

INTERSESSIONAL MEETING OF THE  
WORKING GROUP ON REDUCTION OF  
GHG EMISSIONS FROM SHIPS  
5th session  
Agenda item 4

ISWG-GHG 5/4/9  
22 March 2019  
ENGLISH ONLY

**CONSIDERATION OF CONCRETE PROPOSALS ON CANDIDATE  
SHORT-TERM MEASURES**

**Proposal to strengthen the Ship Energy Efficiency Management Plan (SEEMP)**

**Submitted by ICS, BIMCO, INTERTANKO, INTERCARGO and IPTA**

**SUMMARY**

*Executive summary:* The co-sponsors provide concrete proposals to lower GHG emissions from ships. The proposals are to strengthen the Ship Energy Efficiency Management Plan (SEEMP) as a short-term measure to reduce GHG emissions from international shipping. The proposals could be agreed and implemented relatively quickly, and deliver actual GHG emissions reductions. The co-sponsors also propose developing an accurate datum point for 2008 transport work emissions, to be developed for each ship type and size.

*Strategic direction, if applicable:* 3

*Output:* 3.2

*Action to be taken:* Paragraph 43

*Related documents:* Resolution MEPC.304(72); resolution MEPC.282(70); MEPC 73/WP.1, MEPC 73/WP.8, MEPC 73/WP.5; MEPC.72/INF.5; ISWG-GHG 4/2/9, ISWG-GHG 4/2/10; ISWG-GHG 2/2/7; MEPC.1/Circ.684; MEPC.67/5/4; MEPC.65/4/30, MEPC.65/4/19; MEPC.65/4/30 and resolution A.1118(30)

**Introduction**

1 The *Initial IMO Strategy on reduction of GHG emissions from ships* (resolution MEPC.304(72)) (the Initial Strategy) was adopted at MEPC 72. The co-sponsors supported the adoption of the Initial Strategy and consider it to be a major step forward for the international shipping sector, setting out a pathway for the phase-out of GHG emissions.

2 At MEPC 73 the *Programme of follow-up actions of the Initial IMO Strategy on reduction of GHG emissions from ships up to 2023* was agreed. The programme of follow-up

actions, inter alia, proposed three categories for candidate short-term measures and called for consideration of concrete proposals at MEPC 74 (MEPC 73/19/Add.1, annex 9).

3 The co-sponsors consider that short-term measures should be effective and should be agreed and implemented quickly.

4 Document ISWG-GHG 4/2/10 (Liberia et al.) proposed strengthening the SEEMP by introducing a mandatory review and improvement process, including mandatory external audits. The proposal was widely supported at ISWG-GHG 4, however some delegations called for the strengthened SEEMP to include objectives and for a way of demonstrating its effectiveness in lowering GHG emissions.

5 The co-sponsors recognize the necessity of being able to demonstrate the effectiveness of the strengthened SEEMP in reducing GHG emissions. This might be achieved using an operational efficiency indicator or key performance indicators (KPIs). Developing appropriate common operational efficiency indicators which would be suitable for all ships would be extremely difficult, if not impossible. No ship operational performance indicator is appropriate to either all ship types or to all trades. What is important is that operational efficiency indicators should be suitable for a particular ship if used to demonstrate the effectiveness of the SEEMP.

6 The objective is to deliver the necessary GHG emission reductions which have been agreed as levels of ambition in the Initial Strategy. In the context of short-term measures it is considered that the most relevant level of ambition is the 2030 ambition to "reduce CO<sub>2</sub> emissions per transport work, as an average across international shipping, by at least 40% by 2030", recognizing that the 2050 level of ambition can only be achieved by long-term measures such as adoption of zero-carbon fuels and energy carriers. There is a wide range of measures available to shipowners to reduce GHG emissions, some of these measures are operational, some are technical, or a combination of both operational and technical measures may be implemented. The co-sponsors advocate a flexible, goal-based approach, it is not the "how" that is important but delivering emissions reduction.

7 Strengthening the SEEMP would be a group A candidate short-term measure.

### **Discussion – general**

8 Short-term measures should:

- .1 be effective and make progress towards delivering the levels of ambition established in the Initial Strategy, if possible by delivering actual GHG emission reductions before 2023;
- .2 promote innovation and adoption of GHG reducing technologies;
- .3 be implementable;
- .4 avoid penalizing early movers, such as those which are provided with innovative technology and/or use alternative fuels and/or are operated as efficiently as is practicably achievable;
- .5 minimize negative impacts on Member States and global trade (consistent with paragraphs 4.10 to 4.13 of the Initial Strategy); and

- .6 not divert time and resources from the development of longer-term solutions such as zero-carbon fuels.

