

INTERSESSIONAL MEETING OF THE
WORKING GROUP ON REDUCTION OF
GHG EMISSIONS FROM SHIPS
7th session
Agenda item 2

ISWG-GHG 7/2/14
7 February 2020
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**FURTHER CONSIDERATION OF CONCRETE PROPOSALS TO IMPROVE THE
OPERATIONAL ENERGY EFFICIENCY OF EXISTING SHIPS, WITH A VIEW TO
DEVELOPING DRAFT AMENDMENTS TO CHAPTER 4 OF MARPOL ANNEX VI
AND ASSOCIATED GUIDELINES, AS APPROPRIATE**

Strengthening the SEEMP with mandatory elements and regular audits

Submitted by Greece, Japan and Norway

SUMMARY

Executive summary: This document proposes to strengthen the SEEMP framework by adding mandatory elements in the SEEMP and a recommendation to audit the SEEMP at every ship and company audit as part of the existing ISM regime. The document includes drafts amendments to regulation 22 of MARPOL Annex VI and the SEEMP Guidelines.

*Strategic direction,
if applicable:* 3

Output: 3.2

Action to be taken: Paragraph 19

Related documents: ISWG-GHG 6/2/2, ISWG-GHG 6/2/6, ISWG-GHG 6/2/9,
ISWG-GHG 6/2/10 and ISWG-GHG 6/2/11

Background

1 ISWG-GHG 6 provided for an extended exchange of views on the proposals put forward to the Working Group which resulted in a better understanding of the strengths and weaknesses of the approaches. The co-sponsors are committed to establishing a package of measures which ensures that shipping achieves the agreed ambitions of the Initial GHG Strategy, and it is clear that a combination of technical and operational approaches is needed in order to achieve this.

2 To complement the EEXI, the co-sponsors propose to strengthen the SEEMP framework in order to address operational emissions in a more comprehensive manner for all ships.

3 This document presents a revised proposal to strengthen the SEEMP framework, building on experiences of the existing SEEMP framework and on proposals made in documents ISWG-GHG 6/2/2 (Norway), ISWG-GHG 6/2/11 (Denmark et al.) and ISWG-GHG 6/2/9 (China). A strengthened SEEMP framework complements the EEXI and the EEDI and is essential to ensure early action and contribution by all ships to achieving the levels of ambition of the Initial Strategy.

4 This proposal complements other operational proposals. One of the key challenges identified during ISWG-GHG 6 was to ensure a robust enforcement mechanism of operational emissions. While this could take time to develop, using an existing audit regime enables early action by the end of 2022 and paves the way for a more comprehensive energy efficiency regime over time. This also allows for experience-building according to the three-step approach and adds important elements to the decarbonization toolbox.

5 The aim of the proposal is to drive shipping companies to include implementation plans in the SEEMP for achieving the 2030 ambition in the most effective way for each ship, and to have a systematic follow-up at the ship and company levels to ensure continuous improvement of energy efficiency and decarbonization.

The need to address ships' operation

6 Figure 1 below shows the share of emissions based on scope of regulations. Of the approximately 800 million tonnes CO₂ emitted in 2019, 18% came from ships with a required EEDI (Phase 0 or Phase 1) and 67% came from ships in the scope of the proposed EEXI but outside the EEDI scope as they were built before 2013. 13% of the emissions came from ships of 400 GT and above but not in scope of the required EEDI and the proposed EEXI as they were below the size threshold or of a non-applicable ship-type. These ships are, however, subject to the SEEMP requirements in regulation 22. The remaining 2% came from ships below 400 GT and not subject to the energy efficiency requirements of MARPOL Annex VI.

