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ENERGY EFFICIENCY OF SHIPS

Proposal for the revised CII reference lines excluding ships' emissions at idle periods

Submitted by Brazil, Liberia, ICS, BIMCO and INTERCARGO

SUMMARY

Executive summary:	This document presents potential amendments to the Carbon Intensity Indicator (CII) framework, which aim to address the unfair increase of the attained CII due to idle emissions (such as emissions at port, at anchorage and during drydock) and incentivize the reduction of total generated GHG emissions. Determination of revised reference lines excluding idle emissions resolves the issue of the unfair CII ratings for ships with increased idle emissions and of potentially counterproductive CII improvement methods, and ensures a fair and harmonized implementation of the CII regulatory framework while incentivizing true overall GHG reduction.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 25
Related documents:	MEPC 78/7/16; MEPC 79/7/13, MEPC 79/7/15, MEPC 79/7/27; MEPC 80/6/3; MEPC 81/6/1; MEPC 82/INF.46; ISWG-GHG 12/2/3, ISWG-GHG 12/2/4, ISWG-GHG 12/2/5 and ISWG-GHG 12/2/6

Background

1 MEPC 78 adopted resolution MEPC.355(78) on the *2022 Interim Guidelines on correction factors and voyage adjustments for CII calculations (CII Guidelines, G5).* These Guidelines were a first attempt to refine the current framework and establish a fair and level playing field.

2 MEPC 80 endorsed the *Review plan of the short-term GHG reduction measure.* The Review plan is focused on three main sections: scope, timeline, and data sources. The evaluation of the short-term measure will contain, among others, further amendments to the correction factors and voyage adjustments. The proposed timeline is the following:

1. data gathering will be carried out from MEPC 80 to MEPC 82;

2. data analysis will be conducted by a working group at MEPC 82 and continued by a correspondence group; and

3. a review of the Convention and Guidelines will be conducted by an intersessional working group between MEPC 82 and MEPC 83 along with a working group at MEPC 83.

3 The Committee invited Member States and international organizations to collect data and submit proposals to relevant MEPC meetings along with other stakeholders such as shipowners, charterers, and port authorities. In this context, the co-sponsors have submitted proposals to improve the CII framework as stated in documents MEPC 78/7/16 (ICS and INTERTANKO), MEPC 79/7/13 (Bahamas et al.), MEPC 79/7/15 (Bahamas and ICS), MEPC 79/7/27 (ICS and INTERCARGO), MEPC 80/6/3 and ISWG-GHG 12/2/6 (Liberia), ISWG-GHG 12/2/3 and ISWG-GHG 12/2/4 (Malaysia et al.) and ISWG-GHG 12/2/5 (ICS and INTERCARGO).

Discussion

4 The co-sponsors support the use of ship-specific correction factors as part of the CII framework. Without the inclusion of correction factors in the interim CII Guidelines, G5, ships may be assigned a poor carbon intensity rating due to operational factors outside of the ship's control. To date, no additional correction factors have been incorporated into the CII Guidelines, G5. Should the incorporation of additional correction factors not be supported, it will be necessary to revise the reference lines to ensure a fair and technically sound rating system.

5 Document MEPC 81/6/1 (Secretariat) summarized the annual average carbon intensity and fuel consumption reported to the Committee for the years 2019 to 2022. As per the report, the average annual carbon intensity decreased by 4.1% between 2019 and 2022 while the total fuel consumption of 213 million tonnes was the same for both years.

6 In principle, idle emissions (such as emissions at port, emissions at anchorage, emissions during drydock, etc.) deteriorate the CII rating of a ship, since ships emit GHG emissions without conducting any transport work as defined in the CII framework. It is evident that the existing CII framework was structured to be a single and simple metric to cover all ships and operational modes. However, there are operational cases beyond the ship's control that prove that refinement of the CII framework is necessary.