9 Short-term measures which are relatively simple to implement, verify and enforce will reduce GHG emissions more quickly than more complex measures requiring prolonged work to develop and agree. The most effective means to deliver such measures would be by the development of a flexible and goal-based regime focused on delivering the necessary emissions reduction rather than attempting to develop prescriptive measures. This could be achieved by strengthening the SEEMP. This would reduce GHG emissions by improving the energy efficiency of ships.

10 Short-term GHG reduction measures should not only avoid penalizing early movers but also avoid unduly penalizing existing ships. The existing fleet will continue being in service for a significant period and older ships will operate alongside newer tonnage, shipyard capacity and resource availability to introduce new ships. This coexistence is unavoidable even where it is considered desirable to replace the existing fleet. It should be noted that, while the EEDI regulation by itself creates five-year tiers of efficiency by design, the life expectancy of a ship (even should it be shortened) means that it will be impossible to avoid differentiated levels of technical efficiency in the global fleet as the industry inducts new technologies, fuels and energy carriers.

#### **Discussion – operational and technical short-term measures to reduce GHG emissions by improving the energy efficiency of ships**

11 To avoid negative impacts on global trade and Member States, improving operational efficiency should focus on the efficiency of ships, and not the efficiency of trade. This is a critical distinction, as many measures which have been proposed to enhance operational efficiency would be determined by the nature of trade and discourage ships from operating in certain trades, introducing market distortion.

12 Ships are subject to environment and weather conditions, as well as asymmetric trade patterns which are beyond the control of the shipowner and crew. Operational efficiency is influenced by route deployment and the nature of trade on those routes. Even ships which operate on known routes (i.e. liner trades) may be redeployed, and tramp ships may not know their next port of destination until they receive orders for a given voyage. A ship's indicated operational efficiency may vary through the year in ways which cannot be predicted by the shipowner. Document MEPC.72/INF.5 (INTERTANKO) showed that operational efficiency indicators applied to identical sister ships operated by the same company varied greatly, demonstrating the limitations of such indicators.

13 Short-term measures to reduce emissions must not distort markets and penalize those countries, many of which are small islands developing States (SIDS) or least developed countries (LDCs), which are remote from the principal trade routes and/or for which trade is heavily weighted in one direction (import of essential goods and materials or export of a bulk commodity for example). Objectives for individual ships using inappropriate operational efficiency indicators or KPIs could disincentivize ships from serving certain trades if a potential consequence is that a ship fails to meet an environmental objective, triggering enforcement action and being noted as having done so by Administrations and interested commercial parties.

14 Measures to improve operational energy efficiency must not punish efficient ships. If all ships were required to quantitatively demonstrate an improvement of "X"% based on a standard means of measuring operational efficiency, this could have the unfortunate result of punishing ships which are already operating as efficiently as is practicable. It has been

suggested that reference lines for operational efficiency based on a particular efficiency indicator could be developed, followed by requiring reductions below such reference lines. The co-sponsors are concerned that such reference lines may not provide a genuine datum point for operational efficiency of a given ship type because of the risk that it could be based upon an inappropriate operational efficiency indicator. The result could be that very efficient ships are required to meet unrealistic objectives.

15 Some of the most important factors affecting operational efficiency are determined by route deployment, weather conditions and any charterer requirements. Similarly, transport work indicators are largely determined by route deployment and the nature of trade. Many trades are inherently asymmetrical, making it impossible for shipowners to avoid ballast voyages or voyages in the part-load condition. In some cases ships may be unable to load to capacity because of draft restrictions in a particular port. This is despite the best efforts of shipowners to maximize vessel utilisation and minimize ballast and part-loaded voyages. A ship could be managed to a high standard and miss meeting operational efficiency objectives as a result of being redeployed to other routes or because of weather and environmental conditions. This needs to be recognized, as should the fact that operational efficiency indicators may be influenced by the nature of the loads carried, for example the number of refrigerated cargo containers or liquid cargo requiring thermal conditioning, or due to the requirements of charterers.

16 The diversity of shipping means that no single operational efficiency indicator or KPI will be appropriate for all ships, not even all ships of a given ship type. Indicators and KPIs used for a particular ship will not generally provide data which are comparable with data for other ships.

17 The *2016 Guidelines for the development of a ship energy efficiency management plan (SEEMP)* (resolution MEPC.282(70)) (the SEEMP Guidelines) provide detailed and comprehensive guidance for developing a SEEMP, including for speed optimization and use of operational indicators. The guidance provided on improving energy efficiency remains valid.

18 A means of demonstrating the effectiveness of measures should be established in order to provide confidence that the common general objective will be accomplished. This could be achieved by setting objectives which would be aligned with the levels of ambition of the Initial Strategy.