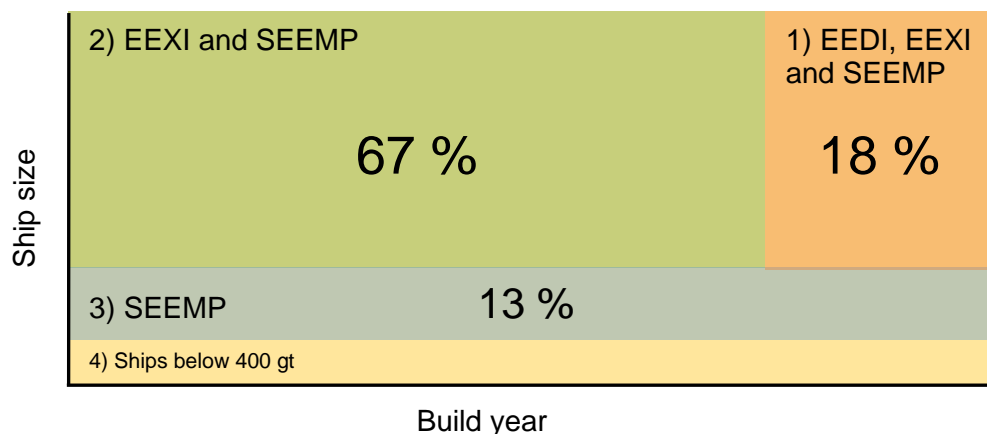


Figure 1: Share of emissions in 2019 based on applicability of suggested regulations, with: 1) Ships built from 2013 and subject to required EEDI and SEEMP, 2) Ships built before 2013 and subject to required EEXI and SEEMP, 3) Ships below the size application limit and subject to SEEMP only and 4) Ships below the 400 GT size threshold in MARPOL Annex VI

7 Figure 2 below shows how the EEXI/EEDI and SEEMP are complementary, using the analysis of technical and operational performance presented in document ISWG-GHG 6/2/2 (Norway). While the EEDI and EEXI ensure a minimum level of technical efficiency (TE) of a ship, operational emissions (measured with the Annual Efficiency Ratio – AER) can still vary.

This variance is addressed by a strengthened SEEMP to ensure that each ship is operated at its best potential.

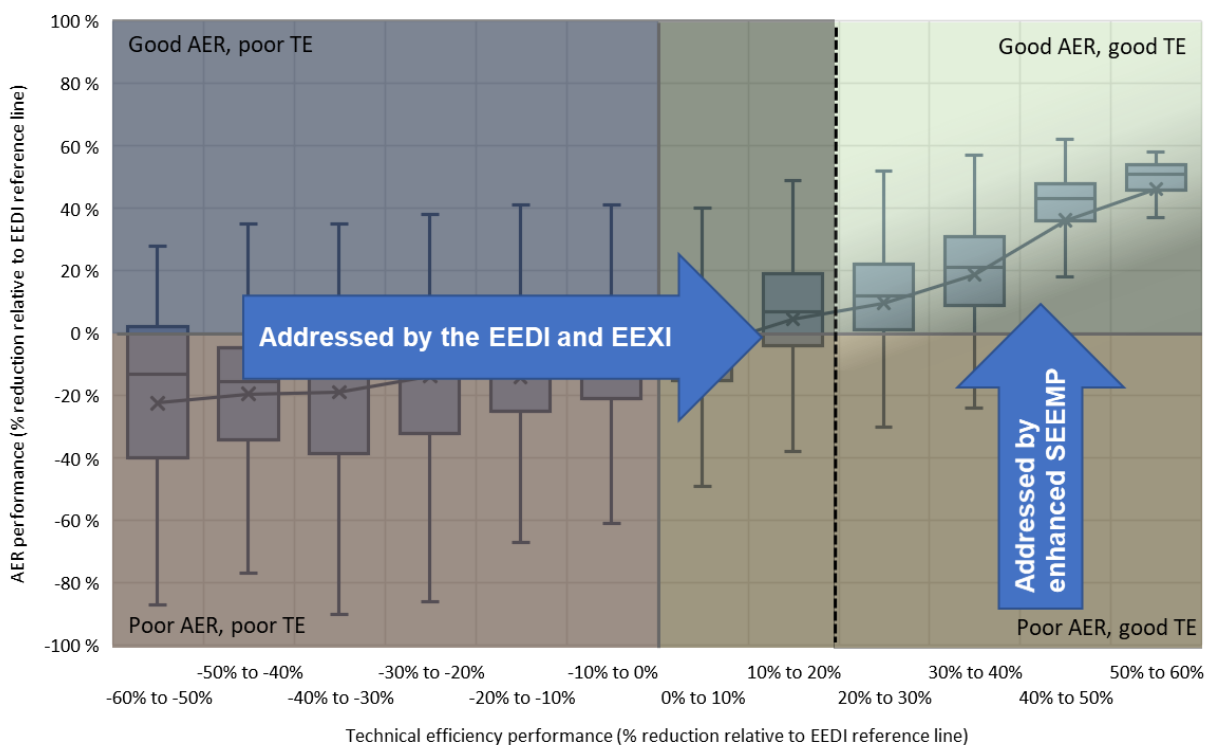


Figure 2: The EEXI and EEDI mandates improved technical efficiency (TE) of ships (horizontal axis), while the enhanced SEEMP addresses operational performance (AER) (vertical axis)

