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CONSIDERATION OF CONCRETE PROPOSALS ON CANDIDATE SHORT-TERM MEASURES

Review of candidate short-term measures

Submitted by ICS, BIMCO, INTERTANKO and IPTA

SUMMARY

Executive summary:	The co-sponsors comment on candidate short-term GHG emissions reduction measures contained within the *Initial IMO strategy on reduction of GHG emissions from ships* and which were proposed at ISWG-GHG 4 and/or MEPC 73
Strategic Direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 54
Related documents:	Resolution MEPC.304(72); MEPC 73/WP.1, ISWG-GHG 3/2/10; ISWG-GHG 4/2/8, ISWG-GHG 4/3, ISWG-GHG 4/3/1, ISWG-GHG 4/3/4, ISWG-GHG 4/2/14, ISWG-GHG 4/2; MEPC 73/5/9; ISWG-GHG 2/2/7 and MEPC.1/Circ.850/Rev.2

Introduction

1 MEPC 72 adopted the *Initial IMO strategy on reduction of GHG emissions from ships* (resolution MEPC.304(72)) (the Initial Strategy). The co-sponsors supported the adoption of this 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. The co-sponsors fully support rapid progress in introducing short-term measures to reduce emissions of GHG gases from ships, such measures should:

.1 be effective, and make progress towards delivering the levels of ambition established in the Initial Strategy;

.2 promote innovation and adoption of GHG reducing technologies;

.3 be implementable;

.4 avoid penalizing early movers;

.5 minimize negative impacts on Member States and global trade; and

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

The 2050 level of ambition of the Initial Strategy can only be achieved by adopting new fuels, energy carriers and technologies. Development, commercialization and provision of the requisite infrastructure for these new fuels and technologies will require a huge effort, efforts to agree and implement short-term measures must not delay or detract from development of mid- and long-term measures. This would be counterproductive and delay adoption of the long-term measures which are needed to decarbonize the industry.

2 At ISWG-GHG 4, a draft programme of follow-up actions of the Initial Strategy was developed which was then agreed at MEPC 73.

3 At MEPC 73, terms of reference were agreed for ISWG-GHG 5, including consideration of concrete proposals on candidate short-term measures (MEPC 73/WP.8, annex 2).

4 This document reviews some candidate short-term measures within the Initial Strategy or which have been proposed and provides comments for the consideration of the Committee. It should be emphasized that many of the measures considered may be appropriate for some ships, however not all measures are appropriate for all ships and it is important to avoid mandating blunt measures which may not be the most appropriate mechanism for all ships and for which alternatives may be more appropriate and less burdensome.

Speed optimization and speed reduction

5 The Initial Strategy includes "speed optimization and speed reduction, taking into account safety issues, distance travelled, distortion of the market or trade and that such measure does not impact on shipping's capability to serve remote geographic areas" as a candidate short term GHG reduction measure.

6 Sections 5.2.6 and 5.2.7 of the SEEMP Guidelines state:

"5. 2.6 Speed optimization can produce significant savings. However, optimum speed means the speed at which the fuel used per tonne mile is at a minimum level for that voyage. It does not mean minimum speed; in fact, sailing at less than optimum speed will consume more fuel rather than less. Reference should be made to the engine manufacturer's power/consumption curve and the ship's propeller curve. Possible adverse consequences of slow speed operation may include increased vibration and problems with soot deposits in combustion chambers and exhaust systems. These possible consequences should be taken into account"; and

"5. 2.7 As part of the speed optimization process, due account may need to be taken of the need to coordinate arrival times with the availability of loading/discharge berths, etc. The number of ships engaged in a particular trade route may need to be taken into account when considering speed optimization."

7 The co-sponsors concur with the SEEMP Guidelines, which provide a concise summary of the principal arguments as to why the Initial Strategy should promote speed optimization, and not speed reduction.

8 Reducing the speed of a ship reduces the required power and hence fuel consumption, however it should be recognized that speed will reach a point where there is no further reduction in fuel use because of the effect of sea margin and provision of additional ships to maintain transport supply.

9 Inappropriate mandatory speed reduction measures could adversely affect areas which are remote from the principal shipping routes and population centres, hence the inclusion of optimization in the candidate measure (see document ISWG-GHG 3/2/10 for analysis of this matter).