19 Both technical and operational measures could be implemented to improve a ship's efficiency. In some cases, it may be appropriate to implement purely operational measures such as speed optimization. In other cases, it may be appropriate to implement technical measures (for example, measures such as engine de-rating, fitting a new propeller, re-profiling bow or stern contours and enhancing energy recovery systems). A third option is to apply a combination of both operational and technical measures. The SEEMP Guidelines provide a wealth of good guidance for implementing both technical and operational efficiency improvement measures.

20 The decision whether to apply technical or operational measures, or a combination of both, should be made by the shipowner based on an analysis of what would constitute an appropriate improvement strategy for their ship(s).

21 The SEEMP Guidelines include a self-assessment and improvement stage. However, although the SEEMP is a mandatory carriage requirement, there is no mandatory requirement for through-life review and improvement. This could be addressed by making part I of the SEEMP part of the ship's Safety Management System. Detailed proposals were provided in document ISWG GHG 4/2/10 (Liberia et al.). This would make the SEEMP subject to

mandatory external audits by the Administration or a duly authorized recognized organization on a regular basis. This would include interim (where applicable), initial, intermediate and renewal audits; the renewal audit being carried out after five years.

22 The effectiveness of the SEEMP in reducing GHG emissions could be demonstrated using an operational efficiency indicator or KPI. This indicator or KPI could be nominated in part I of the SEEMP along with the rationale supporting its appropriateness for the ship.

23 If electing to implement technical measures to improve efficiency, such as technology retro-fitting or engine de-rating, then the co-sponsors consider that the efficacy of such measures could be confirmed in one of two ways, either by:

- .1 means of completing a new EEDI calculation for the ship, recognizing the difference between new construction and conversion. It is considered that the Organization could consider a simplified EEDI process for such ships not requiring sea trials; or
- .2 demonstrating the resulting emissions reduction using an operational efficiency indicator or KPI.

24 Either approach should be acceptable and the decision of which approach to use should belong to the shipowner. This should not be interpreted as supporting the introduction of a mandatory EEDI for ships built prior to the establishment of the EEDI requirements or mandatory reductions to the EEDI values for ships with an attained EEDI, which the co-sponsors would resolutely oppose.

25 An alternative technical approach which could reduce emissions might be to use fuel with a lower carbon factor ( $C_f$ ). This may not improve efficiency but could lower GHG emissions. In such cases the approach outlined in paragraph 21 could be applied in conjunction with the alternative fuels  $C_f$ .

### **Discussion – 2008 transport work emissions**

26 The necessary GHG emissions reduction objectives have already been agreed in the Initial Strategy. The co-sponsors consider that only the 2030 level of ambition "to reduce CO<sub>2</sub> emissions per transport work, as an average across international shipping, by at least 40% by 2030" is relevant to short-term GHG emissions reduction measures. The 2050 levels of ambition of the Initial Strategy will only be achieved by adoption of long-term GHG emissions reduction measures such as a switch to zero- (or very low-) carbon fuels, energy carriers and technologies.

27 The levels of ambition of the Initial Strategy make it necessary to define the 2008 reference lines for emissions, it will therefore be essential to define transport work emissions for the year 2008. The co-sponsors consider that this should reflect the 2008 transport work emissions as accurately as possible.

28 An added complication is that some ship types have significant auxiliary loads for cargo conditioning. These loads are not related to transportation: if the product was held in land based facility's tanks the requirement for conditioning would remain. In many cases the effective operation of such cargo conditioning systems (such as cooling) is essential to assure the safety of the ship. Systems are already designed to minimize energy demand (for example, effective insulation, use of energy recovery) and the energy demand is unrelated to transport work operational efficiency. For example, measures such as speed optimization, route management and improving machinery and propulsion efficiency can all improve transport

work efficiency but they will have no effect on the energy load necessary for cargo conditioning. The co-sponsors consider that this needs to be taken into account when considering transport work efficiency and developing reference lines and objectives.

29 The Organization should develop a methodology to establish transport work emissions for 2008, establishing a reference point. The co-sponsors propose that a series of reference lines, each one representing a specific ship type and varying with ship size, could be developed from historic data. A source of such data might be the *Third IMO GHG Study 2014*. This study includes tables which provide average fuel consumption and deadweight for ships by type along with emissions. However other sources may also be available.

30 In most cases the resulting reference lines could be expressed in terms of gram of CO<sub>2</sub> per tonne-nm based on deadweight. In the case of containerships, it is considered more appropriate to use TEU in place of deadweight, and ro-ro ship types could use gross tonnage (GT) instead of deadweight. Other ship types may also better use alternatives to deadweight, such as m<sup>3</sup> in the case of gas carriers. Further work would be necessary to consider appropriate proxies for those ship types which do not carry passengers or cargo.

