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REDUCTION OF GHG EMISSIONS FROM SHIPS

Four Regulatory Elements Critical to an Effective Global GHG Agreement

Submitted by The World Shipping Council

SUMMARY

Executive summary:	MEPC 81 will consider development of an IMO GHG regulatory agreement consistent with the revised IMO GHG Strategy adopted at MEPC 80 in July 2023. This paper identifies four regulatory elements that WSC considers critical to formulating an IMO GHG instrument that can achieve the necessary environmental outcomes. These regulatory elements may be considered as *cornerstones* to an effective agreement that encourage shipowners, operators, and energy providers to make the necessary investments and enable the commercially viable operation of ships using advanced fuels and technologies.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 25
Related documents:	MEPC 80/INF.39; MEPC 80/INF.39/Add.1; MEPC 78/7; and MEPC 77/7/1

INTRODUCTION

1 The IMO is engaged in an unprecedented effort to accelerate a major fuel and technology transition in response to the climate challenge. IMO Member States have agreed on a GHG Strategy to reach net-zero by or around 2050 and to finalize agreement on appropriate mid-term measures by the end of 2025. We can meet those challenges, but our success will depend on whether we include specific regulatory and economic mechanisms in the forthcoming legal instrument that will deliver the necessary environmental outcomes. If the agreement is to be effective in advancing the necessary energy transition, it will need to enable ships that deliver high GHG reductions to operate in a commercially viable manner in an environment where a multitude of fuels, including fossil-based fuels, are still in use around the world.

2 Liner shipping companies are among those in the industry who have shown leadership in facing these challenges, and our companies are first-movers in putting low and near-zero GHG ships on the water. Our companies are also acutely aware that the forthcoming IMO GHG legal instrument must include the specific regulatory and economic provisions to enable construction and operation of those ships that will be critical to meeting the IMO objectives for 2030, 2040, and 2050. In this paper we outline four specific regulatory elements we consider to be key *cornerstones* to constructing an effective and commercially viable global legal instrument. The four cornerstones are:

i. Establishing a full set of GHG energy-intensity standards that are defined upfront
ii. An effective GHG emissions pricing mechanism / economic instrument that includes proportional regulatory provisions related to the GHG intensity of the fuels and technologies used
iii. A flexibility provision that allows 'vessel pooling'
iv. Regulations using well-to-wake (WtW) values

KEY REGULATORY AND ECONOMIC CORNERSTONES CRITICAL TO IMO'S GHG LEGAL INSTRUMENT

3 We briefly describe four regulatory and economic cornerstones we believe must be addressed as the Committee develops a base document for further consideration by the Committee in formulating an appropriate IMO GHG legal instrument.

Critical to Establish GHG-intensity Standards that are Defined Upfront

4 Current discussions and proposals made to the Committee propose establishment of sequential GHG-intensity standards that apply for specific intervals between entry-into-force of the instrument and 2050. In this context, WSC stresses the importance of defining each of the respective GHG-intensity steps upfront – namely, at the time of adoption of the instrument. Defining each of the GHG-intensity steps upfront is critical to establishing the needed demand signals and subsequent planning. These signals are important both to shipowners and operators and also to energy providers that will need to decide when and what fuels are to be produced. Ship owners and operators must be able to plan up to decades in advance as they order new ships and plan for the fueling of those ships. Energy providers must be able to see regulations written in the next two years that demonstrate sufficient demand for new fuels that justifies the substantial investments that need to be made in the immediate future.

5 We also note that establishing each of the GHG-intensity standards up front must be supported by a well-developed lifecycle assessment across the full well-to-wake spectrum. We address this matter further in paragraphs 18-22 of this paper.

An Effective Economic Measure / GHG Pricing Mechanism

6 GHG policy discussions have consistently pointed to the need for an effective economic measure or GHG pricing mechanism that establishes a strong incentive in the marketplace to move to alternative energy sources that offer increasingly lower, near-zero, or net-zero GHG emissions. Such a measure could take different forms, and the Committee is already reviewing different proposals and will likely see new variants as discussions progress.

7 The World Shipping Council is open-minded on the specific form an economic measure may take. The critical point is that the economic measure must be of sufficient size

that it incentivizes the necessary investments in new technologies and new fuels and that it provides a level playing field while different energy sources and technologies are being used across the fleet. The energy transition will occur in a period where ships and energy suppliers are operating in a landscape where different fuels, energy sources, and technologies are in use across the globe.