10 Document ISWG-GHG 4/2/8 (CSC) provided proposals for a mandatory speed reduction measure. The co-sponsors thank the submitters of the document for recognizing that any speed measures must be nuanced and cognizant of the different operational characteristics of different ship types, however they cannot recommend support for this proposal at this time.

11 The CSC proposal would establish speed baselines for ship types, further sub-divided by size, and then defining limits for average speed over the course of a year. The baseline speeds would be established based on historic data and then verified using data submitted to the IMO Data Collection System (DCS). It is stated that use of an average speed limit value would enable ships to operate at higher speeds at certain times of the year when required to carry perishable cargo, and compensate by operating at lower speeds at other times of the year. This, it is claimed, would avoid market distortion. An initial reduction of 10% below the baselines is indicated, with further reductions to help IMO meet its 2030 GHG emissions reduction target.

12 Establishing baselines from historic speed data will not account for regional conditions and the demands of different trades and cargo. The proposal assumes that ships will only carry perishable cargo at certain times of year, allowing them to offset seasonal high speed operation by slowing down out of season. A reefer ship or reefer container ship can be expected to carry time sensitive cargo at all times of the year. Further, the nature of liner ship operations requires regular fixed schedules of operation in order to maximize efficiency of the logistic chain.

13 At MEPC 73, many delegates recognized the importance of port optimization in reducing GHG emissions from ships. Improving port efficiency will play an essential role in achieving the objectives of the Initial Strategy (MEPC 73/WP.1, paragraphs 7.19 to 7.21). For port optimization measures to work ships must have flexibility to adjust voyage speeds in order to ensure on time arrival.

14 Efficiency measures must not risk the safety of seafarers and ships. Ships routinely use weather routing to avoid adverse weather and this may necessitate increasing speed to compensate for the longer routing. An annualized average speed limit could result in unintended consequences in the later part of the reporting period if ships are unable to operate at a higher speed to offset the lost time involved in avoiding adverse weather conditions.

15 Ships must be provided with sufficient power to operate safely when adverse conditions cannot be avoided or when operating in areas with strong currents or exposed to high windage. Low load engine operation reduces efficiency both in terms of engine specific fuel consumption (g/KWhr) and also in terms of overall power system efficiency as energy recovery systems cannot operate as efficiently. For example, engine load may be reduced to a point which requires use of oil fired boilers for steam generation because waste heat recovery systems cannot generate the necessary quantity of steam. Most ships have already reduced speed to a point which provides a good balance between lower fuel use and minimizing problems associated with low load operation.

16 Despite tools such as AIS tracking, monitoring and enforcement of speed limits would not be a simple task. For example, it would need to consider circumstances where ships need to increase speed to avoid hazards to safety. This could create an unreasonable administrative burden for both shipowners and Administrations.

17 Port congestion is already a major challenge for the industry. Slowing the global fleet down without expanding port capacity could, in fact, be counterproductive as more vessels would be required in order to move the same annual amount of cargo.

18 The propeller law (i.e. $P \alpha V^3$) is a simplification and breaks down at low speeds as ships reach a point where reducing speed will not result in further reduction of power (and hence fuel consumption). Also, as speed reduces, so does the proportionate reduction in power.

19 Speed reductions could lead to modal shift and higher aggregate GHG emissions in the case of time sensitive cargo, particularly in the short sea segment. Some cargo might even shift to air freight, resulting in higher GHG emissions.

20 Mandatory speed reduction measures could inhibit technological innovation. There has been some comment on the possibility of a rebound effect (see for example document ISWG-GHG 4/3). If a ship can emit less GHG emissions and also operate at a higher service speed then this should not be prevented, to do so would effectively remove a major incentive for shipowners to invest in new and innovative technologies.

21 Low load engine operation increases emissions of NO_X, PM and black carbon, the co-sponsors would urge the Committee to apply a holistic view which recognizes the importance of emissions of both local pollutants and GHGs.

22 The existing SEEMP Guidelines already address speed optimization. Strengthening the SEEMP would avoid the time necessary to agree separate speed measures, reduce administrative burden and avoid the negative consequences of mandatory speed restrictions.

