



CII

## **Carbon Intensity Indicator (CII) Guide**

Guide on the calculation and impact of CII on your ship



**Sustainable Ships**

SUSTAINABILITY ON DEMAND

## EXECUTIVE SUMMARY

The Carbon Intensity Indicator (CII) is a measure of how efficiently a ship transports goods or passengers. It is given in grams of CO<sub>2</sub> emitted per cargo-carrying capacity and nautical mile. It is an instrument wielded by the International Maritime Organization (IMO) to achieve carbon reduction in shipping.

The goal of this guide is to provide the reader with detailed information on the requirements, calculation and compliance of CII. Use the [website](#) to gather the latest information regarding CII, or use the [helpdesk](#) to ask for clarifications at any time.

### Key Points

- CII is an IMO mandated regulation that determines 'carbon intensity' or transport efficiency for individual ships, not a fleet. The main documents stipulating the regulation are MEPC.346(78) and MEPC.355(78) ([learn more](#)).
- CII applies to ships above 5,000 GT involved in international trade, *i.e.*: Bulk carriers, Gas carriers, Tankers, Container ships, General cargo ships, Refrigerated cargo carriers, Combination carriers, LNG carriers, Vehicle carriers, Ro-Ro cargo vessels, Ro-Ro passenger vessels, Cruise passenger ships ([learn more](#)).
- CII is calculated by dividing annual CO<sub>2</sub> emissions by the capacity multiplied by the annual distance travelled. For RoRo and Cruise Passenger ships the capacity is GT, for other ships it is deadweight. IMO DCS input is used for calculation ([learn more](#)).
- Ships are rated from A to E every year, with A being the best. A consecutive triple D-rating or a single E-rating means non-compliance in which case a corrective plan is required. At the time of writing, cost impact is limited ([learn more](#)).



Figure 1. A masterclass on CII to make your life easier.

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## 1.0 ABOUT CII

### 1.1 Introduction

The Carbon Intensity Indicator (CII) is a measure of how efficiently a ship transports goods or passengers. It is given in grams of CO<sub>2</sub> emitted per cargo-carrying capacity and nautical mile<sup>1</sup>.

$$CII = \frac{CO_2 \text{ emissions}}{\text{Capacity} \cdot \text{Distance Travelled}}$$

The CII went into effect on the 1<sup>st</sup> of January 2023. From that year onwards, each ship has to calculate and report their CII according to the latest guidelines provided by IMO. The yearly CII is calculated based on reported IMO DCS data and the ship is given a rating from A to E, where A is the best category and E the worst.

Ships must achieve rating C as the minimum standard. For ships that achieve a D rating for three consecutive years or an E rating in a single year, a corrective action plan needs to be developed as part of the SEEMP and to be approved by the Administration or Recognized Authority (RO).

Ships must document the CII as part of SEEMP 3, retain the Statement of Compliance to CII onboard and at verification audits prove that they are compliant with a reduction trajectory of 11% by 2026.

CII applies to ships above 5,000 GT of the following ships types: bulk carriers, gas carriers, tankers, container ships, general cargo ships, refrigerated cargo carriers, combination carriers, LNG carriers, vehicle carriers, Ro-Ro cargo vessels, Ro-Ro passenger vessels and cruise ships.

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<sup>1</sup> The exact formula and calculation of the rating is slightly more complicated, as highlighted in chapter 2.0.

## 1.2 Legislator and jurisdiction

The International Maritime Organization (IMO) is the main legislative body responsible for CII. As such, CII is applied globally. Key documents stipulating the regulation are:

- Regulation 26.3.1 of MARPOL Annex VI Prevention of Air Pollution on board of Ships
- Resolution MEPC.346(78) 2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)
- Resolution MEPC.355(78) 2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (CII Guidelines, G5)

MARPOL Annex VI is the overall with regards to the prevention of air pollution on board of ships. Resolution MEPC.346 describes the general process and requirements of CII as part of the SEEMP. MEPC.355(78) describes CII calculations and correction factors. A detailed list with all guidelines on the carbon intensity of international shipping by IMO can be found [here](#).

### 1.3 Requirements

The below list shows a basic minimum of requirements under the regulations stipulated by IMO.

- Revision of SEEMP to add the Ship Fuel Oil Consumption Data Collection Plan (DCP) which includes a description of the methodology for data collecting and the reporting processes. To be updated every three years.
- Data collection on board from 2019 onwards.
- Reporting the collected data to the Administration or Recognized Organization (RO) in accordance with IMO DCS (Data Collection System) fuel reporting data.
- Verification of the reporting data by the Administration or RO, which are “ratings” from A (good) to E (bad) which will be added on Statement of Compliance form.
- Retaining the Statement of Compliance issued by Administration or RO onboard, and keeping the relevant data.

An “E” rating for a single year, or a “D” rating for three consecutive years constitutes a low rating. Low-rated vessels are non-compliant and are to develop a plan of corrective actions. This plan is to be approved by the Administration or Recognized Authority.

Learn more about (non-)compliance, corrective actions and mitigations in chapter 3.0. Learn more about the relation between CII and IMO DCS in section 1.6.



## 1.4 Applies to...

CII applies to ships above 5,000 GT of the following ships types:

- Bulk carriers
- Gas carriers
- Tankers
- Container ships
- General cargo ships
- Refrigerated cargo carriers
- Combination carriers
- LNG carriers
- Vehicle carriers
- Ro-Ro cargo vessels
- Ro-Ro passenger vessels
- Cruise passenger ships

## 1.5 Exemptions and exceptions

CII does not apply to ships below 5,000 GT, nor any ship types that have not been stated in the previous section. New ship types can be included in the future however. Additional correction factors apply to ship types and voyages, see section 2.5.