Proposed improvements to regulation 22 and the SEEMP Guidelines

8 The existing regulation 22 of MARPOL Annex VI is not stringent as it does not set any mandatory requirements to the SEEMP and does not ensure an explicit follow-up through any survey or audit scheme, other than through ISM (International Safety Management) audits on a sampling basis. The regulation does not provide for making use of the full potential of improving energy efficiency in the ship's operational phase. In order to unveil this positive potential, and to complement the technical requirements of the proposed EEXI, the co-sponsors propose to make the following elements mandatory in the SEEMP:

- .1 a list of ship-specific energy efficiency improvement and decarbonization measures;
- .2 a specific Carbon Intensity Indicator (CII), calculated in line with the guidelines developed by the Organization;
- .3 a self-set annual CII Goal; and
- .4 an implementation plan documenting how the annual CII goal will be achieved and a procedure for self-evaluation and improvement.

9 The SEEMP should be subject to approval and verified as part of the initial survey defined in regulation 5.4 of MARPOL Annex VI and should be subject to regular shipboard and company audits. For existing ships, the SEEMP should be approved prior to the first company audit after entry into force of the regulation.

10 The proposed amendments for the strengthened SEEMP regulations are robust and require limited technical work to finalize. The work on developing guidelines for the Carbon Intensity Indicators should commence as soon as possible. All ships would benefit in applying the proposed elements resulting in increased operational efficiency.

Ensuring regular auditing of the SEEMP

11 In order to ensure focus on operational energy efficiency throughout a ship's lifespan, the co-sponsors propose that the mandatory parts of the SEEMP are audited through an existing auditing infrastructure, the ISM audit regime. Using the existing safety management system and ISM audit regime is an effective and flexible approach to ensuring compliance with the required elements of the SEEMP and can be implemented shortly.

12 An audit approach will, in the view of the co-sponsors, have better effect on operational efficiency and decarbonization than just checking that a specific CII is below a defined level. In case of a non-conformity, the company has to follow-up with an action plan. This action plan has to be acceptable to the Administration or Recognized Organisation. The effectiveness of the implemented corrective actions is to be verified at the next audit.

13 The ISM Code already provides for following-up of energy management through its objective which includes avoidance of damage to the environment. One of the objectives is that the safety management system shall ensure compliance with mandatory rules and regulations, and that applicable codes, guidelines and standards are taken into account. However, the ISM Code covers a wide range of topics, for example safe working practises, cyber risk management, garbage management, voyage planning, maintenance, manning, training, competence, and emergency preparedness in addition to the management system elements requiring companies to execute self-verification, internal audits, monitoring and review of the effectiveness of the management system. Therefore, it is not possible to cover all aspects of each mandatory regulation at every external audit, and a sample of topics and records has to be selected for verification.

14 The co-sponsors propose to ensure that SEEMP is addressed in ISM audits through an approach similar to how cyber risk was addressed by IMO, by recommending Administrations to include the SEEMP at every ISM audit, whether at company premises or on board a ship. This ensures an annual audit of the SEEMP at the company level as part of the existing ISM regime, and two audits per ship every five years. Through such approach there is no need for any new regulations or audit guidelines for evaluation of the effectiveness of the SEEMP.

15 The co-sponsors expect that the burden on companies and ships of this verification approach will be limited as energy and decarbonization management will be part of an existing audit regime, and that limited extra training will be needed for ISM auditors. ISM auditors are trained in management systems auditing procedures and techniques and are therefore in a good position to evaluate the effectiveness of a company's energy and decarbonization management approach.