7 The current framework may encourage operational practices leading to the improvement of the CII rating, despite the perverse consequence of increasing the total emissions. Such hypothetical cases are:

.1 instead of staying idly at anchorage waiting to load or discharge cargo, ships slow steam while remaining near the port. In this way, the travelled distance increases, which results in an improved CII rating as well as an increase in total emissions; and

.2 similarly, during periods when not under hire, ships, instead of staying idle, perform ballast voyages. In this way, the travelled distance increases, which results in an improved CII rating as well as an increase in total emissions.

8 Revising the CII reference lines would resolve the issue of unrepresentative CII ratings for ships with increased emissions during idle periods and would help to ensure a fair and harmonized implementation of the CII regulatory framework. In addition, ships are held accountable for emissions that are exclusively under their control and thus are incentivized to reduce them by improved efficiency measures. This document presents a potential path forward for the revision of the CII reference lines, including an analysis of the impact of omitting idle emissions.

9 This proposed framework aligns with the IMO goal to reduce the total annual GHG emissions and reach net zero by or around 2050 since:

.1 it would better align the CII ratings with actual under way operational efficiency since the emissions during idle time are not being considered;

.2 ships will not be incentivized to increase the distance travelled, and thus total emissions, in pursuit of improved CII ratings; and

.3 it recognizes the importance of addressing these idle emissions in the broader context of their environmental impact by promoting ports' infrastructure development (zero and low carbon fuels' availability and just-in-time arrival) as per paragraph 4.9.7 of the 2023 IMO GHG Strategy.

Analysis

10 An analysis was carried out using the American Bureau of Shipping (ABS) verified 2019 DCS data, for the ship types of tankers, bulk carriers, container ships, LNG carriers, general cargo ships and gas carriers.

Table 1: Data sample information

Ship type		Number of ships
Bulk carrier	279,000 DWT and above	14
	Less than 279,000 DWT	1,364
Tanker		1,045
Container ship		519
Gas carrier	65,000 DWT and above	6
	Less than 65,000 DWT	94
General cargo ship	20,000 DWT and above	89
	Less than 20,000 DWT	14
LNG carrier	100,000 DWT and above	9
	65,000 < DWT < 100,000 DWT	78
	Less than 65,000 DWT	0
Total number of ships		3,232

11 The effect of port waiting periods on the AER can be clearly identified in the following graph, where the Annual Efficiency Ratio (AER), calculated on voyage level, is colour-plotted in relation to the port staying duration with respect to the whole voyage duration. It is evident that the higher the port staying duration, the worse the AER rating. Details of the analysis are provided in document MEPC.82/INF.46 (Liberia and ICS) where an example of the application of the revised CII reference curves on three different ships that were selected based on their port emissions is included. Under the proposed framework, ships with higher-than-average port time emissions with respect to their total emissions get a better rating. This indicates that they are currently penalized not for being inefficient, but due to their operational profile which includes considerable port time. Furthermore, ships with average port time generally retain the same rating under the proposed framework. Finally, ships with below-average idle time, which are being favoured by the current CII framework, may move to a lower CII category, if they are not operationally efficient.