23 The co-sponsors fully support speed optimization as a short-term measure. This includes speed reduction where appropriate. However, the co-sponsors also support applying new and innovative technology and adoption of new very low carbon and carbon free fuels and a mandatory speed limit could inhibit innovation. Speed optimization (which includes speed reduction) is already addressed by the SEEMP Guidelines and it is considered that strengthening the SEEMP would promote speed optimization. This could achieve the benefits claimed for mandatory speed reduction.

Operational efficiency indicators

24 Operational efficiency indicators have been advocated, for example, in documents ISWG-GHG 4/3/1 and ISWG-GHG 4/2/14. The co-sponsors agree that an appropriate operational energy efficiency indicator or key performance indicator (KPI) would provide a useful tool for a ship to demonstrate its energy efficiency performance. However, inappropriate metrics would be counterproductive.

25 The operational energy efficiency indicators which have been submitted for the consideration of the Committee measure the efficiency of trade, not the operational energy efficiency of ships, and rely on assumptions. They do not account for asymmetric trading patterns or influence of sea conditions, weather and current, as such they would not provide meaningful, comparable values. If published they would almost certainly be used unfairly to promote some ships as being better than others, leading to erroneous conclusions and distortion of trade.

26 Research undertaken on behalf of INTERTANKO (document MEPC.72/INF.5) demonstrated that the results of applying efficiency indicators to identical sister ships operated by the same company varied greatly. This supported the conclusions of document ISWG-GHG 2/2/7 (Argentina et al.).

27 No single operational energy efficiency indicator is suitable for all ships. Ships have to obey charterers' instructions regarding service speed, itinerary and amount of cargo to be shipped when under time charter. Even liner ships are routinely redeployed between different routes with very different operating conditions, meaning that historic data for operational performance cannot be assumed to be meaningful in terms of assessing future (or current) performance.

28 The co-sponsors support the use of appropriate operational efficiency indicators or KPIs selected by the shipowner as part of the SEEMP self-evaluation and improvement process. Such indicators or KPIs must be appropriate for the ship type.

Mandatory technology retrofit

29 Document ISWG-GHG 4/2/14 (Belgium et al.) included mandatory technology retrofitting as a possible short-term GHG reduction measure.

30 The co-sponsors fully support improving the efficiency of existing ships, and support using technical measures to improve the efficiency of existing ships where this is appropriate. However, mandatory technology retrofitting would be very problematic. In ISWG-GHG 4/2/14 it is stated that "many efficiency improving technologies that have been shown to be cost-effective are not applied to ships", how is "cost-effective" defined? How would the economic viability of a measure be assessed? The costs of retrofitting any technology will be ship specific and vary hugely, based on (but not limited to) factors such as:

.1 the extent of work needed to access the installation area, followed by reinstating any access openings;

.2 scale of modifications required to existing system;

.3 modifications to existing systems and equipment, which may not necessarily form part of the retrofit but which require extensive adjustment to create space;

.4 structural modifications to the fabric of the ship to carry additional weight and consequential modifications to maintain stability and fire/flood sub-division;

.5 the location chosen for the work and availability of resource; and

.6 time off hire for completion of works.

31 These are all in addition to the cost of purchasing the equipment and associated class costs. Whether or not a retrofit is sensible will also be influenced by the age of the ship. The cost of a retrofit cannot be estimated, but only worked out on a ship specific basis requiring significant time and effort. Generic high-level estimates proposed by consultants and others should not be seen as credible cost estimates.

32 There is a lack of independent and impartial information to assess the performance of new technologies and it is unclear how much, if any, environmental benefit, some technologies deliver. Documents MEPC 73/5/9 and ISWG-GHG 4/3/4 (RINA) highlighted uncertainties and inaccuracies associated with claims which have been made for percentage savings for energy saving techniques and how this makes it difficult to compare the effectiveness of such techniques. RINA also observed that the effectiveness of some techniques may have been overestimated and called for a robust framework which could be used to verify claims made for energy saving techniques. The co-sponsors concur with the arguments presented by RINA, which are consistent with the operational experiences of shipowners.

33 Mandatory retrofitting of technology is not within scope of existing IMO instruments and would be within Group B of the programme of follow-up actions of the Initial IMO Strategy, a candidate measure which is not work in progress and is subject to data analysis.

