INTERNATIONAL MARITIME ORGANIZATION

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

ISWG-GHG 7/2/9
7 February 2020
ENGLISH ONLY

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

Proposal for a mandatory operational goal-based short-term measure

Submitted by Denmark, France and Germany

SUMMARY

Executive summary:	The co-sponsors propose a mandatory operational "goal-based" short-term measure where an individual target of carbon intensity reduction is assigned to each ship and where shipowners and crews are free to choose the means to reach it. Enforcement will be based on the ship's International Energy Efficiency Certificate (IEEC) that will be renewed every five years with an annual verification audit on achievement of the ship's annual target. The co-sponsors propose several amendments to MARPOL Annex VI, including a new regulation 22B.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 43
Related documents:	MEPC 75/7/2; ISWG-GHG 7/2, ISWG-GHG 7/2/2, ISWG-GHG 7/2/20; ISWG-GHG 6/2/9, ISWG-GHG 6/2/10, ISWG-GHG 6/2/11; MEPC 74/7/4 and MEPC 74/18

Introduction

1 The Marine Environment Protection Committee, at its seventy-fourth session (13 to 17 May 2019), instructed the Working Group on Reduction of GHG Emissions from Ships at its sixth and seventh intersessional meetings (ISWG-GHG 6 and ISWG-GHG 7) to further consider 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.

2 ISWG-GHG 6 (11 to 15 November 2019) agreed that "goal-based measures should be pursued and that two approaches, i.e. technical approach and operational approach, should be further developed in parallel, taking into account the comments made at this meeting. In this connection, the Group noted that Japan offered to informally coordinate future work on technical approach while China, Denmark and France offered to coordinate the future submission on the operational approach, noting that it would benefit from collaborative approaches" (MEPC 75/7/2, paragraph 32). Soon after that, Germany joined the group of coordinators.

3 Denmark, France, China and Germany have since worked to coordinate and develop the mandatory operational goal-based short-term measure. The co-sponsors appreciate the collaborative efforts of many Member States and organizations to develop the proposal ranging from discussions at ISWG-GHG 5, MEPC 74 and ISWG-GHG 6, as well as other questions, comments, analyses and suggestions presented to the co-sponsors through an informal collaborative group of interested parties.

4 The co-sponsors note that various adverse circumstances occurred during the last weeks (holiday season in Europe and Chinese New Year followed by the corona virus outbreak in China) made impossible to meet physically and challenging to meet and work online as well. The time and work constraints result in no agreement on a common proposal before the submission deadline for ISWG-GHG 7. Nevertheless, coordination of work took place in a constructive and solutions-oriented spirit.

5 The work focused on the measure’s targets, indicators, compliance, enforcement, implementation, review of the measure, and a detailed impact assessment (submitted separately in document ISWG-GHG 7/2/20). Based on this work, the co-sponsors have developed draft amendments to MARPOL Annex VI, as set out in annex 1 to this document.

6 In the next section, the draft amendments to MARPOL Annex VI are explained.

Principles

7 The co-sponsors propose a mandatory operational goal-based short-term measure where an individual target is assigned to each ship and where shipowners and crews are free to choose the means to reach it. This approach allows to take into account operational means such as speed or trim optimization, voyage routing, hull cleaning, etc.; but also technical means such as power limitation, energy optimization, use of alternative fuels, etc. As an example, speed optimization, which has alrady strongly contributed to reduce international shipping emissions since 2008, is one available means for a great number of existing ships to meet their targets. Further, the mandatory operational goal-based approach incentivizes innovations through the uptake of current and future technological and digital solution as well as better systems integration, which all have high emissions reduction potential.

8 The mandatory operational goal-based approach relies on both trust and control to ensure effectiveness, credibility and a level playing field:

.1 trust is granted to shipowners, operators and crews to determine, plan and implement the best strategy for their ships to meet the targets set to them by the regulation; and

.2 control is performed both by flag and port States. In order to ensure a level

playing field, in all regions of the world, it is necessary to have a good balance between the role of the flag State and the role of the port State.

The concept

9 The concept of the mandatory operational goal-based short-term measure consists of several elements:

.1 the general concept of the proposal is to apply to all ships an annual required carbon intensity reduction factor (Xr);

.2 the 2008 base year's reference point for each ship is based on a Carbon Intensity Indicator (CII) reference line, which is calculated on the basis of EEDI reference lines for different ship types, adding different correction factors;

.3 the International Energy Efficiency Certificate (IEEC) is already partly issued on the basis of the ship's SEEMP. It is proposed that the ship's SEEMP must include, among others, the annual required carbon intensity reduction factor (Xr);

.4 the IEEC's period of validity is proposed to be five years and should include annual verification audits of the IEEC (on the anniversary date of the IEEC) and a renewal audit of the IEEC within a window of the three months following the fifth anniversary date;

.5 a combination of effective enforcement by flag State verification audits and Port State Control would safeguard against inappropriate compliance strategies and the challenge of charterers for ships engaged in voyage and time charters; and

.6 a review of the measure based on concrete data and evidence to particularly analyze the need for any changes to the measure.

Scope

10 The mandatory operational goal-based short-term measure should include all ships of 400 gross tonnage and above. In a first stage, it would be limited to the categories defined in regulations 2.25 to 2.31, 2.33 to 2.35 and 2.38 to 2.39 of MARPOL Annex VI, as follows:

- Bulk carrier,
- Gas carrier,
- Tanker,
- Containership,
- General Cargo ships,
- Refrigerated cargo carrier,
- Combination carrier,
- LNG carrier,
- Ro-ro cargo ship (vehicle carrier),
- Ro-ro cargo ship,
- Ro-ro passenger ship,
- Cruise passenger ship having non-conventional propulsion.

11 Some ship types are not included in the EEDI regulation. For these ship types, other proxies or baselines for the 2008 emissions will be needed and should be developed to include these ships at a later stage.

Carbon intensity indicators (CII)

12 Each ship will have its own CII defined as $CII = \frac{CO2emissions}{capacity \times distance}$.

13 The ship's CO_2 emissions are the sum of the emissions of each source on board. The Consumption/Emission conversion factor and capacity are those determined by regulation 20 of MARPOL Annex VI (Attained EEDI). Distance is the distance recorded by a receiver for a global navigation satellite system. The CII is calculated over a 12-month period from 1 January to 31 December of the relevant year (see Table 22B.2 of annex 1).

Targets

Nominal required CII and reduction factors

14 The targets for each ship type will be set based on data from the Fourth IMO GHG Study and other relevant data. They can be adjusted according to the operational and technical capacity of each ship's type to contribute to the overall emission reduction objectives. After the adjustment, the total reduction in emissions should be at least equal to what it would have been if each category of ship had reduced its emissions by transport work by 40% in 2030 compared to 2008.

15 Targets for individual ships are set as a Nominal Required Carbon Intensity Reduction Factor (Xnr) in relation to a ship type specific Carbon Intensity Indicator (CII) reference point for 2008, as proposed in Table 22B.2 below.

Table 22B.2: Proposal for annual Nominal Required Carbon Intensity Reduction factors (Xnr) for individual ships (in %) for the CII relative to CIIref

Year / Ship type	2008	2023	2024	2025	2026	2027	2028	2029	2030
Nominal Reduction factor (Xnr)	0%	[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Bulk carrier		[27%]	[29%]	[31%]	[32%]	[34%]	[37%]	[39%]	[41%]
Gas carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Tanker		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Containership		[27%]	[29%]	[32%]	[35%]	[38%]	[41%]	[43%]	[45%]
General Cargo ships		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Refrigerated cargo carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Combination carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
LNG carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]

Ro-ro cargo ship (vehicle carrier)		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Ro-ro cargo ship		[13%]	[14%]	[15%]	[16%]	[17%]	[18%]	[19%]	[20%]
Ro-ro passenger ship		[13%]	[14%]	[15%]	[16%]	[17%]	[18%]	[19%]	[20%]
Cruise passenger ship having non-conventional propulsion		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]

16 Each ship type will have its own CII reference line for 2008. In this way, correction factors are introduced to set the 2008 reference line as close as possible to actual 2008 carbon intensity (see also Figure 1 below), and to account for specificities of some ship types.

17 The CII reference line for 2008 is defined as:

$$CIIref = a \times K1 \times K2 \times capacity^{-c}$$

Where :

$K1$ is the correction factor applied to move the reference line from 2013 to 2008 which is the reference year. K1 will be defined in the Guidelines to be developed by the Organization.

$K2$ is the correction factor, which accounts for the specificities of some ship types as defined in the Guidelines to be developed by the Organization.

Parameters *a* and *c* are defined in Table 2 of regulation 21 of MARPOL Annex VI.

