transition:** Each of the respective proposals can be designed to include details supporting an equitable transition. The benchmarking proposal offers a number of explicit mechanisms intended to serve this purpose. The feebate proposal made by Japan clearly seeks to provide incentives to first movers, and the levy proposals seek to recognize the unique situation of SIDs and LDCs. As a technical measure, the GFS proposal does not offer any explicit mechanisms to address fuel availability and how it may vary geographically as the world undergoes a major energy transition. To address this matter, we offer a few suggestions in section three of this paper that we believe would address how a GFS proposal may be structured to proceed with a graduated approach that recognizes that most low, near-zero and zero GHG fuels initially will have limited production and supply volumes that vary by location and that use of these fuels can be expected to expand in a step-wise manner as production and supply infrastructure expands.

6 **Climate Endpoints:** The climate outcome expected to be achieved via a given proposal is critically important. All proposals can be expected to reduce relative GHG emissions from the fleet, while recognizing that the degree of emission reduction is highly dependent on a variety of critical factors. By way of example, a levy or feebate system will establish a carbon / GHG price per tonne of emissions (calculated via fuel consumed), and an ETS would price GHG emissions directly through allowances. Whether these market-based measures achieve absolute emission reductions and whether the magnitude of those reductions achieves IMO GHG targets and milestones is directly a function of the magnitude

of the carbon price and whether it is sufficient to drive the introduction of new low, near-zero, and zero GHG fuels and technologies. More specific points follow in the next three subparagraphs:

.1 In general, emission trading systems stipulate a declining emissions cap with the freedom to trade credits among the regulated parties. Other provisions such as allocation policies, prevailing 'market' prices, or exemption conditions can seriously alter the climate outcome. Equally relevant in a global emissions trading system is whether the structure in fact proposes an emissions cap, and how the trading system and related markets function as an integrated global system. ISWG-GHG 12/3/13 proposes an annual emissions cap applicable to maritime shipping. A definitive global emissions cap provides the foundation for concrete environmental outcomes, but further detail and elaboration are needed to truly assess how a 'closed' emissions trading system for shipping would function at the global scale. To this end, we invite Members and other parties interested in establishing a global ETS to build on ISWG-GHG 12/3/13 to articulate how a global ETS system could be established, enforced, and how it would function on a day-to day basis.

.2 As drafted, the benchmarking proposal encourages improved ship efficiency by imposing costs on ships rated as D and E. This is not a "carbon price" per se as the cost only applies to ships rated as D and E under the CII. Considering the complications of whether such ships are truly inferior ships (or are simply ships serving routes and ports that require higher fuel consumption), the potential for absolute emission reductions based on an index calculated to include transport work is unclear. In addition, emissions from ships rated as C, B, and A do not incur any explicit cost associated with the GHG emissions generated by these ships. As a result, there appears to be limited incentive to meet IMO GHG targets for ships that perform above the benchmark.

.3 The GFS proposal arguably offers one of the most direct mechanisms to deliver very significant emission reductions, but to achieve IMO GHG objectives through this mechanism requires agreement on stringent GHG intensity limits. In addition, recognizing the magnitude of capital investment required to produce near-zero GHG fuels, a marine GFS regulation by itself is unlikely to result in the necessary energy investments. To be successful, a GFS regulation (like many other approaches) will require parallel actions to stimulate the needed energy projects. This point is further addressed in paragraphs 7, 9, 10 and 11.

7 Production of fuels using Renewable Energy: It is important to understand that achievement of IMO's goal to phase out GHG emissions will be dependent on the development of capacity to produce low and near-zero GHG fuels with renewable energy at a reasonable cost. The fact that demand in the maritime sector alone is unlikely to stimulate an adequate market response in production and supply infrastructure suggests that regulation must be coupled with parallel actions (including financial support) to address these critical and expensive energy development activities.

8 Global Marine Transportation Supply: During the IMO GHG discussions concern has been expressed by various parties about potential rationing of maritime transportation services. Examining the mid-term proposals made to date we do not find that marine transportation supply is rationed or otherwise limited by any of the proposals presented to the Committee. A proposal or agreed objective may limit GHG emissions from the fleet, but this does not equate to limiting marine transportation services if we create a regulatory and commercial environment that allows carriers to transition to low, near-zero, and zero GHG

fuels and the technologies needed to use them safely and efficiently.¹ Creating that regulatory structure coupled with the necessary investments in renewable energy production is the core challenge we face.

Section 2: Cross-Cutting Issues

9 Each of the Mid-Term Measure proposals and development of an effective global GHG strategy face certain common challenges as discussed in MEPC 78/7. We briefly outline here a set of challenges (common to all proposals on the table) that require solutions if we are to develop an effective, realistic, and equitable set of measures.