## 1.6 Relation between CII, DCS and SEEMP Part III

CII can be viewed as *part of* a strengthening of the SEEMP (Ship Energy Efficiency Management Plan), referred to by some as the 'enhanced SEEMP'. The intention is to ensure continuous improvement of energy efficiency and to lower carbon intensity. The enhanced SEEMP shall include an implementation plan on how to achieve the CII targets (called the Ship Operation Carbon Intensity Plan) which will be subject to approval and company audits.

Starting in 2024, the CII must be calculated and reported to the Data Collection System (DCS) verifier together with the aggregated DCS data for the previous year, including any correction factors and voyage adjustments (see 2.5). Deadline for DCS and CII submission is no later than 31 March each year.

Attained CII and additional CII data will be visible in IMO DCS upon submission after the year end. After successful verification, both attained CII and acquired Environmental Rating (A to E) will be presented on the DCS Statement of Compliance.

The attained annual operational CII and the environmental rating will be noted on the DCS Statement of Compliance (SoC), which will be required to be kept on board for five years.

Ships that achieve a D rating for three consecutive years or an E rating in a single year, a corrective action plan needs to be developed. That means the SEEMP III must be updated and verified before the SoC can be issued. The corrective action plan should consist of an analysis of why the required CII was not achieved and include a revised implementation plan (learn more in chapter 3.0).

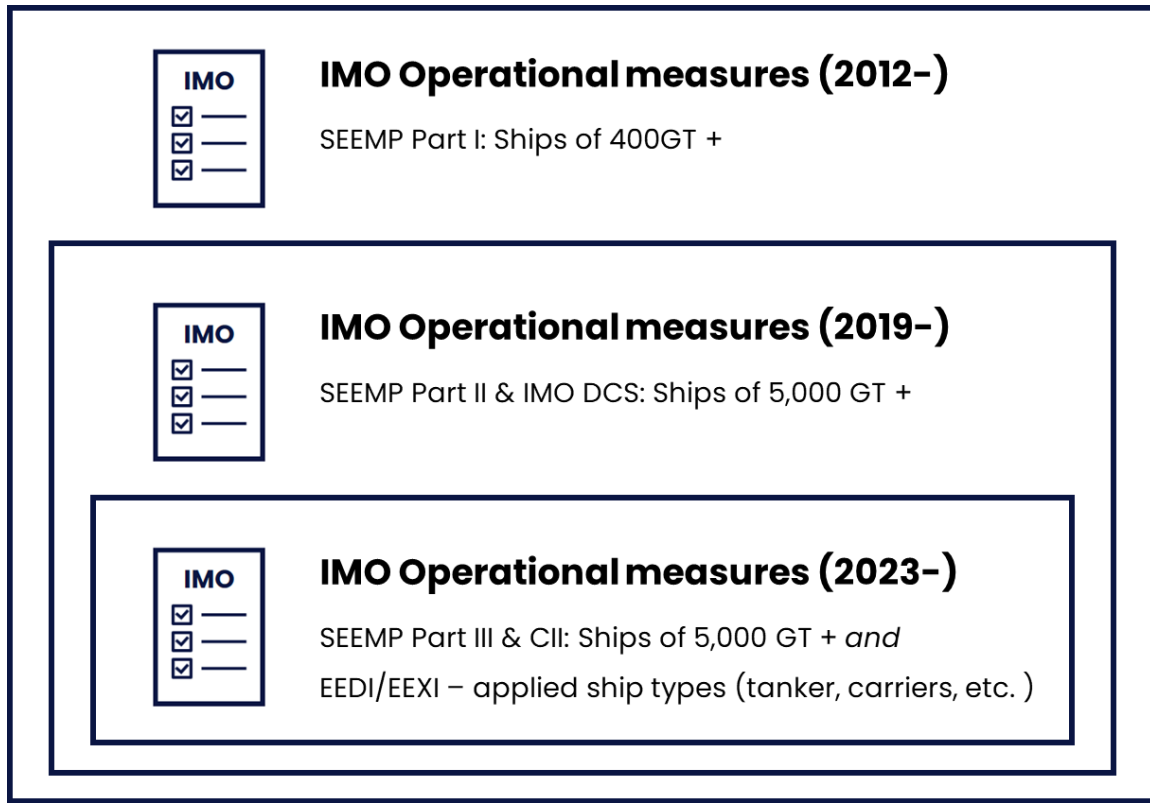


Figure 2. CII is part of IMO's operational measures to reduce carbon emissions, *i.e.* SEEMP III (Ship Energy Efficiency Management Plan).

## 1.7 Relation between the CII and EEXI

The EEXI (Energy Efficiency Existing Ship Index) is a one-time certification equivalent to the EEDI (Energy Efficiency Design Index). The CII is an operational indicator and will be assessed *annually* from 2023 with *yearly* stricter emission limits.

The EEXI and CII are applicable to the same ship types. The difference is that CII ratings will apply to ships 5,000 GT and above regardless of propulsion type.

EEXI calculations are based on the methodology developed for the Energy Efficiency Design Index (EEDI) for newbuilds. The EEXI describes a vessel's CO<sub>2</sub> emissions, determining standardized CO<sub>2</sub> emissions related to installed engine power, transport capacity and ship speed. Emissions are calculated based on the installed power of the main engine, fuel oil consumption, and a conversion factor between fuel and the corresponding CO<sub>2</sub> mass.

A ship's CII is calculated as the ratio of the total mass of CO<sub>2</sub> emitted to the total transport work undertaken in a given calendar year. A vessel's performance rating is determined by comparing a ship's operational carbon intensity performance with the average performance of others ships of the same type. Required reductions for each ship type are expected to either increase or remain stable over time, ensuring that international shipping achieves the IMO's intended targets.