Proposal

16 The co-sponsors propose to include mandatory elements to the SEEMP through regulation 22 of MARPOL Annex VI and ensure regular shipboard and company audits. The following draft documents are provided in annexes to this document:

- .1 draft amendments to regulations 5 and 22 and appendix VII of MARPOL Annex VI (in annex 1);
- .2 draft SEEMP Guidelines (in annex 2); and
- .3 draft resolution recommending Administrations to include the SEEMP in ISM shipboard and company audits (in annex 3).

17 The co-sponsors also propose that MEPC forwards this proposal to the HTW Sub-Committee for its review.

18 In order to enable ships to start applying the strengthened SEEMP, the work on developing guidelines for calculating Carbon Intensity Indicators should commence as soon as possible.

Action requested of the Working Group

19 The Group is invited to consider the information and proposals put forward in this document and take action as appropriate.

ANNEX 1

DRAFT AMENDMENTS TO MARPOL ANNEX VI

(New text is shown as underlined and text to be deleted as ~~strikethrough~~)

Regulation 5

Surveys

4 Ships to which chapter 4 of this annex applies shall be subject to the surveys specified below, taking into account the guidelines adopted by the Organization.*

.1 An initial survey before a new ship is put in service and before the International Energy Efficiency Certificate is issued. The survey shall verify that the ship's attained EEDI and SEEMP are ~~is~~ in accordance with the requirements in chapter 4 of this Annex, and that the SEEMP required in regulation 22 is on board;

.2 [No changes]

.3 [No changes]

.4 ~~For existing ships, the verification of the requirement to have a SEEMP on board according to regulation 22 of this Annex shall take place at the first intermediate or renewal survey identified in paragraph 1 of this regulation, whichever is the first, on or after 1 January 2013; and~~

The verification of the requirement to have an approved SEEMP on board according to regulation 22 of this Annex shall take place at the first annual survey identified in paragraph 1 or the initial survey identified in paragraph 4.1 and 4.3 of this regulation, whichever is the first, on or after [date of entry into force]; and

.5 [No changes]

Regulation 22

Ship Energy Efficiency Management Plan (SEEMP)

1 Each ship shall keep on board a ship specific Ship Energy Efficiency Management Plan (SEEMP) approved either by the Administration or by any person or organization recognized by it. This may form part of the ship's Safety Management System (SMS).

2 On or before 31 December 2018, in the case of a ship of 5,000 gross tonnage and above, SEEMP shall include a description of the methodology that will be used to collect the data required by regulation 22A.1 of this Annex and the processes that will be used to report the data to the ship's Administration.

3 The SEEMP shall be developed taking into account guidelines adopted by the Organization* and shall include:

- .1 a list of ship specific energy efficiency improvement and decarbonization measures;
- .2 a specific Carbon Intensity Indicator (CII), calculated in line with the guidelines developed by the Organization;
- .3 a self-set annual CII Goal; and
- .4 an implementation plan documenting how the annual CII Goal will be achieved and a procedure for self-evaluation and improvement.

4 For ships for which Chapter IX of the International Convention for the Safety of Life at Sea (SOLAS), 1974 applies, the effectiveness of the SEEMP shall be subject to verification at ISM Code shipboard and company audits taking into account guidelines adopted by the Organization.

Appendix VIII – Supplement to the IEE certificate

5 Ship Energy Efficiency Management Plan

5.1	The ship is provided with an <u>approved</u> Ship Energy Efficiency Management Plan (SEEMP) in compliance with regulation 22	
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ANNEX 2

DRAFT AMENDMENTS TO RESOLUTION MEPC.282(70) ON 2016 GUIDELINES FOR THE DEVELOPMENT OF A SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

(New text is shown as underlined and text to be deleted as ~~striketrough~~ (Note: draft amendments to appendix 1 and 2 referred to in subparagraph 1.3 are not included))

1 INTRODUCTION

1.1 The Guidelines for the development of a Ship Energy Efficiency Management Plan have been developed to assist with the preparation of the Ship Energy Efficiency Management Plan (SEEMP) required by regulation 22 of MARPOL Annex VI.

1.2 The aim of the SEEMP is to improve the energy efficiency and carbon intensity of a ship's operation and to contribute to achieving the levels of ambition of the *Initial IMO Strategy on Reduction of GHG Emissions from Ships* in the most effective way.