- i. IMO's goal to phase out GHG emissions from shipping will require very significant investments in the production and supply of low, near-zero, and zero GHG fuels.
- ii. Well-to-Wake LCA is critical to avoid favouring fuels that have attractive Tank-to-Wake figures, but possess high life-cycle emissions.
- iii. Countries across the globe face very different economic circumstances and some locations – especially those that are remote and import or export small volumes – already face very high transportation costs. Any proposal needs to identify an effective structure to address these issues of equity and sustainability of isolated and developing economies.
- iv. Simplicity of implementation and the ability to verify and enforce standards unique to a given proposal.

10 The cross-cutting issues identified above are among the most challenging issues we face in constructing an effective set of mid-term measures. Consequently, we should take the opportunity to explicitly address these issues precisely because they are critical to the overall viability and success of IMO's GHG Strategy.

11 The Committee has recently discussed the need for an equitable means of transition. We believe this is critically important both because of the different economic circumstances that countries face across the globe and also because a major energy transition cannot be expected to produce the needed production capacity, supply infrastructure, and ships capable of using the necessary and technologies in a single, uniform step across the world. To this end, we believe the Committee and GHG Working Group should invest considerable effort in exploring options to address both the equities and the technological and investment advancements necessary for this energy transition.

Section 3

Opportunities for Capitalizing on the Strengths of the Existing Proposals and the Need for Additional Complementary Measures

12 The suite of mid-term proposals before the Committee presents a wide range of approaches with various attributes and challenges. Building on the observations in Section 1 and the principal cross-cutting issues identified above, we offer three suggestions that we believe would significantly strengthen the Organization's GHG Strategy. The three suggestions address specific proposals, while also outlining complimentary actions to strengthen the broader GHG strategy.

¹ Supporting analyses from the four IMO GHG Studies (2000, 2009, 2014, and 2020) indicate in all projections and scenarios that shipping GHG emissions can be reduced while meeting transport work demand.

13 The three suggestions are as follows:

- A. Modify the GFS proposal to include a more limited set of steps (perhaps two or three) and establish dates based on projected fuel and technology production timeframes (not on a standard five-year increment). Too many increments in an GFS can stall progress because more significant advances may be made more efficiently with a sufficient interval between a more limited set of steps;
- B. Building on existing initiatives, develop an IMO Green Corridors Programme as a means to introduce new fuels and technologies in a structured manner and as a practical and explicit vehicle for pursuing an equitable transition. Green corridors can be created to connect both developed and developing economies with the introduction of appropriate ships and fuel infrastructure serving specific routes with a graduated expansion of the routes served;
- C. Consider a benchmarking approach not based on the CII, but using an LCA-based GHG intensity metric that more directly incorporates climate endpoints. In this context, consider replacing the relative benchmark tied to the CII proposed in ISWG-GHG 12/3/9 to a benchmark based on a direct LCA-based GHG emissions metric.

ACTION REQUESTED OF THE COMMITTEE

14 The Committee is invited to consider the comments and actions outlined in this document and to take action as it deems appropriate.

ANNEX

1 In this Annex we briefly describe the principal mid-term measure concepts (hereafter referred to as 'approaches') that have been presented to the Committee, at ISWG-GHG 12, and earlier sessions. While there are proposals that outline unique variants or characteristics, we group the existing mid-term proposals into four basic approaches for purposes of simplicity. The four approaches include: 1) a GHG emissions / fuel levy, 2) a GHG Fuel Standard (GFS), 3) the benchmarking proposal made in ISWG 12/3/9, and 4) emissions trading. In the following discussion, we attempt to briefly describe the key features and offer a perspective on some of the most significant strengths and challenges posed by the different approaches.

2 *Important Note:* Describing the strengths and challenges of a given measure is inherently a subjective exercise and we fully recognize that States and other interested parties may characterize the strengths and challenges differently. Bearing this in mind, we have endeavoured to write a concise summary and we have attempted to provide as objective a description as possible in the hopes this proves valuable to members of the Committee and the Working Group on Reduction of GHG Emissions from Ships.

A Global GHG Levy or Feebate System

3 A global GHG levy would assign a carbon price on a ton of CO₂ or GHGs emitted as measured through defined conversion factors for the amount of a given fuel consumed in a given year. The levy (carbon price) may be set at a fixed value that remains indefinitely. Alternatively, the levy amount may be fixed for a defined period and recalculated on a periodic basis. The quantum of the levy can be determined by political agreement or one may establish a system where the value is determined by benchmarking the value against an existing pricing reference or the average of multiple pricing systems found in today's markets.