8 We have roughly two decades for this major transition to take place, but it must begin today and accelerate rapidly, because decisions on technologies and fuels made today will remain with us for years to come. An effective economic measure – i.e., one that is substantial enough to make it attractive and economically feasible to invest in new technologies and new energy sources – at the beginning of this period is essential to success. If the economic signal is too small, it will encourage investments in incremental changes that are not capable of delivering the ultimate goal of net zero. Half-measures would both undermine the chances of success and also lead to higher overall cost by encouraging investments that will ultimately have to be repeated when earlier approaches are found to be insufficient. In short, an economic measure must be designed to make it economically rational and attractive for both ship owners/operators and energy providers to direct their investments at solutions that result in very substantial GHG reductions from the effective date of the regulations.

9 If we consider capital (CAPEX) and operating expenses (OPEX) over the next 25 years we can expect a high need for capital investments early in the period that grows significantly and then plateaus later in the transition. Of particular importance here is the transition to renewable and zero-carbon energy sources that will be critical for the production of e-fuels, also known as 'renewable fuels of non-biological origin (RFNBOs), certain bio-fuels, and wind technologies that deliver deep GHG gas emissions and are suitable for use in the maritime sector. As these fuels become available in volume, the second critical role of the economic measure is a set of regulatory provisions that enable carriers to handle the increased operating expenses associated with use of these fuels and technologies. In short, we need a global regulatory instrument that allows those ships that have higher OPEX associated with aggressive GHG reduction to operate in the same trades as ships that may meet a given GHG-intensity standard, but have lower CAPEX and OPEX as they have not yet moved to deeper GHG reduction fuels and technologies.

10 Consistent with the points emphasized in the two preceding paragraphs, an effective economic measure must be proportional to the GHG intensity of a given fuel or energy source and the technologies used to produce it. The GHG reduction achieved by a given ship or group of ships needs to be evaluated and rewarded on the GHG reduction achieved, including GHG reductions that exceed the specific GHG intensity standard required at a given point in time. Aggressive investments in the lowest available GHG technologies and energy sources will only be made if they are explicitly rewarded by the global regulatory framework.

11 Adoption of an economic and regulatory measure that treats the reductions achieved in a proportional manner, versus pass / fail, is essential to success because the depth of reductions achieved by a given ship or group of ships is important for 1) achieving significant emission reductions early in the two-decade period, and 2) because ships delivering deep GHG reductions must have a way to compete economically while incurring the higher expense of these fuels and technologies. Whether vessels operating with the lowest GHG fuels and technologies can compete in the commercial marketplace is therefore an essential test of whether a proposed economic measure is able to achieve its intended policy purpose.

12 To illustrate how the above economic provisions may be incorporated into the IMO agreement we outline two examples. The first addresses how this may work in a set of measures that include GHG fuel standards as well as a GHG emission / fuel levy. The second outlines an example relevant to an integrated measure.

Example 1 - GHG Fuel Standards plus Levy

In this scenario IMO would implement two complementary measures, a fuel standard and a fuel levy.

- ***GHG Fuel Standards***

For the reporting period (assumed to be January 1 – December 31), each ship would have a required energy based GHG intensity, defined using CO_{2eq}/MJ, for illustrative purposes defined as value A. At the end of the reporting period the company would calculate the actual attained well-to-wake GHG intensity in gCO_{2eq}/MJ, which for illustrative purposes is defined here as value B. The reported values would also be subject to third-party verification;

If value A = value B the ship would be in compliance;

If value B is higher than value A the company could utilize a flexible compliance mechanism to buy the necessary credits to be brought into compliance;

If value B is lower than value A the ship could distribute these excess credits to other ships in a given pool, or alternatively sell or bank the credits. This mechanism is important to facilitate and accelerate investments that would not be feasible if those investments had to made to thousands of ships (many of which would likely be new-builds) at a single point in time.

- ***Fuel levy***

For each tonne of fuel loaded, the ship would pay a sum into a central fund determined by applying a GHG factor based on GHG intensity. Verification would use DCS data and an architecture similar to the IMRB/IMRF proposal.

Example 2 – Integrated Measure

The IMSF&F proposed by China seeks to integrate an economic measure into the fuel standard. In this example, the architecture may look like the following:

For the reporting period (assumed to be January 1 – December 31), each ship would have a required energy based GHG intensity, defined using CO_{2eq}/MJ, for illustrative purposes defined as value A. At the end of the reporting period the company would calculate the actual attained well-to-wake GHG intensity in gCO_{2eq}/MJ, which for illustrative purposes is defined here as value B. The reported values would also be subject to third-party verification;

If value A = value B the ship or ships would neither be rewarded nor be required to make any payment into a fund;

If value B is higher than value A the company would have to pay into a fund to bring the ship or ships into compliance; the payment would be proportional to the scale of excess GHG intensity;

If value B is lower than value A the ship or ships would be rewarded using money paid into a fund by under-performing ships; the reward would be proportional to over-performance for GHG intensity;

The quantum of payment and reward would be determined by a body to be defined by the Organization so as to collect enough money from under-performing ships - based on fleet

performance and projected reduction trajectory - to cover reward payments plus other disbursements from the fund, including for applied R&D and other funds supporting an equitable transition.