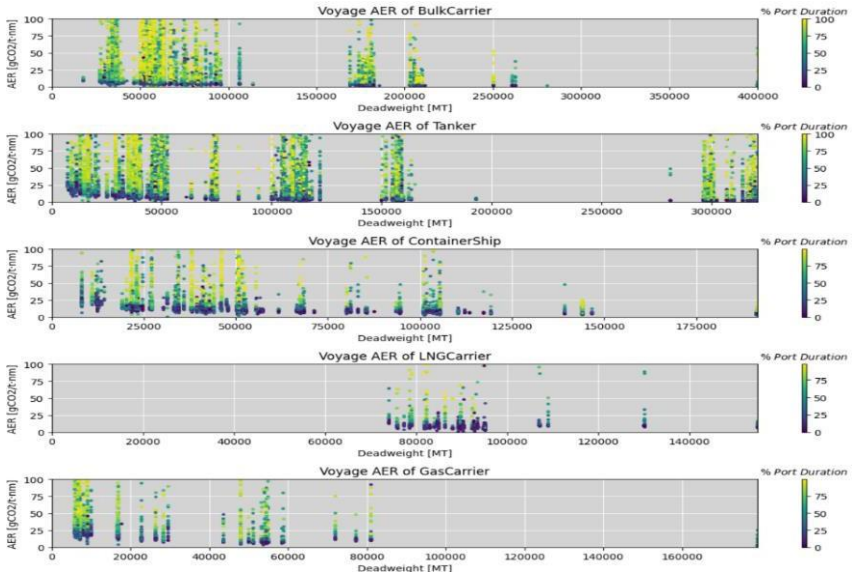

Figure 1: Voyage AER with respect to % port staying duration

Under way CII reference curves

12 New CII reference curves derived from ABS 2019 verified data using again median regression fit as in the CII Reference Lines Guidelines, G2 (resolution MEPC.353(78)), but the AER is calculated without accounting for the emissions at port. Idle emissions include, inter alia, emissions at port, at anchorage and drydock. However, the available data set does not provide the required level of granularity and, therefore, only port emissions have been removed, while emissions generated at drydock periods and at anchorage remain included.

13 The proposed adjustment to the CII framework represents a significant refinement in assessing environmental impact, as it specifically excludes port emissions and introduces reference curves based on under way emissions. Contrary to concerns that such modification might distort the reference CII curves, the analysis underscores that the proposed changes contribute to a more stringent yet technically sound framework. By excluding port emissions from the calculation, the revised methodology acknowledges that these emissions are often beyond the ship's control, offering a more accurate reflection of a ship's true efficiency.

Table 2: Under way CII reference curves parameters

Ship type	Capacity	*α*	*c*
Bulk Carrier below 279,000 DWT	DWT	2,569	0.572
Tanker	DWT	3,730	0.591
Container ship	DWT	3,315	0.537
LNG Carrier above 65,000 DWT, below 100,000 DWT	DWT	86.9E12	2.638
Gas Carrier below 65,000 DWT	DWT	2,776	0.546

Under way CII rating boundaries

14 Having defined the CII under way reference curves, the next step is to define the rating boundaries. Similarly to the methodology described in resolution MEPC.354(78) on the *2022 Guidelines on the operational carbon intensity of ships (CII rating guidelines, G4)*, the rating boundaries can be defined by applying a quantile regression fit for different quantiles. These quantiles are 0.15, 0.35, 0.65 and 0.85. The quantile regression lines in logarithmic form are expressed:

$$\ln(\text{attained CII}) = \delta^p - c \cdot \ln(Capacity) + \varepsilon^p$$

Having applied the methodology, the rating boundaries are calculated as follows:

Table 3: dd vectors for under way CII reference curves

dd vectors (after exponential transformation)				
	Under way emissions framework deducting port emissions			
Ship type	exp(d1)	exp(d2)	exp(d3)	exp(d4)
Bulk carrier	0.87	0.96	1.06	1.17
Tanker	0.83	0.93	1.08	1.24
Container ship	0.81	0.94	1.07	1.21
LNG carrier	0.77	0.94	1.08	1.22
Gas carrier	0.91	0.96	1.05	1.15

Emissions at port

15 In the methodology described so far, emissions generated when the ship is at port have been deliberately excluded from consideration. The exclusion is justified by the acknowledgement that ships lack direct control over them. In the table below, the percentages of emissions generated in ports versus the total emissions are tabulated. Although this portion of emissions is low compared to the emissions generated while the ship is under way, its effect on the attained CII becomes significant for ships with long periods of idle time within a calendar year.

Table 4: Idle versus total emissions

Ship type	**% port emissions**
LNG carrier	3.87
Container ship	4.74
Tanker	10.67
Bulk carrier	4.80
General cargo ship	5.51
Gas carrier	9.86

16 While this approach adheres to the fairness principles of the current framework, it is imperative to recognize the importance of addressing these emissions in the broader context of their environmental impact. The 2023 IMO GHG Strategy provides in paragraph 4.9.7, "consider and analyse measures to encourage port developments and activities globally to facilitate reduction of GHG emissions from shipping, including…to further optimize the logistic chain and its planning, including ports".