The co-sponsors suggest that *capacity* is the one used for the EEDI (Table 1 of regulation 21 of MARPOL Annex VI) (see Table 22B.1 in annex 1 of this document).

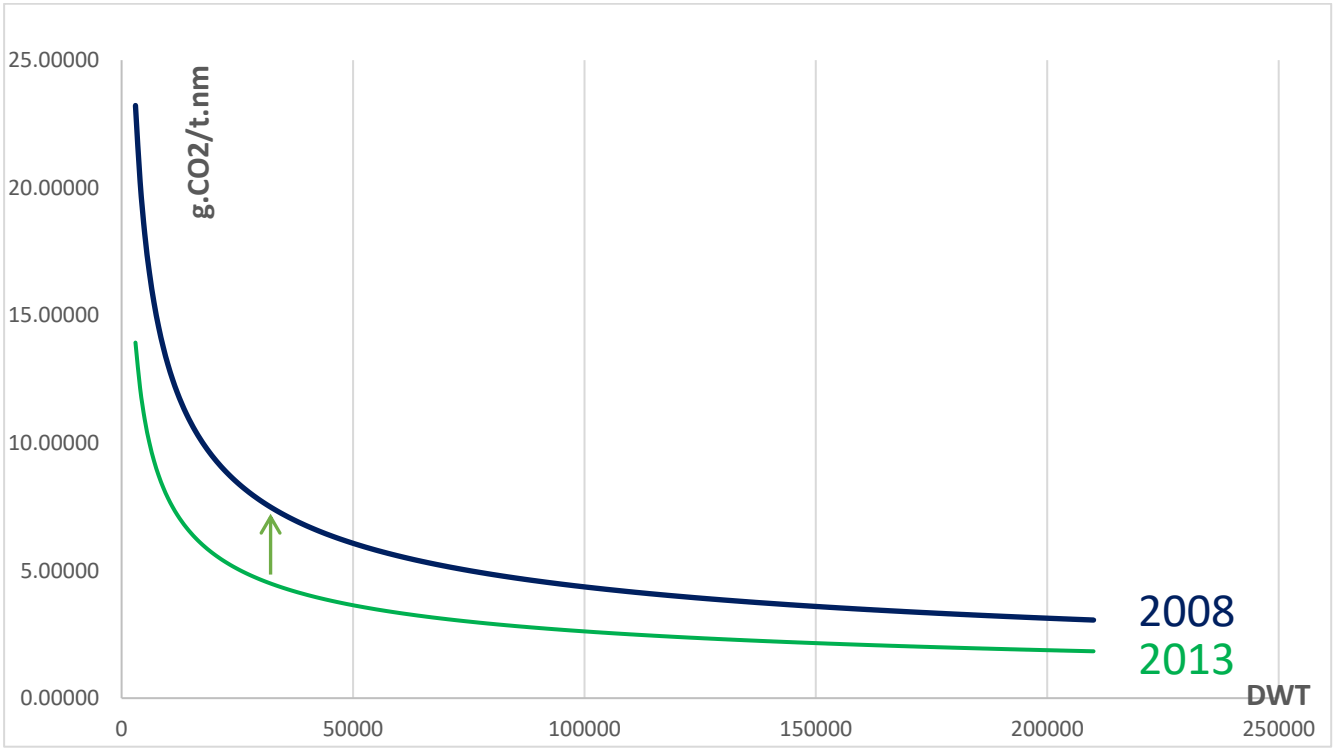

Figure 1: Corrected 2008 CII reference line from 2013 EEDI reference line based on data from the Fourth IMO GHG Study

18 From the CII reference line of its type, each ship, depending on its size, can calculate its 2008 reference point.

19 The ship annual nominal required CII from 2023 to 2030 (Req CII) will be calculated from the 2008 reference point using the annual nominal required carbon intensity reduction factor (Xnr) defined in Table 1 above.

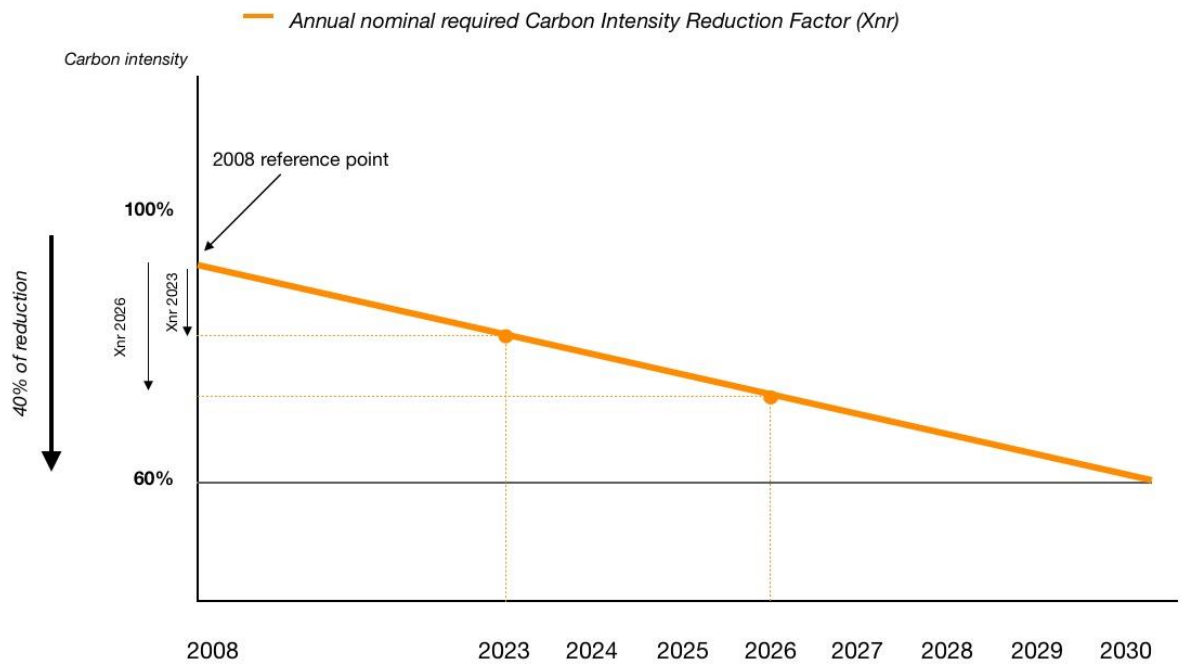

Figure 2: Annual Nominal Required Carbon Intensity Reduction factor (Xnr) for individual ships (in %) for a given ship

Effective required CII and reduction factors

20 During the year of entry into force of the regulation (year y), the ship's attained reduction factor (Xatt) (year y) will be calculated and compared to the nominal required reduction factor of the same year Xnr (year y).

21 This means that ships will have different starting points in 2023 based on the ship's attained reduction factor (Xatt) in 2023. This is illustrated in three cases below.

22 **Case 1** (see Figure 3 below): if the ship's attained reduction factor (Xatt) in the first year (year y) is equal to the nominal required reduction factor Xnr (year y), then the ship's required reduction factors of the following years (Xr y+1, Xr y+2, Xr y+3 …) are the same as the nominal ones (Xnr y+1, Xnr y+2, Xnr y+3 …).

23 **Case 2** (see Figure 4 below): if the ship's attained reduction factor (Xatt) in the first year (year y) is superior to the nominal required reduction factor Xnr (year y), then the ship's required reduction factors of the following years (Xr y+1, Xr y+2, Xr y+3 …) are the same as the nominal ones (Xnr y+1, Xnr y+2, Xnr y+3 …).