4 Most levy proposals would create a single central fund where revenues are paid directly to a central fund manager (see MEPC 76/7/12, MEPC 78/7/5, and ISWG-GHG 12/3/7). This effectively avoids national hypothecation issues that arise if funds are collected by national governments or collected via bunker suppliers. The management, distribution, and use of the funds can cover a variety of objectives (e.g., acceleration of decarbonization efforts in the sector, applied R&D, explicit funds for assistance in supporting the green energy transition, fuel infrastructure in SIDs and LDCs, and other purposes) as defined by the parties.

5 A short list of the relevant strengths and challenges of a GHG levy follow:

Strengths:

- A GHG levy has the ability to be constructed and implemented at a global scale, and the mechanisms to establish and administer the measure are relatively simple;
- Emissions are priced directly with ships emitting the most GHG emissions incurring the most significant payment obligations;
- Technology neutral;
- Feebate mechanism in MEPC 78/7/5 specifically designed to encourage deployment of zero and near-zero ships; and
- Reasonable argument that a GHG levy is the easiest economic measure to bring into effect that is truly global in scale.

Challenges:

- Effectiveness at reducing fleet GHG emissions is highly dependent on the quantum of the levy (e.g., a modest levy price is unlikely to motivate a transition to green fuels);
- Requires agreement on the appropriate quantum of the levy. This difficulty may be mediated by agreement on use of a particular benchmark for establishing the initial levy amount and periodically resetting the value to help create the necessary financial incentives for transitioning to low and near-zero fuels; and
- Some countries are resistant to a GHG levy in concept due to international taxation concerns and fear that the added cost to transportation would prove detrimental to national economic goals as well as transportation costs to SIDs and other remote locations.

A GHG Fuel Standard (GFS)

6 A GHG Fuel Standard, referred to as GFS and previously referred to as LGFS, is a regulatory instrument that stipulates the amount of carbon or GHG equivalent allowed in marine fuels at a given period. GFS proposals tabled to date lay out a series of standards where the GHG content of a marine fuels must meet specified GHG-intensity limits after a specific date with subsequent standards requiring progressively lower GHG content.

7 A GFS has the benefit of directly addressing the core issue of GHG emissions by requiring the use of fuels with a lower and lower GHG footprint. Undergoing a fundamental and widespread transition to near-zero GHG fuels is the inescapable necessity of achieving the GHG goals expressed in both the Initial IMO GHG Strategy and the UNFCCC goal to keep global temperature increases to 1.5C or less.

8 The fuel standard as proposed in document ISWG-GHG 12/3/3 defines requirements in terms of 'the mass of GHG emissions per unit of energy used on-board a ship, e.g., g CO₂e/MJ'. To enable such a low GHG fuel standard the Committee needs to develop and agree upon a standard methodology to quantify both well to tank emissions as well as tank to wake emissions. Tank to wake emissions for certain fuels (such as methane, ammonia, and nitrous oxide) are a function of the combustion process that are dependent on machinery and operating profile, meaning tank to wake values cannot be estimated (with any reliability) from a fuel delivery note carbon equivalent value. In short, both well to tank and tank to wake calculations are important pieces in developing a well to wake assessment.

9 The primary challenges arise with assumptions concerning the production and supply of the necessary fuels, and the need to stimulate the massive investments necessary to develop the production and supply of fuels produced through renewable energy sources (e.g., solar, wind, hydro, ...). Given that commercial maritime demand is relatively modest relative to other sectors, it appears reasonable to conclude that a low GHG fuel standard would need to be accompanied by significant government / private partnerships and related initiatives to jumpstart major production of near-zero fuels and supply infrastructure at key locations.

Strengths:

- Directly addresses the core issue in transitioning to zero / near-zero;
- Uses a regulatory structure employed for similar purposes in achieving national and international air quality goals;
- Is less dependent on development of a market-based measure;
- May be easier for many Member States to agree to as it does not directly require explicit payments like a levy or ETS;

- Technology neutral; and
- Fleet averaging / pooling mechanism that encourages the introduction of new ships as well as low, near-zero, and zero GHG fuels.

Challenges:

- Unlikely that the necessary fuels will be equally available across the globe at a given point in time. This would appear especially true for those fuels with lowest GHG footprint that require extensive capital investments in production and supply;
- Would likely require sequential implementation geographically with production and supply expanding across the globe. A formal and integrated approach using 'Green Corridors' may be critical for success;
- Well-to-wake LCA analysis is critical to avoid stimulating fuel use that is attractive on a tank-to-wake basis while actually generating very significant GHG emissions when looking at the full lifecycle GHG footprint;
- The number of stages in a GFS should not be based on a standard five-year interval, but should be limited in number and set to align with expected timeframes necessary for the production and supply of low and near-zero GHG fuels and technology; and
- The lowest GHG intensity fuel limits need to be agreed up front, with the timing to be determined based on technology and supply as noted above. If agreement is limited to only the initial GHG content limits, one can lock in an intermediate set of fuels with modest GHG benefits – thereby stalling the transition to those fuels with the lowest GHG footprints.