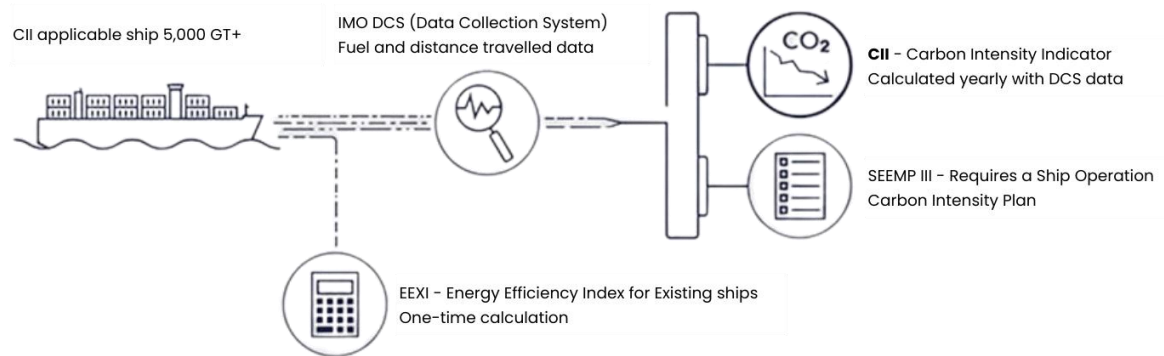


Figure 3. The relation between CII and EEXI is that CII applies to the same vessels that EEXI applies to. EEXI is a one-time calculation however, and CII is calculated every year.

## 2.0 CALCULATING CII

- ! Skip the reading and use the CII [quickscan](#) to determine your CII Rating.
- ! Full formula with correction factors can be found in MEPC.355(78).
- ! The RoRo Passenger/Cargo ship type is not explicitly mentioned in IMO regulations, but is used in some occasions. In case multiple ship types are available, the most conservative case must be used.

### 2.1 Calculation in brief

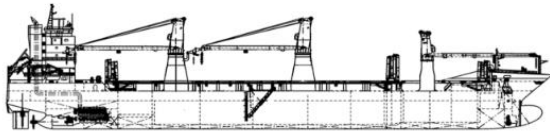
CII is calculated by dividing annual CO<sub>2</sub> emissions with annual distance sailed multiplied by ship capacity. If applicable, correction factors are applied. The CII unit is “grams of CO<sub>2</sub> emitted per cargo-carrying capacity times nautical mile”, whereby cargo capacity is either deadweight or gross tonnage depending on ship type. Correction factors are similar to those used for EEXI/EEDI, in addition to factors for specific ship types and voyage circumstances. Correction factors are described in more detail in section 2.5.

$$\text{CII} = \frac{\text{Annual fuel consumption} \cdot \text{CO}_2 \text{ factor}}{\text{Annual distance sailed} \cdot \text{Capacity}} \cdot \text{Correction factors}$$

The above formula stated the calculation of the CII *attained*. To get the CII *rating* – the label ranging from A to E – the CII attained is compared with a CII *reference* for the specific ship type, leading to a label. To somewhat simplify and showcase these calculations, **this guide divides the calculation of the CII into three steps:**

- Step 1) Calculate CII Attained
- Step 2) Calculate CII Reference
- Step 3) Calculate CII Rating

These steps are shown on the right hand side for a bulk carrier. No correction factors have been taken into account, providing a conservative estimate. This process is repeated for each consecutive year, which results in a table of ratings per year upon which basis (non-)compliance is determined. This is explained in more detail in step 3.



Sustainable Ships

CII QUICKSCAN

2023	2024	2025	2026
C	C	C	C

You are compliant to CII.

Step 1 - Calculate CII Attained			
Ship type	Bulk Carrier		$CII_{Attained} = \frac{CO_2 \text{ emissions}}{\text{Deadweight or } GT \cdot \text{Distance Travelled}}$
GT	34,515		
Deadweight	61,215	[mT]	
Distance sailed	93,960	[nm/year]	
Fuel consumption	8,500	[mT / year]	
Fuel type	HFO		
Emission factor	3.114	[mT/mT]	
CO <sub>2</sub> emissions	26,469,000,000	[g/year]	
<b>CII Attained</b>	<b>4.60</b>	<b>[g/mT nm]</b>	

Step 2 - Calculated CII Reference			
a	4,745		$CII_{Reference} = a \cdot Capacity^{-c}$
c	0.622		
Capacity	61,215	Deadweight	
<b>CII Reference</b>	<b>5.00</b>		

Step 3 - Calculate CII Rating			
Reduction (R)	11%	2026 as reference	$CII_{Required} = \frac{100 - R}{100} \cdot CII_{Reference}$
CII Required	4.45		
Attained / Required	1.03		$CII_{Rating} = \frac{CII_{Attained}}{CII_{Required}}$
<b>CII Rating</b>	<b>C</b>		

Figure 4. The steps required to calculate the CII for a single year, with a bulk carrier taken as benchmark. Correction factors have NOT been taken into account. Use the [CII quickscan](#) to quickly determine your CII.

## 2.2 Step 1 - Calculate CII Attained

CII attained is calculated using IMO DCS data. That means annual fuel consumption and annual distances sailed as reported in IMO DCS is taken for calculations. Emission factors used for calculation by Sustainable Ships can be found in the Sustainable Ships emission guide.

Capacity for each ship is determined as per the table on the right hand side. Note that ships carrying *cargo* generally use deadweight as capacity, and ships carrying *people* use GT as capacity. The capacity is also taken from IMO DCS as fixed parameters.

Correction factors can be included in this step, which are not shown here because they are different for each individual vessel and voyage. More information on correction factors are shown in section 2.5.3.