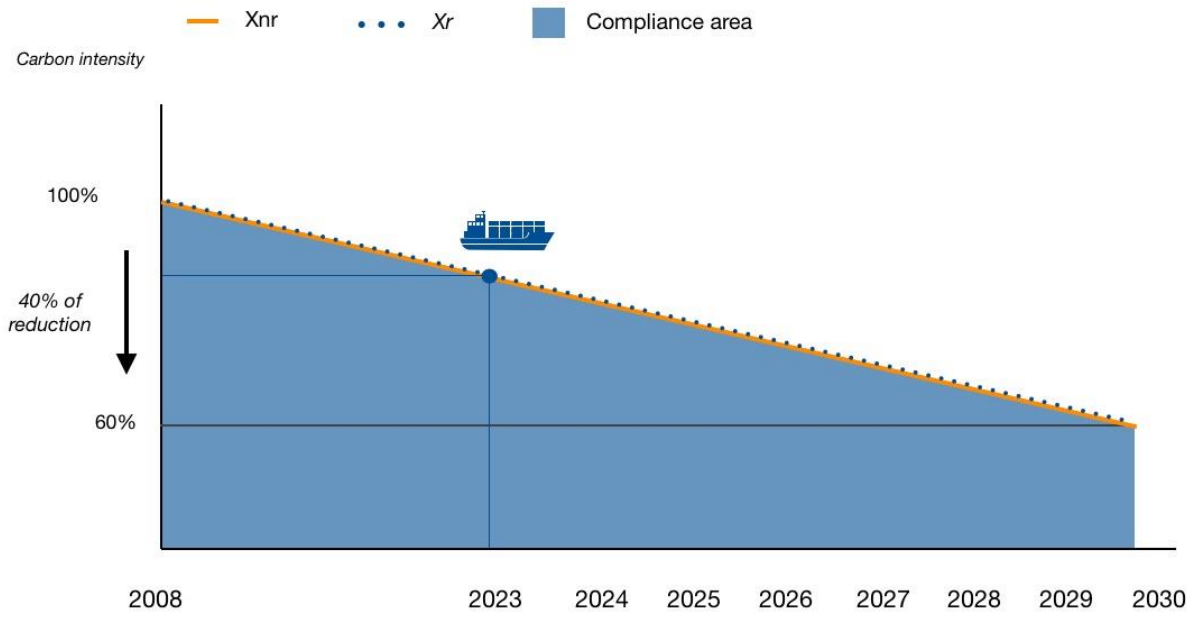

Figure 3 : Illustration of case 1

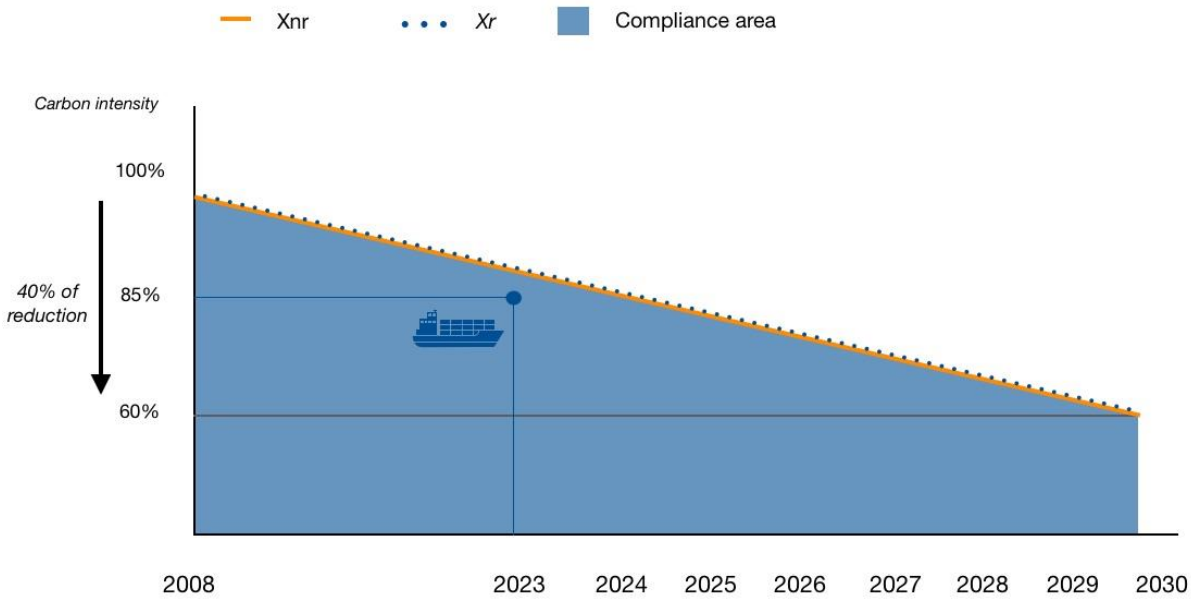

Figure 4: Illustration of case 2

24 **Case 3** (see Figure 5 below): if the ship's attained reduction factor (Xatt) (year y) is inferior to the nominal required reduction factor Xnr (year y), then the ship's required reduction factors of the following years (Xry+1, Xry+2, Xry+3 …) must be calculated on a straight-line basis between its value in year y and nominal required reduction factor value five years after Xnr (year y+5). After five years, the ship required reduction factors of the following years (Xry+5, Xry+6, Xry+7 …) are the same as the nominal ones (Xnry+5, Xnry+6, Xnry+7 …). Thus, in this case, the ship will have an individual objective during five years in order to have enough time to converge.

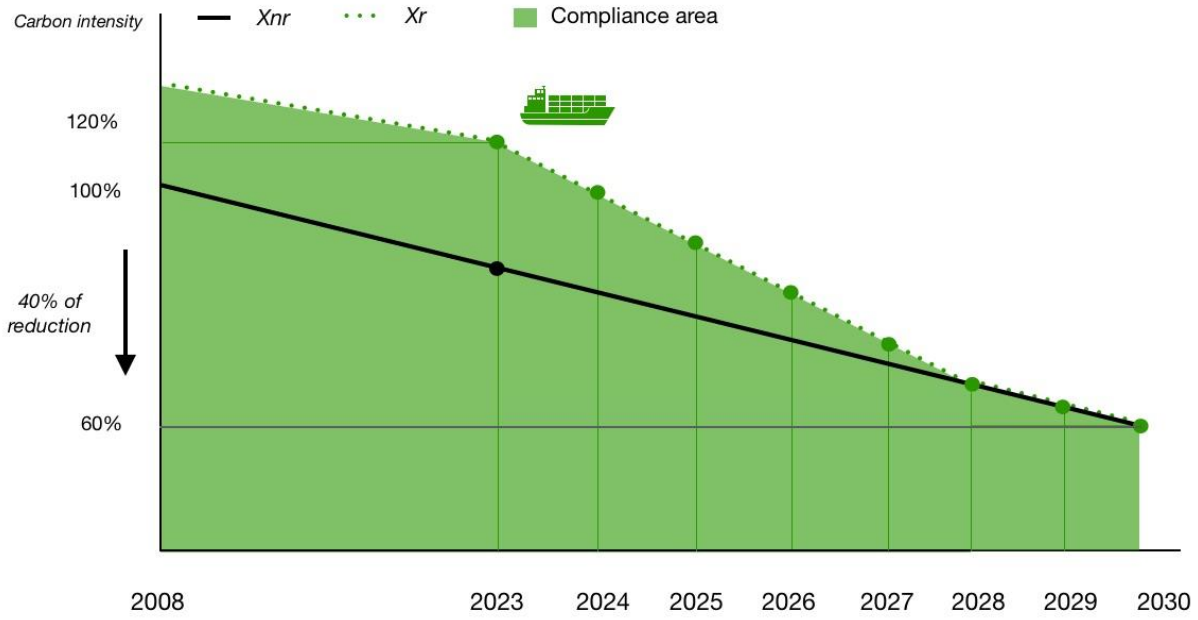

Figure 5: Illustration of case 3

Rating system

25 An operational carbon intensity rating of A, B, C, D or E shall be assigned to each ship based on the attained CII relative to the nominal required annual CII, indicating a major superior (A), minor superior (B), moderate (C), minor inferior (D), or inferior (E) performance level.

26 Member States and relevant actors are encouraged to set up incentive schemes in favour of A and B rated ships.

27 The rating is specified in table 22B.3 below, and corresponding annual CIIs are displayed in Table 2 and Figure 6 below.

Table 22B.3: Operational carbon intensity rating

Rating	Percent compared to the nominal Required CII
Inferior (E)	> [125%]
Minor inferior (D)	> [105%]
Moderate (C)	> [95%]
Minor superior (B)	≤ [95%]
Major superior (A)	≤ [85%]