1.3 There are two parts to a SEEMP. Part I provides a possible approach for monitoring ship and fleet efficiency performance over time and some options to be considered when seeking to optimize the performance of the ship. Part I should further include a **specific Carbon Intensity Indicator (CII), calculated in line with guidelines developed by the Organization, and a self-set annual CII Goal.** Part II provides the methodologies ships of 5,000 gross tonnage and above should use to collect the data required pursuant to regulation 22A of MARPOL Annex VI and the processes that the ship should use to report the data to the ship's Administration or any organization duly authorized by it.

1.4 A sample form of the SEEMP is presented in appendices 1 and 2 for illustrative purposes. A standardized data-reporting format for the data collection system is presented in appendix 3.

2 DEFINITIONS

2.1 For the purpose of these Guidelines, the definitions in MARPOL Annex VI apply.

2.2 "Ship fuel oil consumption data" means the data required to be collected on an annual basis and reported as specified in appendix IX to MARPOL Annex VI.

2.3 "Safety management system" means a structured and documented system enabling company personnel to implement effectively the company safety and environmental protection policy, as defined in paragraph 1.1 of International Safety Management Code.

2.4 "Carbon Intensity Indicator" means a performance indicator by which it is possible to measure the carbon intensity of the ship.

2.5 "Carbon Intensity Goal" means a self-set annual target on the Carbon Intensity Indicator.

PART I OF THE SEEMP: SHIP MANAGEMENT PLAN TO IMPROVE ENERGY EFFICIENCY AND THE CARBON INTENSITY OF THE SHIP

3 GENERAL

3.1 In global terms it should be recognized that operational efficiencies delivered by a large number of ship operators will make an invaluable contribution to reducing global carbon emissions.

3.2 The purpose of part I of SEEMP is to establish a mechanism for a company and/or a ship to improve the energy efficiency and carbon intensity of a ship's operation. Preferably, this aspect of the ship-specific SEEMP is linked to a broader corporate energy management policy for the company that owns, operates or controls the ship, recognizing that no two shipping companies are the same, and that ships operate under a wide range of different conditions.

3.3 Many companies will already have an environmental management system (EMS) in place under ISO 14001 which contains procedures for selecting the best measures for particular vessels and then setting objectives for the measurement of relevant parameters, along with relevant control and feedback features. Monitoring of operational environmental efficiency should therefore be treated as an integral element of broader company management systems.

3.4 In addition, many companies already develop, implement and maintain a Safety Management System. In such case, part I of SEEMP may form part of the ship's Safety Management System.

3.5 This section provides guidance for the development of part I of SEEMP that should be adjusted to the characteristics and needs of individual companies and ships. Part I is intended to be a management tool to assist a company in managing the ongoing environmental performance of its vessels and as such, it is recommended that a company develops procedures for implementing the plan in a manner which limits any on-board administrative burden to the minimum necessary.

3.6 Part I of SEEMP should be developed as a ship-specific plan by the company and should reflect efforts to improve a ship's energy efficiency and carbon intensity through four steps: planning, implementation, monitoring, and self-evaluation and improvement. These components play a critical role in the continuous cycle to improve ship energy efficiency and carbon intensity management. With each iteration of the cycle, some elements of part I will necessarily change while others may remain as before.

3.7 At all times safety considerations should be paramount. The trade a ship is engaged in may determine the feasibility of the efficiency measures under consideration. For example, ships that perform services at sea (pipe laying, seismic survey, OSVs, dredgers, etc.) may choose different methods of improving energy efficiency when compared to conventional cargo carriers. The nature of operations and influence of prevailing weather conditions, tides and currents combined with the necessity of maintaining safe operations may require adjustment of general procedures to maintain the efficiency of the operation, for example the ships which are dynamically positioned. The length of voyage may also be an important parameter as may trade specific safety considerations.

4 FRAMEWORK AND STRUCTURE OF PART I OF SEEMP

4.1 Planning

4.1.1 Planning is the most crucial stage of part I of SEEMP, in that it primarily determines both the current status of ship energy usage and the expected improvement of ship energy efficiency. Therefore, it is encouraged to devote sufficient time to planning so that the most appropriate, effective and implementable plan can be developed.