17 Resolution MEPC.366(79) on the *Invitation to Member States to encourage voluntary cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships* was issued to support the reliable and efficient data exchange between ship and port as well as enhanced berthing slot allocation policies by ports, thereby, optimizing voyages and port calls and facilitating the just-in-time (JIT) arrival of ships. Implementation of virtual arrivals/just-in-time arrivals can have a high impact on operational ship efficiency and hence the CII ratings, leading to a reduction of up to 14.6% CO_2 emissions for container ships on a voyage basis according to a recent IMO Global Industry Alliance (GIA) study. Other studies indicate even higher savings.

18 The Maritime Single Window (MSW) came into effect on 1 January 2024 which makes the single window for data exchange mandatory in ports around the world, providing a significant step in the acceleration of digitalization in shipping. In 2023, the Organization approved the *Guidelines for harmonized communication and electronic exchange of operational data for port calls* (FAL.5/Circ.52) which facilitate a uniform way for implementation of the JIT arrival concept.

19 It is recognized that many ports are voluntarily working in line with resolution MEPC.366(79) on a mixture of facilitating measures and cooperation with partners in the transport chain on optimizing the port calls. Nevertheless, a more robust regulatory framework and strategies are needed to encourage the development and implementation of information technology and infrastructure. This will lead to the reduction of emissions in port and ships' idle time.

Proposal

20 The Committee is invited to take note of the study presented and the suggestions for amendments in the existing CII framework as described in paragraphs 12 to 14 and to readjust the CII Guidelines, G2 and CII Guidelines, G4.

21 The analysis presented suggests the development of the revised CII reference curves while excluding idle emissions (i.e. emissions generated in port, anchorage and drydock). However, due to the insufficient data granularity of the currently available data set, the revised reference curves presented in this document exclude only emissions generated in port while retaining emissions generated at anchorage and in drydock. Therefore, consideration of expanded data sets will be necessary.

22 Appendix VI to resolution MEPC.385(81) makes the reporting of fuel consumption when the ship is not under way mandatory. These amendments are coming into force as of 1 August 2025 while flag Administrations may consider the early application of the amendments from 1 January 2025. Once the enhanced data becomes available, the methodology as explained above can be applied, and the CII framework revised, on the sole basis of under way emissions. Therefore, a two-stage approach for the CII framework review is proposed:

.1 Stage 1: Minor adjustments before 1 January 2026, in line with regulation 28.11 of MARPOL Annex VI including enhancement of the correction factors included in the CII Guidelines, G5; and

.2 Stage 2: Major adjustments after 1 January 2026, including determination of the revised reference lines excluding idle emissions by utilizing the data granularity of the revised DCS for a fair and harmonized implementation.

23 Ships would continue reporting their total emissions as per regulation 27 of MARPOL Annex VI at all times; however, their CII rating would be determined by the emissions occurring while the ship is under way. This information is available through arrival/noon/departure reports. The fuel consumption when the ship is not under way will be separately measured and reported. No additional measuring devices are needed while the logging requirements remain the same: fuel consumption and hours under way should be recorded in the ship's logbook, reporting templates and electronic systems.

24 While this revised methodology would resolve the issue of unfair CII ratings for ships with increased emissions during idle periods, the co-sponsors acknowledge that it will not on its own resolve all the issues. Therefore, the co-sponsors remain open to other submissions, including additional correction factors, alternative metrics, measures addressing emissions while ships are not under way, and further reference line revisions that may supplement this proposal and enable the most comprehensive, holistic, and technically sound suite of system improvements going forward.

Action requested of the Committee

25 The Committee is invited to consider the proposals set out in paragraphs 20 to 24 and take action as appropriate.