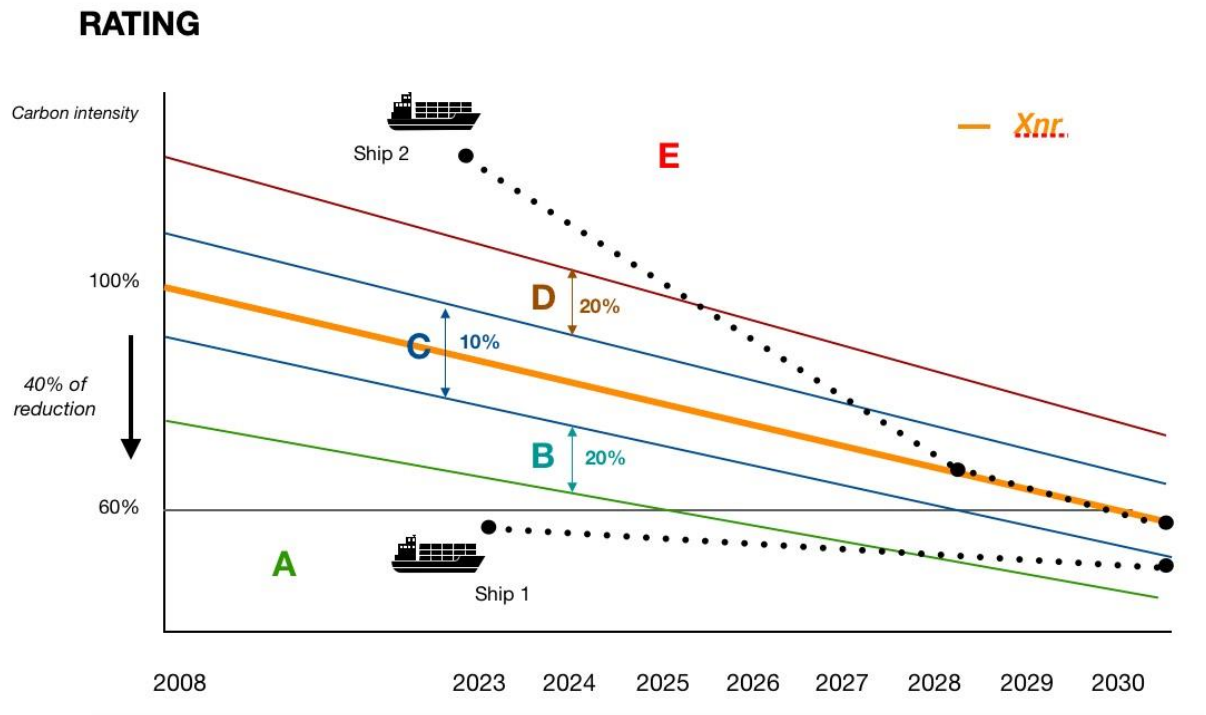

Figure 6: Illustration of rating areas for a specific ship type and size

Compliance

28 The SEEMP shall recall the ship's attained CII (Att CII), the ship's attained reduction factor (Xatt), the ship's annual required CII (Req CII) and the ship's annual required carbon intensity reduction factors (Xr). The SEEMP shall also explain how the ship will attain them and how it will monitor and register the data.

29 For each calendar year:

.1 if the ship's Xatt is the same or above the Xr, it is in compliance;

.2 if the ship's Xatt is not more than 5 percentage points below the Xr, it is a non-conformity. As such, the ship must develop an action plan to verifiably illustrate how it intends to comply on the following years. The ship will also be given an additional reduction factor (Xadd), which will be transferred to the following year;

.3 if, in the following year, the ship's Xatt is below the Xr + Xadd, it is not in compliance with a major non-conformity;

.4 if the ship's Xatt is more than 5 percentage points below the Xr, it is not in compliance with a major non-conformity; and

.5 if the ship is not in compliance with a major non-conformity, its IEEC 22B will cease to be valid. The IEEC 22B is further explained in the section on enforcement below.

30 Three examples of ship's CII compliance and non-compliance are illustrated below.

.1 **Ship 1** illustrates a ship in compliance throughout five years.

Table 1: Example of ship 1

	Year	2023	2024	2025	2026	2027
	Xr	*[26%]*	*[28%]*	*[30%]*	*[32%]*	*[34%]*
Ship 1	Xatt	26%	29%	33%	32%	35%
	Xadd	NA	NA	NA	NA	NA
	Compliance	Yes	Yes	Yes	Yes	Yes

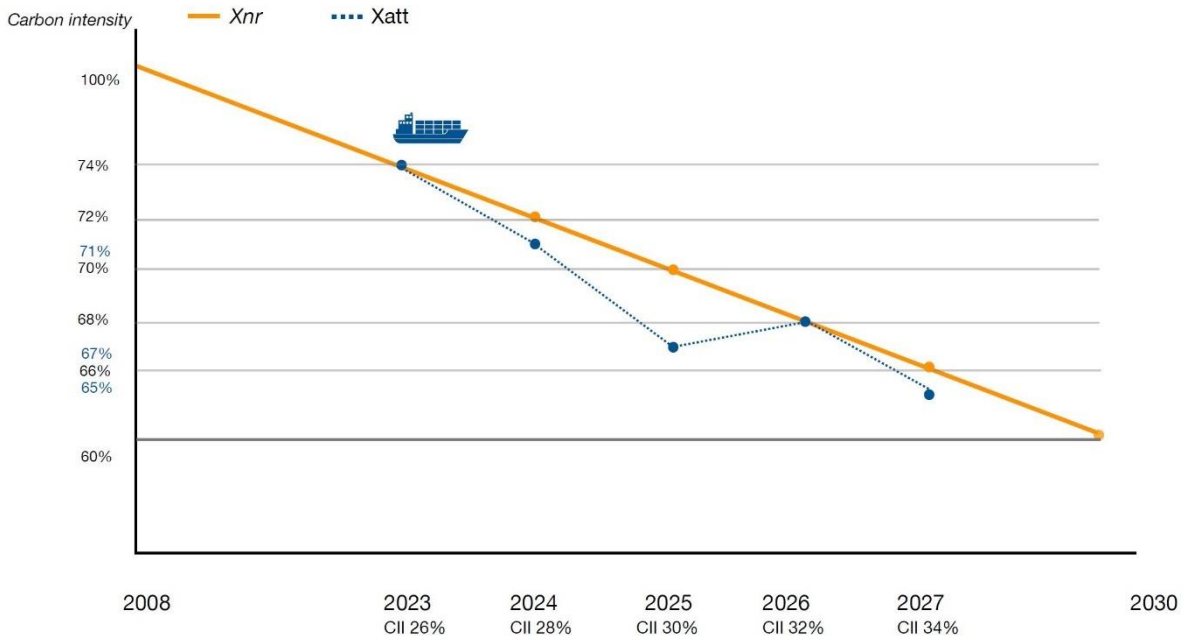

Figure 7: Illustration of ship 1

.2 **Ship 2** illustrates a ship in compliance throughout five years, but with non-conformity in 2024, and with an additional Xadd of 2% added to its 2025 required carbon intensity reduction factor (Xr). Therefore, in 2025, the ship has to perform 30% CII reduction + 2%. As it reaches 32% it recovers conformity in 2025.

Table 2: Example of ship 2

	Year	2023	2024	2025	2026	2027
	Xr	*[26%]*	*[28%]*	*[30%]*	*[32%]*	*[34%]*
Ship 2	Xatt	26%	26%	32%	32%	35%
	Xadd	NA	NA	2%	NA	NA
	Compliance	Yes	Non-conformity	Yes	Yes	Yes

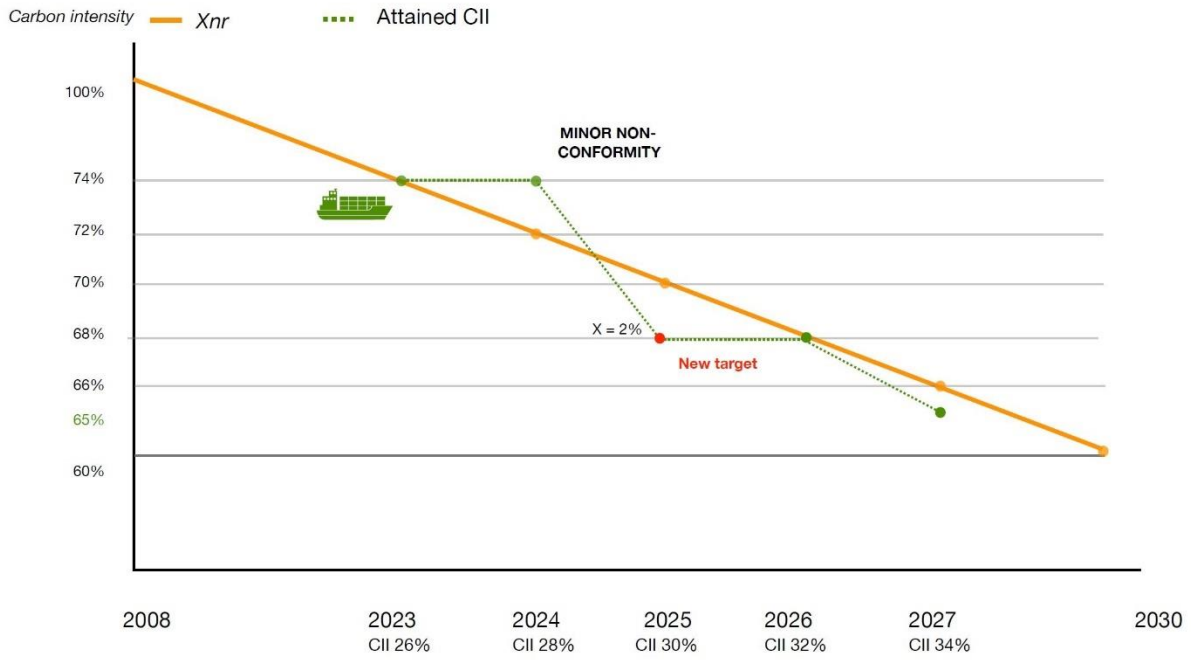

Figure 8: Illustration of ship 2

.3 **Ship 3** illustrates a ship with non-conformity in 2024, and with an additional Xadd of 2% added to its 2025 required carbon intensity reduction factor (Xr). Therefore, in 2025 the ship has to perform 30% CII reduction + 2%. As it attains only 31%, it is a major non-conformity in 2025 and the IEEC ceases to be valid.