Ship-specific measures

4.1.2 Recognizing that there are a variety of options to improve efficiency – speed optimization, weather routing ~~and~~, hull maintenance, retrofitting of energy efficiency devices and alternative fuels, for example – and that the best package of measures for a ship to improve efficiency differs to a great extent depending upon ship type, cargoes, routes and other factors, the specific measures for the ship to improve energy efficiency should be identified in the first place. These measures should be listed as a package of measures to be implemented, thus providing the overview of the actions to be taken for that ship.

4.1.3 During this process, therefore, it is important to determine and understand the ship's current status of energy usage. Part I of SEEMP should identify energy-saving, and carbon intensity reducing measures that have been undertaken, and should determine how effective these measures are in terms of improving energy efficiency and carbon intensity. Part I also should identify what measures can be adopted to further improve the energy efficiency and carbon intensity of the ship. It should be noted, however, that not all measures can be applied to all ships, or even to the same ship under different operating conditions and that some of them are mutually exclusive. Ideally, initial measures could yield energy (and cost) saving results that then can be reinvested into more difficult or expensive efficiency upgrades identified by part I.

4.1.4 Guidance on best practices for fuel-efficient operation of ships, set out in chapter 5, can be used to facilitate this part of the planning phase. Also, in the planning process, particular consideration should be given to minimize any on-board administrative burden.

Company-specific measures

4.1.5 The improvement of energy efficiency and carbon intensity of ship operation does not necessarily depend on single ship management only. Rather, it may depend on many stakeholders including ship repair yards, ship-owners, operators, charterers, cargo owners, ports and traffic management services. For example, "Just in time" – as explained in paragraph 5.2.4 – requires good early communication among operators, ports and traffic management service. The better coordination among such stakeholders is, the more improvement can be expected. In most cases, such coordination or total management is better made by a company rather than by a ship. In this sense, ~~it is recommended that~~ a company should also establish an energy management and decarbonization plan to improve the performance of manage its fleet ~~(should it not have one in place already)~~ and make necessary coordination among stakeholders.

Human resource development

4.1.6 For effective and steady implementation of the adopted measures, raising awareness of and providing necessary training for personnel both on shore and on board are an important element. Such human resource development is encouraged and should be considered as an important component of planning as well as a critical element of implementation.

Goal setting

4.1.7 The last part of planning is goal setting. It should be emphasized ~~that the goal setting is voluntary, that there is no need to announce the goal or the result to the public, and that neither a company nor a ship are subject to external inspection.~~ The purpose of goal setting is to serve as a signal which involved people should be conscious of, to create a good incentive for proper implementation, and then to increase commitment to the improvement of energy efficiency. ~~The goal can take any form, such as the annual fuel consumption or a specific target of Energy Efficiency Operational Indicator (EEOI). Whatever the goal is, The goal should be measurable, and easy to understand and ensure for a continuous improvement on energy efficiency and carbon intensity. The goal can be a specific target expressed in Annual Efficiency Ratio (AER), Energy Efficiency Operational Indicator (EEOI) or any other Carbon Intensity Indicator calculated according to guidelines developed by the Organization. The fulfilment of the goal should be documented annually.~~

4.2 Implementation

Establishment of implementation system

4.2.1 After a ship and a company identify the measures to be implemented, it is essential to establish a system for implementation of the identified and selected measures by developing the procedures for energy management, by defining tasks and by assigning them to qualified personnel. Thus, part I of SEEMP should describe how each measure should be implemented and who the responsible person(s) is. The implementation period (start and end dates) of each selected measure should be indicated. The development of such a system can be considered as a part of planning, and therefore may be completed at the planning stage.

Implementation and record-keeping

4.2.2 The planned measures should be carried out in accordance with the predetermined implementation system. Record-keeping for the implementation of each measure is beneficial for self-evaluation at a later stage and should be encouraged. If any identified measure cannot be implemented for any reason(s), the reason(s) should be recorded for internal use.