Step 1 – Calculate CII Attained		
Ship type	Bulk Carrier	
GT	34,515	
Deadweight	61,215	[mT]
Distance sailed	93,960	[nm/year]
Fuel consumption	8,500	[mT / year]
Fuel type	HFO	
Emission factor	3.114	[mT/mT]
CO <sub>2</sub> emissions	26,469,000,000	[g/year]
<b>CII Attained</b>	<b>4.60</b>	<b>[g/mT nm]</b>

$$CII_{Attained} = \frac{CO_2 \text{ emissions}}{\text{Deadweight or GT} \cdot \text{Distance Travelled}}$$

Step 1 – Additional Information		
Ship Type	Capacity	
Tanker	Deadweight	<p>Deadweight corresponding to maximum summer load draft, i.e. value on IEE certification.</p> <p>Correction factors &amp; voyage adjustment guidelines can be taken into consideration for calculations.</p>
Bulk Carrier	Deadweight	
Combination carrier	Deadweight	
Container Ship	Deadweight	
General Cargo	Deadweight	
Gas Carrier	Deadweight	
LNG Carrier	Deadweight	
RoRo Passenger and Cargo	Gross Tonnage	
RoRo Cargo	Gross Tonnage	
RoRo Passenger	Gross Tonnage	
RoRo Cargo Vehicle Carrier	Gross Tonnage	
Refrigerated Cargo Carrier	Deadweight	
Cruise Passenger Ship	Gross Tonnage	

Figure 5. Calculation steps breakdown for CII attained, including a reference table with capacity for different ship types.

### 2.3 Step 2 - Calculate CII Reference

Calculation of the CII *reference* is fairly straightforward, as fixed values are taken based on ship type and ship capacity. These are shown on the right-hand side for our example bulk carrier. The CII reference is sometimes referred to as the CII reference line as well, as the reference formula follows an exponential line as a function of ship capacity. More information on the line can be found in the ClassNK reference on CII (see [references](#)).

Step 2 – Calculated CII Reference				
a	4,745		$CII_{Reference} = a \cdot Capacity^{-c}$	
c	0.622			
Capacity	61,215	Deadweight		
<b>CII Reference</b>	<b>5.00</b>			

Step 2 – Additional Information				
Ship Types	Condition	Capacity	a	c
Tanker	DWT	Deadweight	5,247	0.610
Bulk Carrier	DWT >= 279,000	Deadweight	4,745	0.622
	DWT < 279,000	Deadweight	4,745	0.622
Combination carrier	DWT	Deadweight	5,119	0.622
Container Ship	DWT	Deadweight	1,984	0.489
General Cargo Ship	DWT >= 20,000	Deadweight	31,948	0.792
	DWT < 20,000	Deadweight	588	0.3885
Gas Carrier	DWT >= 65,000	Deadweight	1.44050E+11	2.071
	DWT < 65,000	Deadweight	8,104	0.639
LNG Carrier	DWT >= 100,000	Deadweight	9.827	0.000
	100,000 > DWT >= 65,000	Deadweight	1.44790E+14	2.673
	DWT < 65,000	Deadweight	1.44790E+14	2.673
RoRo Passenger/Cargo	GT	Gross Tonnage	1,967	0.485
RoRo Cargo	GT	Gross Tonnage	1,967	0.485
RoRo Passenger	Regular	Gross Tonnage	2,023	0.460
	High-speed craft	Gross Tonnage	4,196	0.460
RoRo Cargo Vehicle	GT >= 57,700	Gross Tonnage	3,627	0.590
	57,700 > GT >= 30,000	Gross Tonnage	3,627	0.590
	GT < 30,000	Gross Tonnage	330	0.329
Refrigerated Cargo	DWT	Deadweight	4,600	0.557
Cruise Passenger	GT	Gross Tonnage	930	0.383

Figure 6. CII Reference calculation, capacity and  $a$  plus  $c$  factors for different ship type according to different conditions. Not that the 'high-speed threshold' taken into consideration by Sustainable Ships is 20 knts, though this could differ in your situation.

## 2.4 Step 3 – Calculate CII Rating

The final CII *rating* is calculated by dividing CII attained by CII required. The CII required is dependent on the year in which CII is calculated, as it is the CII reference multiplied by the Reduction Factor (R).

The reduction factor *increases* over time, which means that if the vessel keeps its emission score same, the rating will be *slightly worse* year by year. Reduction will start as per 2023 with 5% and 2% will be added yearly.

R factors for the years of 2027 to 2030 to be further strengthened and developed taking into account the review of the short-term measure. It should be noted that the IMO strives for carbon neutrality by 2050, which would correlate to a reduction factor of 100% by 2050.

### 2.4.1 From number to letter

As is shown, the CII rating is the attained number in grams per ton mile divided by the required number in grams per ton mile. The result is again a number (typically around 1) which is transformed into a letter based on 'd-values'. These values are fixed, ship-specific values determined by IMO. The resulting CII rating number is compared to these values according to the logic shown in the additional information figure to the right.

Based on this comparison, we end up with a letter for each year: the resulting CII rating. This is used to determine compliance or non-compliance by class, which is explained in more detail in chapter 3.0.

Step 3 - Calculate CII Rating			
Reduction (R)	11%	2026 as reference	$CII_{Required} = \frac{100 - R}{100} \cdot CII_{Reference}$ $CII_{Rating} = \frac{CII_{Attained}}{CII_{Required}}$
CII Required	4.45		
Attained / Required	1.03		
<b>CII Rating</b>	<b>C</b>		

Parameter	2023	2024	2025	2026
Reduction (R)	5%	7%	9%	11%
CII Required	4.75	4.65	4.55	4.45
CII Attained	4.60	4.60	4.60	4.60
Attained / Required	0.97	0.99	1.01	1.03
<b>CII Rating</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>

Figure 7. CII Rating calculations over the years with the bulk carrier as an example. Below is shown additional information that shows how the CII rating *number* is transformed into a CII rating *letter*.