Table 3: Example of ship 3

	Year	**2023**	**2024**	**2025**	**2026**	**2027**
	Xr	*[26%]*	*[28%]*	*[30%]*	*[32%]*	*[34%]*
Ship 3	Xatt	26%	26%	31%		
	Xadd	NA	NA	2%		
	Compliance	Yes	Non-conformity	Major non conformity		

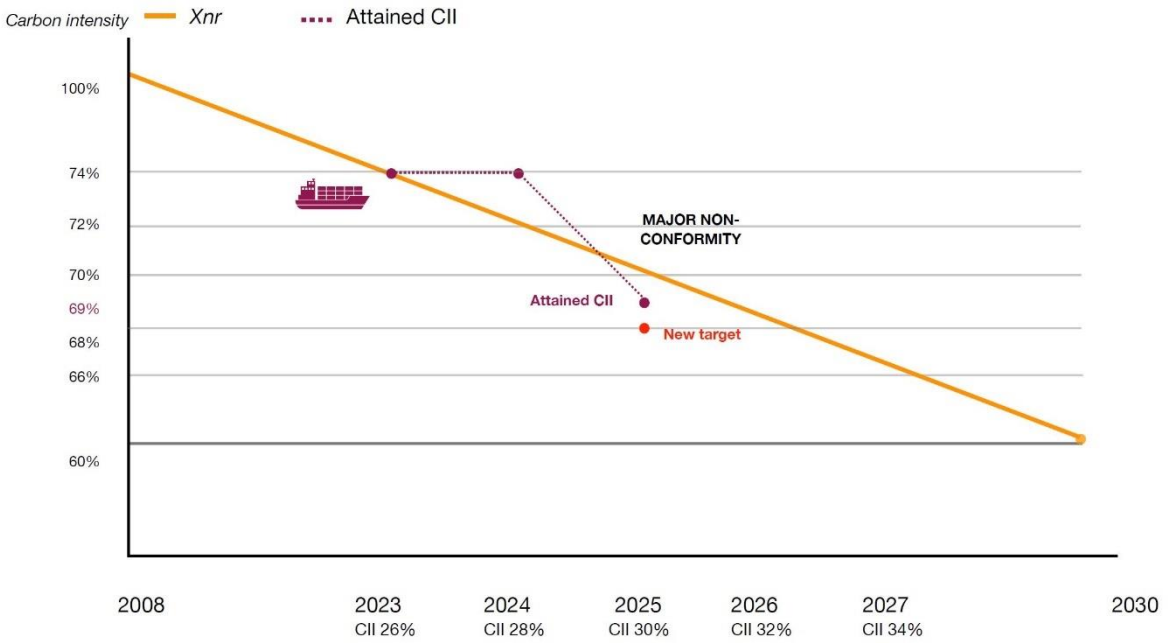

Figure 9: Illustration of ship 3

Implementation

31 The co-sponsors propose to have objectives per calendar year and therefore harmonized for the world fleet. Nevertheless, in order to have a distribution of audit dates for existing ships, the co-sponsors propose that the annual audit reference date should be the same as the anniversary date of the IAPP certificate. This system has the advantage:

.1 to distribute the audits/visits over a whole year and thus reduce the administrative impact on the Administrations and organizations duly authorized;

.2 to harmonize audits with other statutory visits; and

.3 to have annual audits allowing evaluations over an entire calendar year.

32 Consequently, the implementation of this system would be phased-in over three years:

.1 Year 2022 - SEEMP review / initial audit / issuance of the new IEEC;
.2 Year 2023 - first carbon intensity reduction target period; and
.3 Year 2024 - Audit of 2023 targets achieved.

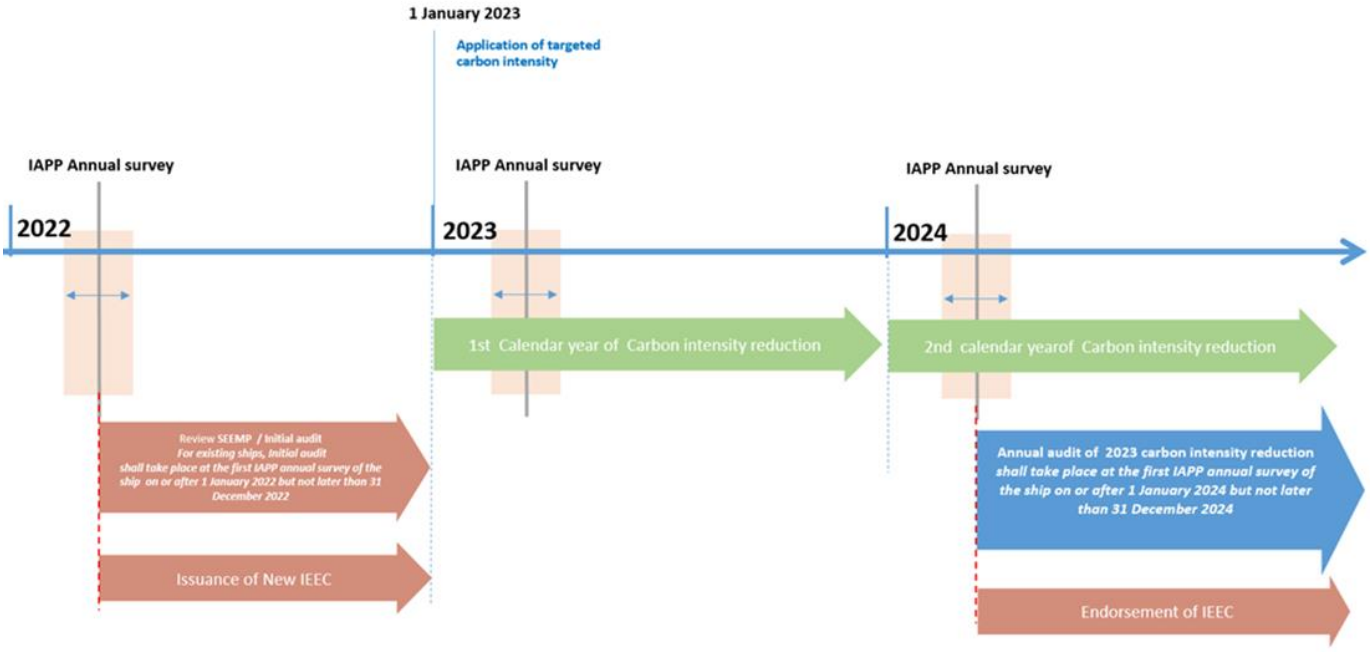

Figure 10: Implementation timeline

33 At any time, if a ship becomes aware that it has not met its annual required CII, it should submit an action plan for validation by the Administration or any organization duly authorized by it before the next scheduled audit.

34 The Administration may, in cooperation with other Administrations as appropriate, issue an exemption for a ship on which innovative technology experiments to reduce its carbon intensity in application of regulation 22B are carried out. Such experimentation shall not exceed 12 months. A ship may benefit from only one innovative technology experiment in a period of five years, provided that innovative technology has not been subject to similar experimentation on a ship of the same type.

Enforcement by flag States

35 Enforcement is based on amendments to MARPOL Annex VI and the inclusion of a new regulation 22B on CI reduction (as proposed in annex 1 to this document) and associated non-mandatory Guidelines (see also annex 2 to this document).

36 Enforcement involves verification audits (initial, annual, renewal and additional), directed by compliance with mandatory CI reduction goals.

37 Enforcement would certify compliance using the IEEC 22B. The IEEC 22B would cease to be valid in specified circumstances, including but not limited to a failure to achieve mandatory cumulative CI reductions during the period of validity of the IEEC 22B.