CII Benchmarking – IMSF & R Proposal

10 Document ISWG-GHG 12/3/9 proposes a system that benchmarks vessels against CII performance each year with ships graded as E or D required to pay into a central fund. Ships receiving an annual rating of A or B would be eligible for some financial reward with the specific amount determined by funds generated and available. The amount of funding in the system is first determined by the number of ships receiving D or E ratings and the magnitude of funds generated through this mechanism. Secondly the proposal allocates 40% of the total funds be made available for “rewards” while 30% of funds are allocated to capacity building, 20% to R&D, and 10% for system administration.

11 As designed, the system determines which ships pay into the system based on CII rating values and not on the total amount of emissions generated by a specific ship or the overall fleet. As such there is not a carbon price applied to GHG emissions from all vessels, but a scaled contribution payable only by ships that receive D or E ratings.

12 The proposal provides funding for both capacity building and R&D and seeks to provide some reward for ships receiving A or B ratings. With respect to rewards provided in the system, ships burning fossil fuels would receive rewards provided the ship receives an A or B rating. A second issue arises as to whether the amount of the award received could incentivize the construction and operation of near-zero GHG ships using fuels produced through 100% renewable energy. Given the considerable cost differentials estimated for the production and use of such fuels and the limited scale of funding (funds are received from only D and E rated ships), the “reward” available to a ship using fuels produced through 100% renewable energy would likely represent only a fraction of the sizable cost differential for these fuels.

13 The proposal also includes a provision that would provide a [5%] rating allowance for ships calling one or more developing countries “likely to be negatively impacted.” Considering

trade routes, this can be expected to introduce a 5% rating allowance for a majority of the world's fleet because a high percentage of international voyages include port calls in developing countries.

Strengths:

- The proposal seeks to directly address a broad range of concerns raised in the Committee including capacity building, R&D, and equity-related provisions;
- Allows for the use of fleet averaging which may encourage investment in zero / near-zero emission fuels and technology;
- Provides funding for needed R&D and technical cooperation; and
- The principle of benchmarking emissions against an agreed baseline along with consequential obligations and rewards is logical and could provide an effective mechanism with use of an appropriate metric.

Challenges:

- Does not impose a carbon price on all ship emissions, but only those rated as D or E under the CII framework. This significantly reduces the scope and magnitude of financial incentives in the system and could fail to meet fleetwide GHG targets;
- Whether this system will provide adequate incentives for the needed transition to near-zero / zero GHG fuels and technologies will depend on the benchmark used and the cost applied to GHG emissions;
- The complexity of the various components of the proposal are significant (including the CII system and its role in financial penalties or rewards) while offering limited potential for catalysing the significant changes required if the world's fleet is to transition to fuels and technologies with a minimal GHG footprint; and
- Consistent with the cross-cutting issues identified in Section 2, the effectiveness of benchmarking is dependent on the use of Well-to-Wake LCA values. If benchmarking was to be implemented with a focus on Tank-to-Wake this could favour fuels that may have attractive Tank-to-Wake values when the Well-to-Wake values may be high. This also has the effect of discouraging investment in zero and near-zero GHG fuels and technology because the proposed structure does not create an environment supportive to these investments.

Emissions Trading

14 Emission trading systems have been established in Europe, North America, and other locations in the world to establish a market-based mechanism for pricing carbon and limiting allocation of various emissions. These systems have been very effective in some applications and less effective in some examples. Effectiveness is generally tied to the clarity of the emissions cap imposed and whether the responsible authority has not provided excessive allowances that serve to reduce the effectiveness of the system.

15 The primary question for purposes of the IMO is whether an effective emissions trading system can be established at a truly global scale. The IMO began discussion of various market-based measures, including emissions trading, well over a decade ago and most recently Norway has outlined the benefits of an emissions trading approach, but the current description is largely conceptual. To properly consider whether a global ETS is a viable option requires a clear and detailed explanation of how a single global emissions trading system adopted through the IMO would work in practice.

Strengths:

- Directly establishes a carbon price applicable to all carbon or GHG emissions;
- Can be integrated into a broader trading system with other sectors;
- Allows market factors to determine price at a given time; and
- Fuel and technology neutral.

Challenges:

- No detailed proposal has been made to date for a single ETS that is global in scale;
- Volatility of the carbon price can be significant;
- If the average price is too low, it is unlikely to be effective;
- Requires a cap on emissions to be fully effective, but absent a global system one faces overlapping rules and national / regional caps; and
- Need to establish a transparent and uniform system for the exchange of carbon credits as well as mechanisms to address possible out-of-sector leakage.