4.3 Monitoring

Monitoring tools

4.3.1 The energy efficiency of a ship should be monitored quantitatively ~~by a Carbon Intensity Indicator. This should be done by an established method, preferably by an international standard. The EEOI, the AER or another performance indicator developed by the Organization are is one of the internationally established tools to obtain a quantitative indicator of energy efficiency of a ship and/or fleet in operation, and can be used for this purpose. Therefore, EEOI or AER could be considered as the primary monitoring tool, although other quantitative approved measures also may be appropriate. The CII should be calculated according to an established method, such as the Annual Efficiency Ratio (AER), Energy Efficiency Operational Indicator (EEOI), or any other CII calculated according to guidelines developed by the Organization.~~

4.3.2 ~~If used, it is recommended that the EEOI is calculated in accordance with the Guidelines for the development of a Ship Energy Efficiency Management Plan (MEPC.1/Circ.684) developed by the Organization, adjusted, as necessary, to a specific ship and trade.~~

4.3.3 In addition to the CII EEOI, if convenient and/or beneficial for a ship or a company, other measurement tools can be utilized. In the case where other monitoring tools are used, the concept of the tool and the method of monitoring may be determined at the planning stage.

Establishment of monitoring system

4.3.4 It should be noted that whatever measurement tools and specific Carbon Intensity Indicator are used, continuous and consistent data collection is the foundation of monitoring. To allow for meaningful and consistent monitoring, the monitoring system, including the procedures for collecting data and the assignment of responsible personnel, should be developed. The development of such a system can be considered as a part of planning, and therefore should be completed at the planning stage.

4.3.5 It should be noted that, in order to avoid unnecessary administrative burdens on ships' staff, monitoring should be carried out as far as possible by shore staff, utilizing data obtained from existing required records such as the official and engineering log-books and oil record books, etc. Additional data could be obtained as appropriate.

Search and rescue

4.3.6 When a ship diverts from its scheduled passage to engage in search and rescue operations, it is recommended that data obtained during such operations is not used in ship energy efficiency monitoring, and that such data may be recorded separately.

4.4 Self-evaluation and improvement

4.4.1 Self-evaluation and improvement is the final phase of the management cycle. This phase should produce meaningful feedback for the coming first stage, i.e. planning stage of the next improvement cycle.

4.4.2 The purpose of self-evaluation is to evaluate the effectiveness of the planned measures and of their implementation, to deepen the understanding on the overall characteristics of the ship's operation such as what types of measures can/cannot function effectively, and how and/or why, to comprehend the trend of the efficiency improvement of that ship and to develop the improved management plan for the next cycle.

4.4.3 For this process, procedures for self-evaluation of ship energy management should be developed. Furthermore, self-evaluation should be implemented periodically by using data collected through monitoring. In addition, it is recommended to invest time in identifying the cause-and-effect of the performance during the evaluated period for improving the next stage of the management plan.

ANNEX 3

DRAFT RESOLUTION ON ENERGY EFFICIENCY AND DECARBONISATION IN SAFETY MANAGEMENT SYSTEMS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECOGNIZING the urgent need to address greenhouse gas emissions from international shipping in line with the resolution MEPC.304(72) on the *Initial IMO Strategy on Reduction of GHG Emissions from Ships* (hereinafter the Initial Strategy),

RECOGNIZING ALSO that Administrations, classification societies, shipowners and ship operators, ship agents, equipment manufacturers, service providers, ports and port facilities and all other maritime industry stakeholders should expedite work towards meeting the ambitions set in the Initial Strategy,

BEARING IN MIND regulation 22 of MARPOL Annex VI which requires each ship to carry a Ship Energy Efficiency Management Plan (SEEMP) and resolution MEPC.282(70) on *2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)* which provides guidance on the development of a SEEMP and its incorporation into the ship's Safety Management System,

RECALLING resolution A.741(18) by which the Assembly adopted the International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code) and recognized, inter alia, the need for appropriate organization of management to enable it to respond to the need of those on board ships to achieve and maintain high standards of safety and environmental protection,

NOTING the objectives of the ISM Code which include, inter alia, the provision of safe practices in ship operation and a safe working environment, the assessment of all identified risks to ships, personnel and the environment, the establishment of appropriate safeguards, and the continuous improvement of safety management skills of personnel ashore and aboard ships,

1 AFFIRMS that an approved safety management system should take into account energy management and decarbonization in accordance with the objectives and functional requirements of the ISM Code;

2 ENCOURAGES Administrations to ensure that energy management and decarbonization are appropriately addressed in safety management systems and effectively implemented ashore and on board at each periodical ISM audit after [date of entry into force + 1 year];

3 REQUESTS Member States to bring this resolution to the attention of all stakeholders.