3 - Additional Information		
if	then	explanation
CII Rating < d1	A	If CII Rating (number) is under d1 value, CII rating (letter) is A
CII Rating < d2	B	If CII Rating (number) is under d2 value and above d1, CII rating (letter) is B
CII Rating < d3	C	If CII Rating (number) is under d3 value and above d2, CII rating (letter) is C
CII Rating < d4	D	If CII Rating (number) is under d4 value and above d3, CII rating (letter) is D
CII Rating > d4	E	If CII Rating (number) is above d4 value, CII rating (letter) is E

CII Number	CII Letter	Bulk carrier example
1.03	C	The calculated CII rating is 1.03, below d3 for a bulk carrier, resulting in a C

Figure 8. The CII rating is transformed from a number to a letter based on 'd-values'. These are fixed numeric values specified for each ship type. Check appendix 5.2 for a full table of d-values for all ship types.

## 2.5 Correction factors

Correction factors and voyage adjustments can be applied to CII attained. These are described in IMO's Resolution MEPC.355(78) – 2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (CII Guidelines, G5 chapter 4). The below formula shows available correction factors, which are described in the subsequent sections.

CII correction factors and voyage adjustments reporting will be verified on a case-by-case basis. In case of uncertainties in reporting, additional documentation or evidence might be required by the verifier.

To receive an official correction to the CII values, the correction factor must be stated in an approved version of the SEEMP Part III. If the correction is not in the SEEMP Part III, the correction will not be applied to the “official” CII corrected values.

Table 1. Overview of possible correction factors that can be used when calculating CII attained, as per IMO guidelines. These are ship-specific and not taken into account into the general calculations as per previous sections. Ensure to check validity and completeness with class for your ship!

Possible correction factors to be applied to CII attained	
$CII_{Attained} = \frac{\sum_j C_{Fj} \cdot \left\{ FC_j - \left( FC_{voyage,j} + TF_j + (0.75 - 0.03y_i) \cdot (FC_{electrical,j} + FC_{boiler,j} + FC_{others,j}) \right) \right\}}{f_i \cdot f_m \cdot f_c \cdot f_{IVSE} \cdot Capacity \cdot (D_t - D_x)}$	
j	Fuel type
C <sub>Fj</sub>	Emission factor for fuel j
FC <sub>j</sub>	Mass (in grams) of fuel j as per IMO DCS
FC <sub>voyage,j</sub>	Mass (in grams) of fuel j that can be deducted as per voyage correction factors
TF <sub>j</sub>	Quantity of fuel j removed for Ship to Ship (STS) operations or shuttle tanker operations.
y <sub>i</sub>	Numbering system for years (y <sub>2023</sub> = 0, y <sub>2024</sub> =1 etc.)
FC <sub>electrical,j</sub>	Mass (in grams) of fuel j consumed for production of electrical power allowed to be deducted
FC <sub>boiler,j</sub>	Mass (in grams) of fuel j consumed by the boiler allowed to be deducted
FC <sub>other,j</sub>	Mass (in grams) of fuel j consumed by other consumers allowed to be deducted
f <sub>i</sub>	Capacity correction factor for ice-classed ships as per EEDI
f <sub>m</sub>	Factor for IA Super and IA ice-classed ships as per EEDI
f <sub>c</sub>	Cubic capacity correction factor for chemical tankers as per EEDI
f <sub>IVSE</sub>	Correction factor for ship-specific voluntary structural enhancement as per EEDI
D <sub>x</sub>	Distance travelled for voyage periods which may be deducted

### 2.5.1 Ship correction factors

There are several correction factors listed by IMO that apply mostly to tankers, LNG carriers and ships carrying refrigerated cargo. These include (amongst others):

- Shuttle Tanker/STS (Ship to Ship) voyages on Tanker - Correction for dynamic positioning and cargo pump
- Tanker - Correction for cargo heating, cargo pump
- LNG carrier - Correction for cargo cooling and reliquefaction
- Ship carrying Refrigerated Containers - Correction for Refrigerated Containers

### 2.5.2 EEDI and EEXI correction factors

Your vessel's EEXI/EEDI Technical file might contain few correction factors that are applicable during CII calculation:

- $f_i$  - capacity correction factor for ice-classed ships
- $f_m$  - ships having ice classes IA Super and IA
- $f_c$  - cubic capacity correction factors for chemical tankers
- $f_{i,VSE}$  represents the correction factor for ship-specific voluntary structural enhancement

### 2.5.3 Voyage correction factors

There are several cases in which a vessel can apply voyage adjustments. Adverse weather which may endanger safe navigation of a ship is not specified as potential for adjustment. Therefore, vessels cannot report voyage adjustments because of unfavourable weather.

1. Scenarios specified in regulation 3.1 of MARPOL Annex VI, which may endanger safe navigation of a ship area within the ice edge.
2. Sailing in ice conditions, which means sailing of an ice-classed ship in a sea within the ice edge.
3. When a vessel encounters imminent safety concerns during its voyage, including (example situations):
  - saving life at sea, i.e., search and rescue operations, evacuation.
  - navigation hazards such as icebergs.
  - areas that have been designated on an ad-hoc period due to prevailing navigational hazards.
  - piracy risk or other areas restricted for navigation due to war risk

### 3.0 IMPACT OF CII

- ! Cost and time Impact of CII is limited (~ €3k) even in the case of non-compliance.
- ! Use the [Decarbonizer](#) to determine cost impact for your own vessel.

### 3.1 Compliance

Compliance means to receive a maximum amount of two (2) D-ratings. For example, you receive a C-rating in 2023 and 2024, and a D-rating in 2025 and 2026, your vessel is compliant. In this scenario, no specific actions or consequences are defined by IMO. It is nevertheless advised to closely monitor CII performance in order to avoid having to take drastic measures unexpectedly. Compliance requirements might change of the CII revision of 2025.