Port State control

38 The role of port State control must be precise and not open to interpretation. The modalities of its control are as follows:

.1 verification of the presence of the valid IEEC 22B;

.2 verification of the presence of the SEEMP and records on board;

.3 verification, on a spot-check basis, that the crew is aware of the SEEMP and its practical implementation;

.4 verification of the presence of an action plan agreed by the flag State Administration, when the IEEC 22B indicates that a required annual CI reduction has not been achieved;

.5 verification, when relevant, on a spot-check basis, that the crew is aware of the action plan and its practical implementation; and

.6 possible control of the adequacy between the target for year y-1, the records and the attained objectives.

Monitoring

39 Each ship must have a means, as defined in the Guidelines to be developed by the Organization, of calculating its CII. Ships subject to regulation 22A may use the data available in this framework. Records must be available on board to the port State authorities upon request.

40 The ship's attained CII (Att CII) and attained reduction factor (Xatt) shall be verified, based on the monitored data, either by the Administration or by any organization duly authorized by it.

Impact assessment

41 The co-sponsors invite the Working Group to refer to document ISWG 7/2/20 (Denmark et al.) for a comprehensive impact assessment of the mandatory operational goal-based short-term measure.

Work plan

Table 6: Time frame of development and implementation of the goal-based short-term measure and associated work

Time frame	Goal-based short-term measure	Associated work
Spring 2020	ISWG-GHG 7 puts forward draft amendment MEPC 75 approves amendment	Assessment of impacts on States Development of Guidelines
Autumn 2020	MEPC 76 adopts amendment	Development of Guidelines
Spring 2021		
Autumn 2021	Acceptance	Finalization of Guidelines MEPC 78 approves Guidelines
1 January 2022		Beginning of the process of survey and certification
Mid-2022	Entry into force	
1 January 2023		Enforcement

Review

42 As soon as possible and no later than three years after the date of entry into force, taking into account the Revised Strategy and possible new and better knowledge and data, e.g. related to assessing impacts on States, the Organization shall review, inter alia, the following items and, if proven necessary, amend the regulation accordingly:

.1 the status of the attained CIIs and reduction factors of all ships compared to the required CIIs and reduction factors;

.2 the accuracy of the definitions of CII and CII reference lines and correction factors;

.3 how to include ships not covered by this regulation; and

.4 the rating system.

Action requested of the Working Group

43 The Group is invited to include this document in its further consideration of the mandatory operational goal-based short-term measure and take action as appropriate.

***

ANNEX 1

DRAFT AMENDEMENTS TO MARPOL ANNEX VI
Regulations for the Prevention of Air Pollution from Ships

CHANGES are shown as additions ~~deletions~~
All other provisions of the Annex that are not reproduced here are not amended.

CHAPTER I
GENERAL

Regulation 1
Application

The provisions of this Annex shall apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 16, 18, 19, 20, 21, 22, ~~and~~ 22A and 22B of this Annex.

Regulation 2
Definitions

36 "*Attained EEDI*" is the EEDI value achieved by an individual ship in accordance with regulation 20 of chapter 4.

36bis Annual Attained carbon intensity indicator (Att CII) is the carbon intensity value achieved by an individual ship in accordance with regulation 22B of this Annex.

37 "*Required EEDI*" is the maximum value of attained EEDI that is allowed by regulation 21 of chapter 4 for the specific ship type and size.

37bis Nominal required carbon intensity indicator (Req CII) is the carbon intensity value required for an individual ship in accordance with regulation 22B of this Annex.

37ter Nominal required carbon intensity reduction factor (Xnr) is specified in table 22B2.

37quater Annual required carbon intensity reduction factor (Xr) is the actual Required carbon intensity reduction factor for a single ship as defined in regulation 22B.5 of the present Annex.

38 *LNG carrier* in relation to chapter 4 of this Annex means a cargo ship constructed or adapted and used for the carriage in bulk of liquefied natural gas (LNG).

Regulation 3
Exceptions and Exemptions

Trials for Ship Emission Reduction and Control Technology Research

2 The Administration of a Party may, in cooperation with other Administrations as appropriate, issue an exemption from specific provisions of this Annex for a ship to conduct trials for the development of ship emission reduction and control technologies and engine design programmes. Such an exemption shall only be provided if the applications of specific provisions of the Annex or the revised NOx Technical Code 2008 could impede research into the development of such technologies or programmes. A permit for such an exemption shall

only be provided to the minimum number of ships necessary and be subject to the following provisions:

.1 for marine diesel engines with a per cylinder displacement up to 30 litres, the duration of the sea trial shall not exceed 18 months. If additional time is required, a permitting Administration or Administrations may permit a renewal for one additional 18month period; or

.2 for marine diesel engines with a per cylinder displacement at or above 30 litres, the duration of the ship trial shall not exceed 5 years and shall require a progress review by the permitting Administration or Administrations at each intermediate survey. A permit may be withdrawn based on this review if the testing has not adhered to the conditions of the permit or if it is determined that the technology or programme is not likely to produce effective results in the reduction and control of ship emissions. If the reviewing Administration or Administrations determine that additional time is required to conduct a test of a particular technology or programme, a permit may be renewed for an additional time period not to exceed five years.

.3 for a ship on which innovative technology experiments to reduce its carbon intensity in application of regulation 22B is carried out. Such experimentation shall not exceed 12 months. A ship may benefit from only one innovative technology experiment in a period of five years, provided that innovative technology has not been subject to similar experimentation on a ship of the same type.

A permit issued under this regulation shall not exempt a ship from the reporting requirement under regulation 22A and 22B and shall not alter the type and scope of data required to be reported under regulation 22A and 22B.

CHAPTER II
SURVEY, CERTIFICATION AND MEANS OF CONTROL

Regulation 5
Surveys

4 Ships to which chapter 4 applies shall also be subject to the surveys specified below, taking into account 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 is in accordance with the requirements in chapter 4, and that the SEEMP required by regulation 22 is on board;

.2 A general or partial survey, according to the circumstances, after a major conversion of a new ship to which this regulation applies. The survey shall ensure that the attained EEDI is recalculated as necessary and meets the requirement of regulation 21, with the reduction factor applicable to the ship type and size of the converted ship in the phase corresponding to the date of contract or keel laying or delivery determined for the original ship in accordance with regulation 2.23;

.3 In cases where the major conversion of a new or existing ship is so extensive that the ship is regarded by the Administration as a newly constructed ship,

the Administration shall determine the necessity of an initial survey on attained EEDI. Such a survey, if determined necessary, shall ensure that the attained EEDI is calculated and meets the requirement of regulation 21, with the reduction factor applicable corresponding to the ship type and size of the converted ship at the date of the contract of the conversion, or in the absence of a contract, the commencement date of the conversion. The survey shall also verify that the SEEMP required by regulation 22 is on board and for a ship to which regulation 22A applies, has been revised appropriately to reflect a major conversion in those cases where the major conversion affects data collection methodology and/or reporting processes.

.4 For existing ships, the verification of the requirement to have a SEEMP on board according to regulation 22 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

.5 The Administration shall ensure that for each ship to which regulation 22A applies, the SEEMP complies with regulation 22.2 of this Annex. This shall be done prior to collecting data under regulation 22A of this Annex in order to ensure the methodology and processes are in place prior to the beginning of the ship's first reporting period. Confirmation of compliance shall be provided to and retained on board the ship.

.6 In addition, ships subject to the application of regulation 22B shall be subject to verification audits specified below, taking into account Guidelines adopted by the Organization:

1. For existing ships at the [1st January 2022], an initial verification audit of the SEEMP shall take place at the anniversary date of the IAPP Certificate as determined under Rule 6 and no later than the [31 December 2022]. Such initial verification audit shall result in the issue of a new IEEC 22B; and

2. For new ships contracted for delivery on or after [1st January 2022], an initial verification audit of the SEEMP shall take place before the ships are put into service and before the IEEC 22B is issued;

3. A renewal verification audit of the SEEMP shall take place at intervals specified by the Administration, but not exceeding five years. The purpose of the renewal verification audit is to assess the conformity with the annual objectives for a five-year period; and

4. An annual verification audit of the SEEMP within three months after and before each anniversary date of the IEEC 22B. The annual verification audit shall be such as to ensure that the Annual Attained reduction factor (Xatt), complies with regulation 22B of this Annex. Such annual verification audits shall be endorsed on the IEEC issued under regulation 6 or 7 of this Annex; and

5. For existing ships, an annual verification audit of the SEEMP on board according to regulation 22B of this Annex shall take place at the first annual audit identified in paragraph 1 of this regulation, on or after 1 January 2024.

6. Additional verification audits shall be carried out whenever the Administration determines that this may be necessary to monitor compliance with the requirements of regulation 22B of this Annex.

Regulation 9
Duration and Validity of Certificates and Statements of Compliance ~~related to fuel oil consumption reporting~~

International Energy Efficiency Certificate

10 For ships not subject to regulation 22B, the International Energy Efficiency Certificate shall be valid throughout the life of the ship subject to the provisions of paragraph 11 below.