34 The co-sponsors consider that there are alternative means, such as strengthening the SEEMP, which would promote technical improvement of existing ships with a lower administrative burden and would avoid the problems associated with mandatory retrofit proposals which have been identified in paragraphs 36 and 37 of this document.

EEDI for existing ships built before EEDI Phase 0

35 Document ISWG-GHG 4/2 (Norway) proposed developing an EEDI for existing ships built before phase 0. The co-sponsors fully support strengthening the existing IMO energy efficiency framework, including the EEDI, however the co-sponsors have serious reservations with respect to extending the EEDI to existing ships built before EEDI phase 0 as a mandatory measure.

36 It must be understood that the EEDI is a design measure, which assigns a value to a ship when tested under controlled conditions according to a defined method of calculation, it is important not to conflate operational efficiency measures with the EEDI. Improving a ship's EEDI can only be done by applying technical and design measures, it cannot be improved by operational measures. Changing the EEDI of an existing ship would require either technology retrofit, re-profiling of the hull, engine derating (this is not the same as slow steaming) or similar measures. The co-sponsors fully agree that such technical improvements to existing ships may be appropriate for some ships. In such cases, allowing the option of completing an EEDI calculation could be a useful way to confirm the improved technical efficiency of a ship.

37 Applying technical measures is only one of many possible efficiency improvement tools which are available and it may be both possible and more appropriate to achieve the necessary efficiency improvement and emissions reduction using only operational measures (such as speed optimization).

38 There is general agreement that the majority of CO_2 emissions originate from large ships. Data in EQUASIS indicates that over 83% of large ships are 0 to 14 years old and just over 16% are older than 15 years, with those older than 25 years at less than 2%. Even if small (with small being <500GT) and medium sized ships are included, it is clear that the majority of ships are in the range 0 to 14 years and with a small minority at 25 years or older*.

39 If a mandatory EEDI for ships built before phase 0 was developed, then ships would be at least 10 to 15 years old when certificated with a new EEDI. Certificating an existing ship with an attained EEDI does not alter that ship's efficiency. If such ships were then required to reduce their EEDI (noting that the EEDI value can only be amended by implementing technical rather than operational measures) then they would be at least 15 to 20 years old by the time such modifications were made. Most larger ships, which are responsible for most GHG emissions from shipping, are less than 15 years old. Introducing an EEDI for ships built before phase 0 would entail significant effort to develop, followed by imposing a significant cost on industry to survey and certificate existing ships, and there would be very limited benefit from such a measure. The expected benefits cannot be considered as being in any way commensurate with the costs and administrative burden of such a measure.

40 The co-sponsors re-iterate that they support implementing technical improvements to existing ships where this is an appropriate means to improve their efficiency. In such cases the EEDI calculation could be used to demonstrate the effect of such changes should the shipowner elect to do this. Alternatively the improvements could be demonstrated using operational efficiency indicators. However the co-sponsors cannot recommend support for any proposals to mandate a new EEDI for existing ships, since such a measure would require significant effort to develop and implement, would affect comparatively few ships and the claimed benefits could be delivered more quickly and efficiently and with a lower administrative burden in other ways.

Strengthening EEDI requirements for existing ships which already have an attained EEDI value

41 Document ISWG-GHG 4/2 (Norway) also proposes strengthening the EEDI for existing ships which already have an attained EEDI value. The co-sponsors would reiterate that the EEDI is a design measure therefore improving the EEDI value of an existing ship would necessitate technical measures such as technology retrofitting, re-profiling the hull, derating the engine or similar.

42 Paragraphs 35 to 39 highlight the challenges associated with technology retrofitting. Robust guidelines to evaluate the effectiveness of such technologies are a prerequisite for any consideration of proposals to mandate technology retrofitting.

43 The age of EEDI phase 0 and phase 1 ships is less than that of those built prior to phase 0, some of them would nevertheless still be reaching an advanced stage of their service lives by the time any proposals to strengthen their existing EEDI took effect, and still older by the time any improvements were applied to lower their attained EEDI values.

* Source: http://www.equasis.org, small <500GT, medium 500 – 25,000GT, large >25,000GT.