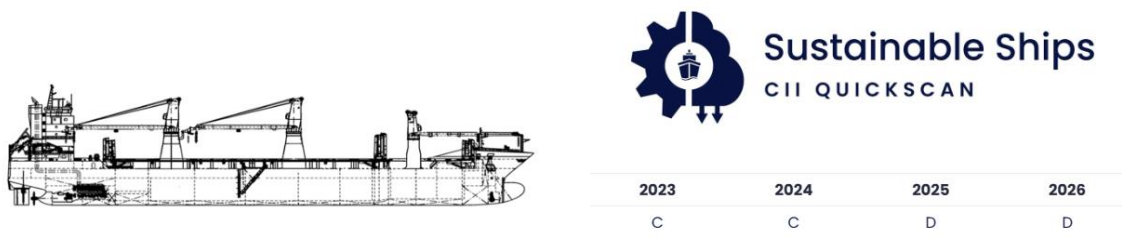


Figure 9. You are compliant to CII. You do not have to do anything.

### 3.2 Non-compliance

An E-rating in a *single* reporting year, or a D-rating for three consecutive years constitutes a “low-rating”. Low-rated vessels are non-compliant and are to develop a Corrective Actions Plan as part of SEEMP Part III. This plan shall be submitted to and approved by the Administration or Recognized Authority before DCS Statement of Compliance for that year can be issued. Guidance and available plans are discussed in the next section.

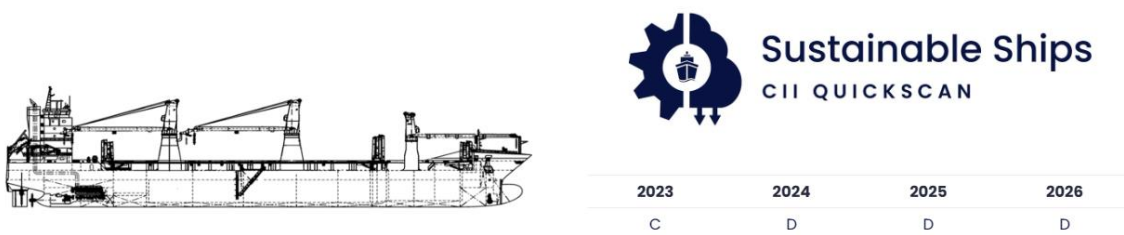


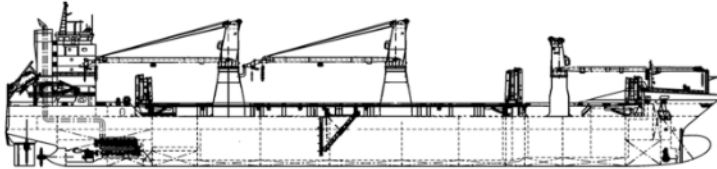
Figure 10. You are non-compliant to CII. You need to submit a Corrective Actions Plan.



### 3.3 Mitigation options

To achieve compliance in the case of means to submit a Corrective Actions Plan that includes measures to either reduce CO<sub>2</sub> emissions with same distance travelled; or increase distance travelled with same CO<sub>2</sub> emissions. Sustainable Ships generally works with a CO<sub>2</sub> reduction approach.

Either approach would work however and lead to the same result, as it would both decrease the CII rating. Below are stated several options that can be included in a SEEMP Corrective Actions Plan. You can use the [Decarbonizer](#) to quickly (and freely) determine possible actions for your ship and to download the corresponding plan. Below is an overview of potential measures for our bulk carrier example, though these is certainly not an exhaustive list. Contact the [helpdesk](#) for customization options for your ship.



CO2 Reduction	No measures applied
CAPEX	-
Dayrate	-

Ship name [CII Example](#)  
 For report [SEEMP Actions Plan](#)

Report

	1	2	3	4
	Ship properties	Regulations	Decarbonize	CAPEX/OPEX
		CO2 Reduction	CAPEX	Dayrate
<input type="checkbox"/>	<a href="#">Shore Power</a>	4%	€ 1,408,000	+ € 389
<input type="checkbox"/>	<a href="#">Solar PV</a>	1%	€ 396,656	- € 228
<input type="checkbox"/>	<a href="#">Wind Propulsion</a>	4%	€ 1,401,000	- € 983
<input type="checkbox"/>	<a href="#">Hull Coating</a>	16%	€ 502,944	- € 3,514
<input type="checkbox"/>	<a href="#">Battery Hybrid</a>	1%	€ 11,153,500	- € 163
<input type="checkbox"/>	<a href="#">Biofuels</a>	40%	€ 0	+ € 4,919
<input type="checkbox"/>	<a href="#">Methanol</a>	92%	€ 5,049,552	+ € 13,872
<input type="checkbox"/>	<a href="#">Hydrogen</a>	100%	€ 22,017,242	+ € 104,610
<input type="checkbox"/>	<a href="#">Full Electric</a>	100%	€ 42,741,182	- € 6,107
	<b>Total</b>	<b>0%</b>	<b>€ 0</b>	<b>€ 0</b>

Figure 11. Use the [Decarbonizer](#) to make your own SEEMP Corrective Actions Plan in a matter of minutes.

### 3.3.1 SEEMP Corrective Actions Plan

#### Option 1 – small CO<sub>2</sub> reduction required (<10%)

In case a small reduction is required, Sustainable Ships advises to make use of operational measures for shipowners. These include Engine Power Limitation or slow steaming, on top of simply ensuring your vessel is in good condition. These are generally the most cost-effective and least impactful on your day-to-day operations. Charterers will also have a major influence over the CII of the ships they charter by selecting the speed, hence discussion with them on speed is advised. Overall cost impact for these measures are negligible frequently coincide with costs *benefits*.

#### Option 2 – moderate CO<sub>2</sub> reduction required (10% – 30%)

In case a moderate reduction is required, Sustainable Ships advises to make use of a combination of shore power implementation and biofuels on top of the operational measures discussed in option 1. Shore power is required in any case after 2030 and could lead to 4% reduction in CO<sub>2</sub>. Biofuels are the least invasive fuel in terms of operational impact and can be blended or used as a drop-in fuel to arrive the exact amount of CO<sub>2</sub> reduction required. Total costs would be in the order of €1.5M CAPEX (for shore power) and €500k yearly for added OPEX. Use the Decarbonizer to verify this for your vessel as significant changes appear on a case-by-case basis.