11 For ships not subject to regulation 22B, an International Energy Efficiency Certificate issued under this Annex shall cease to be valid in any of the following cases:

.1 if the ship is withdrawn from service or if a new certificate is issued following major conversion of the ship; or

.2 upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of chapter 4. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificate carried by the ship before the transfer and, if available, copies of the relevant audit reports.

12 The Statement of Compliance pursuant to regulation 6.6 of this Annex shall be valid for the calendar year in which it is issued and for the first five months of the following calendar year. The Statement of Compliance pursuant to regulation 6.7 of this Annex shall be valid for the calendar year in which it is issued, for the following calendar year, and for the first five months of the subsequent calendar year. All Statements of Compliance shall be kept on board for at least the period of their validity.

International Energy Efficiency Certificate 22B

13 For ships subject to regulation 22B, an International Energy Efficiency Certificate (IEEC 22B) shall be issued for a period specified by the Administration, which shall not exceed five years, provided that the ship is, in all respects, capable of complying with the present regulation

14 Notwithstanding the requirements of paragraph 13 of this regulation:

.1 When the renewal verification audit is completed within three months before the expiry date of the existing IEEC 22B, the new IEEC 22B shall be valid from the date of completion of the renewal verification audit to a date not exceeding five years from the date of expiry of the existing IEEC 22B;

.2 When the renewal verification audit is completed after the expiry date of the existing IEEC 22B, the new IEEC 22B shall be valid from the date of completion of the renewal verification audit to a date not exceeding five years from the date of expiry of the existing IEEC 22B; and

.3 When the renewal verification audit is completed more than three months before the expiry date of the existing IEEC 22B, the new IEEC 22B shall be valid from the date of completion of the renewal verification audit to a date not exceeding five years from the date of completion of the renewal verification audit.

15 If an IEEC 22B is issued for a period of less than five years, the Administration may extend the validity of the certificate beyond the expiry date to the maximum period specified in paragraph 13 of this regulation, provided that the audits referred to in regulations 5.4.6 of this Annex are applicable when an IEEC 22B is issued for a period of five years are carried out as appropriate.

16 If a renewal verification audit has been completed and a new IEEC 22B cannot be issued or placed on board the ship before the expiry date of the existing IEEC 22B, the person or organization duly authorized by the Administration may endorse the existing IEEC 22B and such a IEEC 22B shall be accepted as valid for a further period which shall not exceed five months from the expiry date.

17 If a ship, at the time when a IEEC 22B expires, is not in a port in which it is to be audited, the Administration may extend the period of validity of the IEEC 22B, but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be audited, and then only in cases where it appears proper and reasonable to do so. No IEEC 22B shall be extended for a period longer than three months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to be audited, be entitled by virtue of such extension to leave that port without having a new IEEC 22B. When the renewal verification audit is completed, the new IEEC 22B shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.

18 An IEEC 22B issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this regulation may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal verification audit is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.

19 An IEEC 22B issued under this Annex shall cease to be valid in any of the following cases:

.1 If the relevant verification audits are not completed within the periods specified under regulation 5.4.6 of this Annex;

.2 If the certificate is not endorsed in accordance with regulation 5.4.6.4 of this Annex;

.3 If the action plan provided by the regulation 22B.15 is not present on board;

.4 Upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of regulation 5.4 of this Annex. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible,

transmit to the Administration copies of the certificate carried by the ship before the transfer and, if available, copies of the relevant audit reports.

20 When an IEEC ceases to be valid for the reasons described in paragraph 19 of the present regulation, the Administration shall be satisfied that a ship to which a new IEEC 22B is issued is, in all respects, capable of complying with the present regulation.

Statement of Compliance – Fuel Oil Consumption Reporting

~~12~~ 21 The Statement of Compliance pursuant to regulation 6.6 of this Annex shall be valid for the calendar year in which it is issued and for the first five months of the following calendar year. The Statement of Compliance pursuant to regulation 6.7 of this Annex shall be valid for the calendar year in which it is issued, for the following calendar year, and for the first five months of the subsequent calendar year. All Statements of Compliance shall be kept on board for at least the period of their validity.

Regulation 10
Port State Control on Operational Requirements

1 A ship, when in a port or an offshore terminal under the jurisdiction of another Party, is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of air pollution and greenhouse gases emissions from ships.

2 In the circumstances given in paragraph 1 of this regulation, the Party shall take such steps as to ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this Annex.

3 Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.

4 Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

5 In relation to chapter 4, any port State inspection shall be limited to verifying, when appropriate, that there is a valid Statement of Compliance related to fuel oil consumption reporting, and International Energy Efficiency Certificate and Ship Energy Efficiency Management Plan on board, in accordance with article 5 of the Convention.

6 Notwithstanding the requirements in paragraph 5, any port State inspection shall verify, when appropriate, the duly implementation of the action plan defined in regulation 22B.15 of this Annex. It may verify, for the previous calendar year, the adequacy between the ship required carbon intensity reduction factor and the attained carbon intensity reduction factor as defined in regulation 22B.5.

7 Each ship must have a means, as defined in the Guidelines to be developed by the Organization, of calculating its carbon intensity indicator as defined in regulation 22B. Ships subject to regulation 22A may use the data available in this framework. Records must be available on board to the Port State Authorities upon request.

Regulation 19
Application

3 Regulations 20 and 21 of this Annex shall not apply to ships which have nonconventional propulsion, except that regulations 20 and 21 shall apply to cruise passenger ships having nonconventional propulsion and LNG carriers having conventional or nonconventional propulsion, delivered on or after 1 September 2019, as defined in paragraph 43 of regulation 2. Regulations 20 and 21 shall not apply to cargo ships having icebreaking capability.

3bis Regulation 22B of this Annex shall apply to all ships of 400 gross tonnage whose categories are defined in regulations 2.25 to 2.31, 2.33 to 2.35 and 2.38 to 2.39.

4 Notwithstanding the provisions of paragraph 1 of this regulation, the Administration may waive the requirement for a ship of 400 gross tonnage and above from complying with regulation 20 and regulation 21.

Regulation 22
Ship Energy Efficiency Management Plan (SEEMP)

1 Each ship shall keep on board a ship specific Ship Energy Efficiency Management Plan (SEEMP reg 22). This may form part of the ship's Safety Management System (SMS). The SEEMP shall be developed taking into account Guidelines adopted by the Organization.

2 On or before 31 December 2018, in the case of a ship of 5,000 gross tonnage and above, the 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.*~~

3 On or before [1st January 2023], all ships of 400 gross tonnage and above whose categories are defined in regulations 2.25 to 2.31, 2.33 to 2.35 and 2.38 to 2.39 shall keep on board a ship specific Ship Energy Efficiency Management Plan related to regulation 22B (SEEMP reg 22B); It describes the technical, operational, recording and management means to enable the ship to comply with the provisions of Regulation 22B.

Regulation 22A
Collection and reporting of ship fuel oil consumption data

7 The data shall be verified according to procedures established by the Administration, taking into account Guidelines to be developed by the Organization.

8 ~~Except as provided for in paragraphs 4, 5 and 6 of this regulation,~~ The disaggregated data that underlies the reported data noted in appendix IX to this Annex for the previous calendar year shall be readily accessible for a period of not less than 12 months from the end of that calendar year and be made available to the Administration as well as to the Port State Authorities upon request.

9 The Administration shall ensure that the reported data noted in appendix IX to this Annex by its registered ships of 5,000 gross tonnage and above are transferred to the IMO Ship Fuel Oil Consumption Database via electronic communication and using a standardized format to be developed by the Organization not later than one month after issuing the Statements of Compliance of these ships.

Regulation 22B

Carbon intensity of international shipping

Carbon intensity indicator

1 The carbon intensity indicator (CII) is defined as follows: CII= $\frac{CO2emissions}{Capacity\ X\ distance}$.

The ship's CO_2 emissions are the sum of the emissions of each source on board. The Consumption/Emission conversion factor and capacity are those determined by regulation 20. Distance is the distance recorded by a receiver for a global navigation satellite system as required by Regulation 19, Chapter V of the SOLAS Convention. The CII is calculated over a 12-month period from 1 January to 31 December of the relevant year.

2 The attained CII shall be calculated for each ship within the scope of this regulation.

Reference lines

3 The reference lines are defined as follows:

$$CIIref = a \times K1 \times K2 \times capacity^{-c}$$

with

$K1$ being the correction factor applied to move the reference line from 2013 to 2008 which is the reference year. K1 will be defined in the Guidelines to be developed by the Organization.

$K2$ being the correction factor, which accounts for the specificities of some ship types as defined in the Guidelines to be developed by the Organization.