Considering the preceding discussion, it is clear that the energy intensity baseline, reduction trajectory, and payment/reward quantum will all be critical. To be effective the quantum must be established at a level that is proportional to the GHG reduction achieved or in the case of under-performance, not achieved. One significant risk is a scenario where the vast majority of ships meet the GHG-intensity standard applicable at a given point in time (i.e., the GHG reduction requirement is set too low). This then requires a solution to provide the necessary credits and economic incentives for those ships delivering GHG reductions that significantly exceed those required by the GHG intensity standard in effect at a given point in time.

Common matters of concern

There are several uncertainties and undefined aspects applicable to both options:

- The levels of ambition of the initial strategy were defined as either aggregate emissions or transport work. Therefore, if the IMSF&F was to be based on energy GHG intensity, it would be necessary to develop a baseline for GHG intensity and for the reduction trajectory. WSC fully supports use of WtW CO2eq values because these values will provide the most direct and efficient pathway to achieving the necessary emission reductions and will directly influence technology choices to be made across the fleet;

- Whilst the indicative check points and near to 2050 levels of ambition of the 2023 strategy provide a basic reduction trajectory, these are aggregate values, not ship specific energy GHG intensity values. In light of this, the Committee may wish to consider interpolant values, whether they should be linear or non-linear, and how many steps are appropriate in the regulatory architecture;

- The quantum of the levy or economic reward and penalty in an integrated measure will clearly be critical to success. If the quantum is too low, the measure will simply add to the cost of transportation without incentivizing a move to lower GHG alternatives. Moreover, the credits or financial incentives available to ships and companies delivering deep GHG reductions need to be proportionate to the additional operating expenses of sailing using a given fuel or technology (applicable technologies might include wind or other energy sources not usually described as a fuel).

Vessel Pooling is Critical to the Energy Transition in the Maritime Sector

13 While notable progress can be made with appropriate drop-in fuels, the maritime energy transition and agreed goals to achieve net-zero will require that shipowners invest in new ships (as well as possible retrofits) that can operate on near-zero fuels and energy. Such investments can be expected to occur through the introduction of new ships and retrofits over time. As such, we will see an environment where new ships that deliver deep GHG reductions will operate side-by-side for many years with ships still using fossil fuels. This reality demands a regulatory structure that allows these investments to be commercially viable and to allow sequential fleet investments that are sequenced over the next 20-25 years.

14 Ships should not be required to be part of a pool and many ships may choose to be evaluated on a stand-alone basis. The option for a ship to be evaluated as part of a larger grouping of ships called a '*pool'* for regulatory purposes will be critical to provide a regulatory structure and flexibility that aligns with the sequential replacement and turn-over of a global fleet that consists of tens of thousands of ships of varying age. All ships in the global fleet cannot be replaced at a single point in time, so we need a mechanism that enables owners

and operators of lower, near-zero and net-zero ships to spread the credit and benefits across multiple ships. This provision is essential to the energy transition in the maritime sector.

15 The nature of a vessel pool need not be constrained to a single company. Rather, the regulations should allow ships operated or owned by different companies to form pools that are commercially logical. This would enable companies operating a single ship or a small number of ships to operate in a larger pool. This opens opportunities for small companies to spread the benefits of investments in fuels and technologies and avoids a situation where only large companies can utilize vessel pooling as a compliance option.

16 Two other considerations and benefits accompany a vessel pooling flexibility mechanism:

a. First, research has demonstrated that incremental reductions applied to each and every individual ship actually delays the transition across the maritime fleet (see https://cedelft.eu/publications/fueleu-maritime-and-eu-ets), and

b. A requirement that each individual ship must use 5-10% green fuels (as opposed to an approach that enables a vessel pooling mechanism) will place considerable demand that these fuels be available across the entire globe. While this requirement should be achievable via vessel pooling, the absence of this flexibility mechanism would likely result in numerous fuel non-availability reports (FONARS). In addition, a scenario that does not allow pooling would likely require the transportation of biofuels to remote areas where these fuels are not otherwise available.

17 WSC considers a vessel pooling flexibility mechanism to be critical to an effective and efficient energy transition in the sector. Moreover, pooling will enable rational investments that would otherwise prove infeasible if applied to each and every vessel at a single point in time. While pooling is a flexibility mechanism that a given ship or set of ships may choose to participate in, it is also important that all Administrations use a defined IMO mechanism for pooling. This is important to avoid a situation where ships choose a specific Flag Administration due to differences in the mechanisms offered between Administrations. It would also not be helpful to have a situation where one Administration provides a mechanism for pooling and another does not. In short, a uniform, IMO-defined mechanism is needed to provide an efficient and consistent system across the globe.