#### Option 3 – significant CO<sub>2</sub> reduction required (>30%)

These cases should be rare, but would not incur significant efforts in order to achieve. On top of the previously mentioned actions (shore power and biofuels), wind-assisted propulsion, a new coating and potentially even the switch to alternative fuels is required. Sustainable Ships does *not* recommend this in light of CII regulation however, as these are subject to evaluation in 2025. Consequently the increased use of biofuels is recommended. This would result in an *added* CAPEX of €2M for a total of €3.5M approximately, and yearly added operational expenses in the order of €2M for our bulk carrier example. Use the Decarbonizer to verify this for your vessel as significant changes appear on a case-by-case basis.

## 3.5 Costs and penalties

### 3.5.1 For compliance

Total cost for calculating and approval of a CII rating should be in the order of €1,500 – €3,000 per ship. Total time for calculations and approval of CII rating should be in the order of 10 hours. SEEMP Part 3 that includes CII rating is to be updated every three years.

### 3.5.2 For non-compliance

In addition to compliance costs, an additional corrective action plan has to be made as discussed in the previous section. Pending on the severity of the outcome, this could take 10–100 hours plus of course the costs for complying, ranging from a small operational measure to a complete refit required.

Overall impact on costs and operations seems limited however, as currently only a *corrective action plan* is required. No penalties are incurred upon non-compliance. Technically speaking, the Administration or Recognized Authority *could* withhold issuing the State of Compliance upon non-compliance, but upon delivery of an approved plan this should not be an issue.

It seems therefore that until revision of CII in 2025, cost impact of CII is mostly limited to administrative work.

## 4.0 FREQUENTLY ASKED QUESTIONS

- ! The below frequently asked questions are a collection of questions from DNV, ClassNK, Lloyd's and the Sustainable Ships platform.
- ! Use the [Regulator AI](#) to ask and clarify more questions.

### 4.1 What is CII?

The Carbon Intensity Indicator (CII) is a measure of how efficiently a ship transports goods or passengers and is given in grams of CO<sub>2</sub> emitted per cargo-carrying capacity and nautical mile. The ship is then given an annual rating ranging from A to E, whereby the rating thresholds will become increasingly stringent towards 2030. The CII applies to all cargo, RoPax and cruise ships above 5,000 GT. The yearly CII is calculated based on reported IMO DCS data and the ship is given a rating from A to E. For ships that achieve a D rating for three consecutive years or an E rating in a single year, a corrective action plan needs to be developed as part of the SEEMP and approved.

### 4.2 How is CII calculated?

CII is calculated as the amount of CO<sub>2</sub> emitted in grams per ton of cargo and nautical mile. Correction factors will be added to the CII calculation in a separate guideline that will be developed next year.

For the time being, using actual cargo carried rather than capacity (i.e. the EEOI) can only be reported voluntarily and not for CII rating purposes.

### 4.3 To which ship types does CII apply?

CII applies to ships above 5,000 GT of the following ships types:

- Bulk carriers
- Gas carriers
- Tankers
- Container ships
- General cargo ships
- Refrigerated cargo carriers
- Combination carriers
- LNG carriers
- Vehicle carriers
- Ro-Ro cargo vessels
- Ro-Ro passenger vessels
- Cruise passenger ships

### 4.4 Is verification of the CII to be carried out by the ships' Classification Society or may this be done by another Recognized Organization (RO)?

Verification of the CII may be carried out by another RO than the one that Classes the ship, since this is a verification that can be carried out remotely. It should however be the same verifier as for IMO Data Collecting System for fuel oil consumption of ships (IMO DCS) since the CII is to be calculated based on the collected and reported ship fuel oil consumption data which has been submitted to the DCS.

### 4.5 Is an additional authorization for the RO's necessary for attained CII verification?

the RO's are already authorized to conduct the surveys and to issue the certificates as regulated in MARPOL Annex VI, and the new requirements regarding EEXI and CII are amendments to MARPOL Annex VI, no separate authorization is required. The Appendix to Annex 1 to the Agreement between the NL and RO dated 03 April 2014 already provides for this ([link](#)).

### 4.6 Which CII is to be used for a ship which may fall into more than one ship category?

For ships which are falling into more than one categories of ships, as per MARPOL Annex VI, regulation 28(.1), the most stringent attained annual operational CII, as calculated for the categories the ship may fall into, shall be used.

#### 4.7 **Can time in port be included in the voyage period for when applying voyage adjustments?**

When an ice-classed ship sails in ice conditions to and from a port within the same sea area within the same ice edge.

- the period of time the ship is in that port (port period) may be included in either the voyage period to that port or the voyage period from that port; and
- all fuel consumption for that port period may be included in the voyage adjustment to the calculation of the attained annual operational CII.

#### 4.8 **Why does the CII use 2019 as a reference and not 2008 like the IMO GHG Strategy?**

The reference year for CII is 2019 because this is the first year with verified DCS data reported to the IMO. Otherwise, the reference line would have to be established based on highly uncertain AIS data. The reduction factors are relative to 2019 and are adjusted considering achieved improvements between 2008 and 2019.

#### 4.9 **What is the difference between the CII and the EEXI?**

The EEXI is a one-time certification equivalent to the EEDI (Energy Efficiency Design Index) phase 2 or 3 concerning design parameters of the vessels. The CII is an operational indicator and will be assessed annually from 2023 with yearly stricter emission limits. The EEXI and CII are applicable to the same ship types. The difference is that CII ratings will apply to ships 5,000 GT and above regardless of propulsion type. Learn more [here](#).

#### 4.10 **What is the relation between the CII, IMO DCS and SEEMP?**

CII can be viewed *as part of* a strengthening of the SEEMP (Ship Energy Efficiency Management Plan), referred to by some as the 'enhanced SEEMP'. The intention is to ensure continuous improvement of energy efficiency and to lower carbon intensity. The enhanced SEEMP shall include an implementation plan on how to achieve the CII targets (called the Ship Operation Carbon Intensity Plan) which will be subject to approval and company audits. CII calculations are based on data collection in IMO DCS. Learn more [here](#).