The parameters *a* and *c* are defined by regulation 21, the parameter *Capacity* is defined as follows:

Table 22B.1: Capacity and correction factors

	Capacity	K1	K2
Bulk carrier	[DWT]		
Gas carrier	[DWT]		
Tanker	[DWT]		
Container ship	[70% DWT]		
General Cargo ships	[DWT]		
Refrigerated cargo carrier	[DWT]		
Combination carrier	[DWT]		
LNG carrier	[DWT]		

Ro-ro cargo ship (vehicle carrier)	[DWT]		
Ro-ro cargo ship	[DWT]		
Ro-ro passenger ship	[DWT]		
Cruise passenger ship having non-conventional propulsion	[GT]		

Required carbon intensity indicator

4 The nominal reduction value of the carbon intensity for a ship is defined as follows for each calender year:

Nominal Required carbon intensity indicator (Req CII) = (1-Xnr/100) x reference line value (CIIref), where Xnr is the reduction factor specified in table 22B2 for the required carbon intensity compared to the carbon intensity reference line.

Table 22B.2: Annual Nominal Required Reduction factor (Xnr) for individual ships (in %) for the CII relative to the CII_{ref})

YEAR	2008	2023	2024	2025	2026	2027	2028	2029	2030
Nominal Reduction factor (Xnr)	0%	[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Bulk carrier		[27%]	[29%]	[31%]	[32%]	[34%]	[37%]	[39%]	[41%]
Gas carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Tanker		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Container ship		[27%]	[29%]	[32%]	[35%]	[38%]	[41%]	[43%]	[45%]
General Cargo ships		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Refrigerated cargo carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Combination carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
LNG carrier		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Ro-ro cargo ship (vehicle carrier)		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]
Ro-ro cargo ship		[13%]	[14%]	[15%]	[16%]	[17%]	[18%]	[19%]	[20%]
Ro-ro passenger ship		[13%]	[14%]	[15%]	[16%]	[17%]	[18%]	[19%]	[20%]
Cruise passenger ship having non-conventional propulsion		[26%]	[28%]	[30%]	[32%]	[34%]	[36%]	[38%]	[40%]

5 At the time of the first issued IEEC 22B for a calandar year (year y) the ship's attained CII (ship att CII) is calculated:

.1 If a ship's attained reduction factor (Xatt) (year y) ≥ Xnr (year y), then the ship required reduction of the following years (Xr) is equal to the nominal reduction factor (Xnr) as specified in table 22B1.

.2 If ship's Xatt (year y) < Xnr (year y), then the ship has 5 years to reach the (Xnr) value of the year y+5 as specified in table 22B.2. In this case, the ship's required reduction factor (Xr) must be calculated by the Administration or any organization duly authorized by it on a straight-line basis between the value in year y and the value five years later (y+5). After five years, the ship required reduction of the following years (Xr) is equal to the nominal reduction factor (Xnr) as specified in table 22B.2.

Rating system

6 An operational carbon intensity rating of A, B, C, D or E shall be assigned to each ship based on the attained CII relative to the nominal required annual CII, indicating a major superior (A), minor superior (B), moderate (C), minor inferior (D), or inferior (E) performance level. The rating is specified in table 22B.3 below:

Table 22B.3. Operational Carbon Intensity Rating

Rating	Percent compared to the Nominal Required CII
Inferior (E)	> [125%]
Minor inferior (D)	> [105%]
Moderate (C)	> [95%]
Minor superior (B)	≤ [95%]
Major superior (A)	≤ [85%]

7 This rating is noted on the IEEC by the Administration or organization duly recognized by it.

Monitoring and recording of carbon intensity

8 Each ship must have a means, as defined in the Guidelines to be developed by the Organization, of calculating and recording its CII. Ships subject to regulation 22A may use the data available in this framework. Records must be available on board to the Flag and Port State Authorities upon request

9 Each ship's attained CII (ship att CII) shall be monitored for each calender year [after entry into force of this regulation] in accordance with the methodolody described in the SEEMP.

Compliance

10 At the time of the annual verification audit as defined in regulation 4.6.4 of this Annex, the Administration or any organization duly authorized by it shall verify, relying on the monitored data, the ship's attained CII and reduction factor according to the present regulation.

11 If the ship's attained reduction factor is equal or superior to the ship's required reduction factor (Xatt ≥ Xr), then the ship is in compliance and the IEEC is endorsed by the Administration or any organization duly authorized by it.

12 If the ship's attained reduction factor is inferior to more than 5% points of CII to the ship's required reduction factor (Xatt < Xr), then the IEEC ceases to be valid. If it is inferior of less than 5% of CII, the IEEC is extended for 3 months and the following procedure described in paragraphs 13 to 17 of this regulation applies:

Provisional compliance

13 A ship is allowed a maximum of 5% points of CII for non-compliance with the value of required annual reduction factor (Xr). However, the ship will have to compensate the following year for this shortfall by an additional carbon intensity reduction (Xadd). The (Xadd) reduction value is then added to the required reduction factor of the following year:

$$\underline{Xadd = \ Ship\ Xr\ (y-1) - Ship\ Xatt\ (y-1)}$$
$$\underline{Ship\ Xatt(y)\ must\ be\ equal\ to\ or\ higher\ than\ Ship\ Xr\ (y) + Xadd(y)}$$

14 The Administration or any organization duly authorized by it shall specify these values in the IEEC.

15 The shipowner shall, during this period, submit an action plan to the Administration to ensure that the ship achieves its objective for the following year as defined in paragraph 13 above and credibly illustrate how it intends to comply the following years to regulation 22B. The action plan shall be annexed to the SEEMP and be assesed and validated by the Administration or any organization duly authorized by it. At the end of this extended period the Administration may endorse the IEEC 22B .

16 If $Ship\ Xatt(y)\ is\ not\ equal\ to\ or\ higher\ than\ Ship\ Xr\ (y) + Xadd(y)$, the IEEC will cease to be valid.

17 At any time if a ship becomes aware that it has not met its annual required CII, it shall submit an action plan for validation by the Administration or any organization duly authorized by it before the next scheduled audit.

Review

18 As soon as possible and no later than three years after date of entry into force, taking into account the Revised IMO Strategy on reduction of GHG emissions from ships and possible new and better knowledge and data, e.g. related to assessing impacts on States, the Organization shall review the following, inter alia, and, if proven necessary amend the regulation accordingly:

.1 The status of the attained CIIs and reduction factor of all ships compared to the required CIIs and reduction factor;

.2 The accuracy of the definitions of CII and CII reference lines and correction factors;

.3 How to include ships not covered by this regulation;

.4 The rating system.

APPENDIX X

Form of International Energy Efficiency (IEE) Certificate 22B

[Same as appendix VIII]

THIS IS TO CERTIFY:

1. That the ship has been audited in accordance with regulation 5.4 of Annex VI of the Convention;

2. That the audit shows that the ship complies with the applicable requirements in regulation 20, regulation 21 and regulation 22;

3. That the SEEMP has been subject to verification audit in accordance with regulation 5.4 of Annex VI to the Convention; and

4. That the verification audit shows that the ship complies with the applicable requirements in regulation 22B.

[Same as appendix VIII]

Supplement to the International Energy Efficiency (IEE) Certificate 22B

[Same as appendix VIII]

5 Ship Energy Efficiency Management Plan (SEEMP)

5.1 The ship is provided with a Ship Energy Efficiency Management Plan (SEEMP) in compliance with regulation 22…..…..……..……...□

5.2 The ship is provided with a SEEMP in compliance with regulation 22B, taking into account Guidelines* developed by the Organization……..……□

1.3 The ship is exempted under regulation 3.2.3……..□
Effective date of the exemption: [date] Expiry date of the exemption: [date]

[Same as appendix VIII]

7 Carbon Intensity Indicator

7.1 The required annual carbon intensity reduction in accordance with regulation 22B.1, taking into account the Guidelines** developed by the Organization is:

	Required Carbon Intensity Index Reduction factor (Xr)	Additional carbon intensity reduction (Xadd).	Attained Carbon Intensity Indicator Att CII	Attained Carbon Intensity Reduction factor (Xatt)	Rating (A, B, C, D or E)	Extended Endorsement	Endorsement
[Year 1]							
[Year 2]							
[Year 3]							
[Year 4]							
[Year 5]							

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ANNEX 2

LIST OF GUIDELINES TO BE DEVELOPED BY THE ORGANIZATION

- Guidelines on calculation of CII reference line for 2008 (determination of K1 and K2 factors);
- Guidelines on the SEEMP development;
- Guidelines on the means of monitoring the data needed in calculating the carbon intensity indicator; and
- Guidelines on the rating system.