31 These reference lines would provide a datum point, to assist ships to demonstrate that they are achieving the necessary GHG emission reductions required to meet the 2030 level of ambition of the Initial Strategy.

32 Although the proposal provided in paragraph 27 may appear to be proposing something similar to the existing EEDI reference lines, the co-sponsors are not in favour of using the EEDI reference lines as a proxy for 2008 transport work since:

- .1 these reference lines were derived from an analysis of the fleet during the years 1999 to 2009, meaning they cannot be assumed to be representative of transport work emissions for 2008; and
- .2 there is a significant number of ship types which do not have an EEDI reference line.

## Proposals

33 The co-sponsors again highlight the critical role of charterers in the efficiency of shipping. A majority of the global fleet operates under charter. As has been noted, it is the charterer, not the shipowner, who makes the key decisions which will determine operational efficiency. In order to improve the efficiency of ships, charterers must respect commitments made by, and efficiency management plans developed by, the shipowner to improve the efficiency of their ship(s). If ship charterers do not cooperate with shipowners in supporting effective implementation of efficiency improvement plans, this would be a significant barrier to improving the efficiency of shipping. The co-sponsors request that this key dependency is properly considered by the Committee when agreeing GHG emissions reduction measures, along with consideration of provisions which will ensure that shipowners are able to implement part I of the SEEMP effectively.

34 The co-sponsors propose that part I of the SEEMP should form part of the ship's Safety Management System (SMS) for those ships subject to SOLAS chapter IX. There have been some concerns that such a measure would conflate safety and environmental protection, however regulation 22 of MARPOL Annex VI already states that the ship's SEEMP may form part of the ship's SMS. It should also be noted that the full title of the ISM Code is *International Management Code for Safe Operation of Ships and Pollution Prevention*, therefore ISM has always covered environmental management responsibilities, and the MARPOL Convention

already makes provision for the SEEMP to be part of the SMS. This is reflected in industry guidance (such as, for example, *Guidelines on the Application of the IMO International Safety Management (ISM) Code* published by ICS and ISF).

35 This would make the SEEMP subject to mandatory external audits by the Administration or a duly authorized recognized organization on a regular basis. This would include interim (where applicable), initial, intermediate and renewal audits; the renewal audit being carried out after five years.

36 The shipowner should nominate an appropriate operational efficiency indicator or KPI for the ship, which will be recorded in part I of the SEEMP. The nominated operational efficiency indicator or KPI should be translatable into the metric(s) used to define the 2008 transport work emissions (see paragraphs 26 to 32). This may be either by the operational indicator/KPI resulting in an output value which uses the same metric as 2008 transport work datum, or alternatively by using a conversion calculation or factor defined in part I of the SEEMP.

37 Part I of the SEEMP should include objectives consistent with the levels of ambition of the Initial Strategy. These objectives would be developed on a ship specific basis and with the shipowner having complete flexibility in how to achieve them. It is considered that this will obviate the need to consider other candidate measures such as mandatory speed limits, an EEDI for existing ships built before the EEDI took effect and mandatory technology retrofitting.

38 At audits of the SMS it should be demonstrated that the measures and self-evaluation process of the SEEMP have been implemented. Audit and enforcement measures would be based on verifying effective implementation of the SEEMP as documented, not on achievement of objectives. This is in recognition of the fact that the ship may effectively implement a suitable SEEMP but fail to achieve objectives as a result of circumstances outside the control of the ship.

39 In the case of a ship applying technical measures (or switching to lower  $C_f$  fuels), either:

- .1 the EEDI calculation could demonstrate the emissions reduction, with the ship's International Energy Efficiency (IEE) certificate being amended accordingly; or
- .2 the resulting reduction in emissions may be demonstrated using the ship's operational efficiency indicator or KPI.

40 In the case of ships for which the EEDI calculation is used to validate the effectiveness of technical measures, then the resulting emissions reduction demonstrated by the reduced EEDI value (or newly assigned EEDI value in the case of ships built before the establishment of the EEDI requirements) may be aggregated with emissions reductions achieved using operational measures as demonstrated using appropriate operational efficiency indicators or KPIs.

41 The co-sponsors consider that it would be necessary to review the *Revised guidelines on the implementation of the International Safety Management (ISM) Code by Administrations (A.1118(30))* in order to ensure that these recognize differences between safety and auditing part I of the SEEMP. This is particularly pertinent to the nature of certain non-conformities. For example, failure to meet an environmental improvement objective may be the result of circumstances beyond the control of the shipowner such as prolonged periods of bad weather or a change in ship or even fleet deployment.

42 The Organization should develop a series of reference lines to provide a datum for the 2008 transport work emissions in line with paragraphs 26 to 32.

**Action requested by the Working Group**

43 The Group invited to consider the comments and proposals contained in this document and to take action as appropriate.

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