#### 4.11 **Can consumption due to avoidance of bad weather be deducted from CII calcs?**

According to the published IACS guidelines on CII correction factors, adverse weather/tropical storm/cyclones are not considered as a reason to use FC-voyage correction factor. Therefore, consumption related to avoidance of bad weather cannot be deducted from CII.

**4.12 My vessel did not meet the Required CII and got a D-Rating. What are the consequences?**

Currently, there are no consequences announced by IMO for not meeting the Required CII and receiving a D-Rating for your vessel's performance in the previous reporting year. If a vessel would get a D-Rating 3 years in a row, you would be obliged to submit a SEEMP Part III Corrective Actions Plan before DCS Statement of Compliance can be issued. The situation may change after revision of the regulations from IMO in 2025.

**4.13 How will my vessel's CII be calculated in case of major conversion?**

In case of a ship undergone major conversion, including extensive changes of carrying capacity and/or ship type during the year, defined by regulation 2.2.17 and regarded by the Administration as a newly constructed ship as per regulation 5.4.3, the required and attained annual operational CII should be calculated and verified as per a newly constructed ship for the period after conversion.

For the year of conversion, the attained CII and required CII should be calculated and verified as per a newly constructed ship for the period after conversion. Data for partial year before conversion should still be reported for verification but will not be included in the calculation and verification of the attained annual operational CII.

**4.14 Can a period spent dry-docking or anchored be deducted from CII calculations?**

No, currently there is no CII correction factor nor voyage adjustment that would deduct period spent at the dry-dock or anchored from CII calculation. If the vessel was not connected to an onshore power supply, this period would simply be considered as consumption without distance travelled.

**4.15 Do I need to provide any evidence on reported CII correction factors and voyage adjustments?**

CII correction factors and voyage adjustments reporting will be verified on a case-by-case basis. In case of uncertainties in reporting, additional documentation or evidence might be required by the verifier.



#### 4.16 How will my vessel's CII be calculated in case of change of DWT and/or GT?

In case of DWT and/or GT change, SEEMP Part III to be revised and submitted for verification. If change of DWT and/ or GT is identified as a CII reducing measure in SEEMP part III and/ or CAP, all future required annual operational CII should be calculated and verified using the original DWT or GT value before DWT or GT conversion.

The attained annual operational CII which is to be used to assess compliance should be calculated and verified using the new DWT or GT value after conversion. Except for the year of conversion where the attained CII should be calculated and verified based on the average DWT or GT value weighted on distance travelled before and after conversion.

If change of DWT and/ or GT IS NOT identified as a CII reducing measure in SEEMP part III and/ or CAP, required annual operational CII should be calculated and verified using DWT or GT value after conversion. For the year of conversion, both required CII attained CII should be calculated and verified based on the average DWT or GT value weighted on distance travelled before and after conversion.

#### 4.17 What happens to the CII and Reduction Factor (R) after 2026?

As per Q1 2024, this is still unknown. CII requirements will be evaluation in a planned 2025 revision by IMO. Currently, IMO is aiming for approximately 20-30% reduction in 2030 and 100% reduction in 2050. These values are adhered to by Sustainable Ships as a guideline for the longer term, but a more likely scenario towards 2030 is simply a continuation of the 2% yearly increase of the Reduction Factor (R).

## 5.0 APPENDIX

### 5.1 References

<a href="#">IMO</a>	MEPC.346(78) 2022 Guidelines for development of SEEMP
<a href="#">IMO</a>	MEPC.355(78) 2022 Interim guidelines on CII calculations
<a href="#">ClassNK</a>	CII (Carbon Intensity Indicator)
<a href="#">DNV</a>	CII Frequently Asked Questions
<a href="#">DNV</a>	CII – Carbon Intensity Indicator
<a href="#">Bureau Veritas</a>	EEXI and CII: dual regulations reducing ship's carbon impact
<a href="#">Sustainable Ships</a>	Emissions calculation guide

## 5.2 CII Required

See section 2.4 for more information.

Table 2. d1 - d2 - d3 - d4 for different ship types under different conditions.

Ship type	Condition	d1	d2	d3	d4
Tanker		0.82	0.93	1.08	1.28
Bulk Carrier		0.86	0.94	1.06	1.18
Combination carrier		0.87	0.96	1.06	1.14
Container Ship		0.83	0.94	1.07	1.19
General Cargo		0.83	0.94	1.06	1.19
Gas Carrier	>=65.000 DWT	0.81	0.91	1.12	1.44
Gas Carrier	< 65,000 DWT	0.85	0.95	1.06	1.25
LNG Carrier	>= 100.000 DWT	0.89	0.98	1.06	1.13
LNG Carrier	<100.000 DWT	0.78	0.92	1.10	1.37
RoRo Passenger / Cargo		0.76	0.89	1.08	1.27
RoRo Cargo		0.76	0.89	1.08	1.27
RoRo Passenger		0.76	0.92	1.14	1.30
RoRo Cargo Vehicle Carrier		0.86	0.94	1.06	1.16
Refrigerated Cargo Carrier		0.78	0.91	1.07	1.20
Cruise Passenger Ship		0.87	0.95	1.06	1.16

Table 3. Reduction factors (R) in % for the CII required relative to CII reference from now until 2026. Evaluation of CII and consequently reduction factor is planned for 2025. The ultimate goal of IMO is to achieve 100% CO<sub>2</sub> reduction in 2050, with an intermediate goal of 40% in 2030. This would translate into similar reduction factors, although these are quite high on such a short timeline.

	2023	2024	2025	2026	2027+
Reduction Factor (R)	5%	7%	9%	11%	t.b.d.