44 Where refitting technology is attractive, it is already done for commercial reasons, since shipowners want more efficient ships. Fuel is one of the most significant costs for any shipowner and all try to minimize fuel use so far as is practicable. This applies regardless of the often quoted "split incentive" between owners and charterers, since it also affects the charter rate for a ship.

45 For ships certificated to EEDI phase 1 and phase 2, there will be less scope to apply energy improving technologies, since many of these technologies will have already been applied. De-rating the engine will be less feasible since such ships will in most cases already have down-sized engines in order to optimize their attained EEDI value and will have much less scope to reduce engine power whilst maintaining compliance with the *2013 Interim guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions* (MEPC.1/Circ.850/Rev.2).

46 The co-sponsors support implementing technical improvements to existing ships where this is an appropriate means to improve their efficiency. It should be recognized that implementing operational measures will be a more effective means to lower emissions for many ships, with the resulting improvements not affecting the ships EEDI value. In the case of ships which are subject to technical improvement and which have an attained EEDI value then recalculating the EEDI could demonstrate the effect of such changes, however the improvements could be demonstrated using operational efficiency indicators. We cannot recommend support for any proposals to mandate reducing the EEDI values of ships which have an attained EEDI value, since such a measure would require significant effort to develop and implement, and the claimed benefits could be delivered more quickly and efficiently and with a lower administrative burden in other ways such as via a strengthened SEEMP and by promoting the option of using the EEDI to demonstrate the effectiveness of making technical changes to a ship on a voluntary basis.

Require ships to measure speed-fuel curves in a standardized way

47 Document ISWG-GHG 4/2/14 (Belgium et al.) proposed requiring that ships measure speed-fuel curves in a standardized way. The co-sponsors can support this proposal; however we would offer some observations.

48 Document ISWG-GHG 4/2/14 suggests that information about the ship's energy efficiency is often only available in a simple form, such as a maximum consumption per day, rather than consumption as a function of speed and loading condition. This may be true in some cases; however many ships already have speed-fuel curves for their ships when at different draughts.

49 Document ISWG-GHG 4/2/14 also references the relationship between shipowners and charterers: "One of the well-evidenced market failures is the split incentive between the shipowner and the charterer. In several segments of the shipping market, charter rates do not reflect a ship's efficiency, therefore the shipowner has little incentive to invest in the energy efficiency of the ship" (ISWG-GHG 4/2/14, paragraph 14). It is not correct to state that a shipowner has little incentive to invest in the efficiency of a ship, since a ship's fuel consumption is a key metric for securing charters and establishing the charter rate a ship can command.

50 Notwithstanding the value of speed-fuel curves, it is important to recognize that the relationship between speed and fuel use varies over time as a result of hull fouling, engine condition, propeller condition, operational parameters such as hull trim and environmental conditions such as current and wind. Therefore, even with a standardized methodology to establish speed-fuel curves, a degree of variability will remain.

51 The co-sponsors do, however, support a common methodology for measuring speed-fuel curves for new ships which could then form part of the ship's SEEMP.

Summary

52 The co-sponsors support speed optimization and improving both the technical and operational efficiency of existing ships, however not all measures are appropriate to all ships and in some cases it may be most appropriate to implement either entirely technical measures, or entirely operational measures, or a combination of both operational and technical measures. The objective is to improve efficiency and lower emissions; the co-sponsors consider that how this is done is not important so long as shipping achieves the levels of ambition defined in the Initial Strategy. Mandating retroactive design measures and technology fitment would be time consuming to develop, incur a significant administrative burden and cost, distort markets and be of limited value. At this time, it is considered more appropriate to develop proposals to strengthen the SEEMP and to develop a toolkit of various measures which could be implemented as appropriate.

53 The co-sponsors consider that the efficiency of the existing fleet should be improved using both technical and operational measures, and that the most effective, least burdensome and quickest way to achieve this would be to strengthen the SEEMP. The co-sponsors support strengthening the EEDI for new ships but consider that any attempt to mandate EEDI requirements retrospectively (including requiring EEDI reductions for ships which have an attained EEDI value) and not as a tool in an efficiency improvement toolkit which could be used on an optional basis would be time consuming to agree and implement and that the cost of such a measure would be disproportionate with the expected benefits.

Action requested of the Working Group

54 The Group is invited to consider the comments contained in this submission and to take action as appropriate.