Why Well-to-Wake Figures are Critical to IMO GHG Regulations

18 The Committee has agreed to the importance of rigorous well-to-wake (WtW) life-cycle analysis to inform investment decisions and to achieve effective reductions that do not result in increasing production emissions or otherwise transferring GHG emissions to other sectors. To be clear, WSC considers the use of WtW values in the IMO regulatory structure critical as shipowners and operators make decisions on what fuels and technologies offer the most efficient and environmentally effective choices. In addition, investment decisions made with a full understanding of WtW emission profiles are less likely to result in stranded assets because the full emission profile of the fuel and technology are well understood and quantifiable.

19 Numerous parties have also pointed out that life-cycle analysis is complicated, requiring the evaluation of numerous production pathways, and that the resulting GHG footprint will change as technologies are improved and greater efficiencies emerge with time and experience. The recognition of these complexities and the need to move quickly is driving the consideration of interim default values.

20 The assignment of default emission values is a very important undertaking and one that deserves careful attention by the Committee. If default values are decided based on a careful examination of the relevant emissions and are conservatively assigned, default values can provide a valuable interim step. However, overly generous or unrealistic default values that over-estimate the GHG reductions achieved with a given fuel or technology can seriously undermine and even derail the energy transition. To make this point very clear let's consider the following example:

> *Example*: A specific fuel is estimated to offer a GHG reduction of roughly 40% when compared to the emissions associated with conventional heavy fuel oil (HFO). To incentivize the production and uptake of this fuel, the Committee assigns a generous default value of zero. In this scenario, the generous default value will in fact incentivize the production and use of this fuel. However, the overall effect of this default value would greatly undermine investments in fuels that deliver much higher reductions. Put another way, why invest in more costly, but more effective fuels and technologies if a fuel that delivers moderate improvements is treated as if the emissions were actually net-zero?

21 One other important matter arises in this discussion. Namely, how do we reconcile WtW figures with accepted norms for GHG accounting of national and global inventories? National and global accounting practices separate emissions generated by end-users (ships in this case) and the production of a given fuel. This requires that we carefully consider how to account and assign emissions from the various entities producing the energy, its transport, and its ultimate use onboard a given ship in a manner consistent with the IMO LCA Guidelines which have been developed and adopted for this purpose.

22 Recognizing the above considerations, WSC invites the Committee to consider a three-part approach to bridge this important issue. The three parts are proposed as follows:

a) The GHG intensity standards and economic measure adopted by the Committee should evaluate and measure the GHG reductions achieved using WtW calculations. In this context, the Committee should identify a clear date in the near future where compliance with a given regulatory standard will be assessed using WtW GHG emission values. Entry-into-force of the IMO mid-term measure (e.g., 2027) should be an appropriate date that would enable both carriers and energy producers to have confidence in proceeding with the necessary investments without the risk of stranded assets. The economic measure would also be benchmarked against verified and agreed WtW values.
b) Interim default carbon factors should reflect objective and conservative assessments of the lifecycle GHG footprint of a given fuel / technology and its production. The agreed default values should be limited to a defined period before the required date where all default values will be replaced by values based on detailed WtW analysis.
c) To conform with national and international inventory accounting norms, GHG emissions assigned to a specific ship can be measured - for inventory purposes only - on a tank-to-wake (TtW) basis.

Other Considerations

23 Numerous papers submitted to the Committee have outlined important matters for the consideration of the Committee that will be important to determining what mechanisms and regulatory structure will best achieve the objectives of the Committee and the IMO GHG Reduction Strategy. We wish to acknowledge that this paper does not seek to address all relevant matters on this challenging issue, but we focus discussion to the above matters for clarity and to support progress in reaching agreement on these important issues. Consistent

with discussions within the Committee, WSC fully agrees that measures should facilitate an equitable transition for all Member States, and we stand ready to consider what mechanisms may be appropriate for this purpose.

CONCLUSION

24 A successful IMO GHG legal instrument needs to provide a legal platform that provides investment certainty needed to achieve IMO's GHG reduction ambitions and that enables the commercial operation of ships that serve the trade interests of hundreds of countries across the globe. To achieve this objective, WSC invites the Committee to consider the importance of 1) establishing at the onset of the agreement - all GHG-intensity standards between entry-into-force and 2050, 2) adopting an economic element that measures and rewards GHG reductions that are proportional to the WtW GHG intensity of a given fuel or energy source and the technologies used to produce it, 3) including an option for 'vessel pooling' and 4) incorporating a solution that bridges the TtW and WtW issue in a manner consistent with the recommendations made in paragraphs 18 to 22 of this paper.

ACTION REQUESTED OF THE COMMITTEE

25 The Committee is invited to consider the four regulatory recommendations highlighted in this paper and to take action as appropriate.