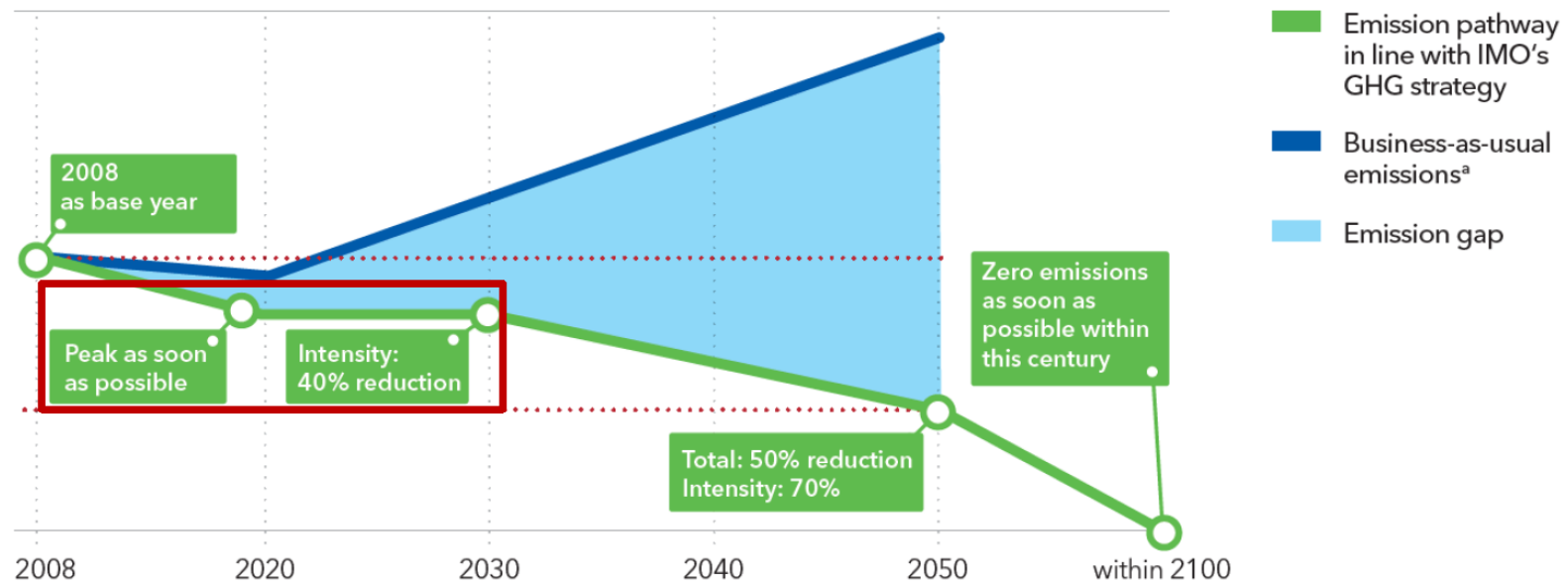


IMO strategy on GHG reductions – vision and ambitions

Units: GHG emissions



Total: Refers to the absolute amount of GHG emissions from international shipping.

Intensity: Carbon dioxide (CO₂) emitted per tonne-mile.

^aNote that the the business-as-usual emissions are illustrative, and not consistent with the emissions baseline used in our modelling (Chapter 6).

Technical measure: Energy Efficiency Existing Ship Index (EEXI)

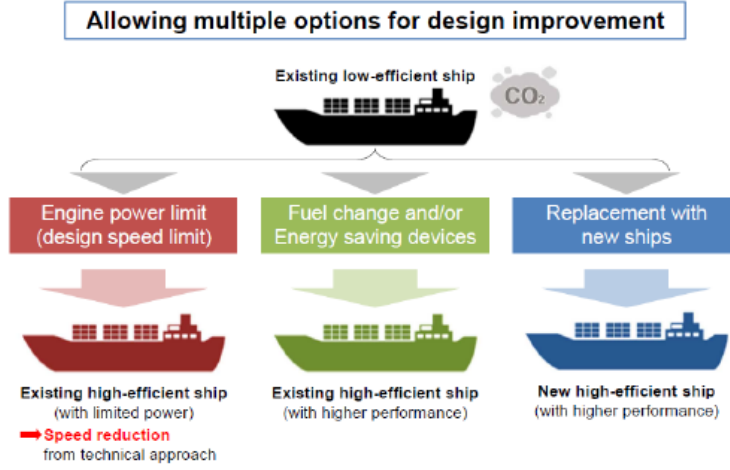
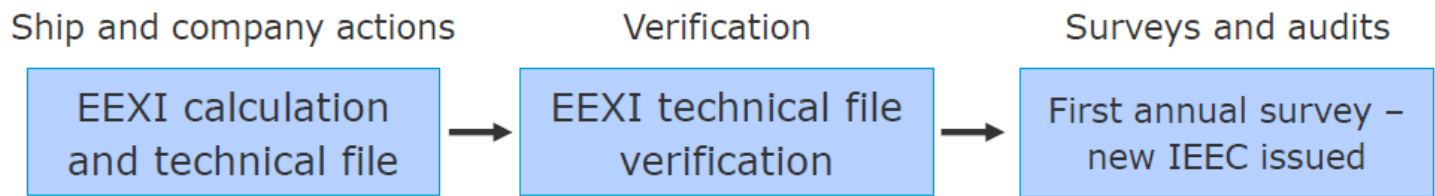
Requirements:

- Applicable for specific **ship types and sizes** (same as for EEDI) regardless of contract date
- **Attained EEXI ≤ Required EEXI** = EEDI Phase 2/3 adjusted requirements

Application:

- On **first annual, intermediate or renewal IAPP survey** or the **initial IEE survey** after 1 January 2023.

Survey and Certification:



Ship type	Required EEXI*
Bulk carrier	Δ15-20% by size
Tanker	Δ15-20% by size
Container	Δ20-50% by size
General cargo	Δ30%
Gas carrier	Δ20-30% by size
LNG carrier	Δ30%
Reefer	Δ15%
Combo	Δ20%
Ro-ro/ro-pax	Δ5%
Ro-ro (vehicle)	Δ15%
Cruise ship	Δ30%

*) Reduction from EEDI reference line

■ EEXI is calculated by the same formula as EEDI.

EEXI [g/ton · mile]=

$$\frac{\left(\prod_{j=1}^M f_j \right) \left(\sum_{i=1}^{nME} P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)} \right) + (P_{AE} \cdot C_{FAE} \cdot SFC_{AE}) + \left\{ \left(\prod_{j=1}^M f_j \cdot \sum_{i=1}^{nPTI} P_{PTI(i)} - \sum_{i=1}^{neff} f_{eff(i)} \cdot P_{AEeff(i)} \right) \cdot C_{FAE} \cdot SFC_{AE} \right\} - \left(\sum_{i=1}^{neff} f_{eff(i)} \cdot P_{eff(i)} \cdot C_{FME} \cdot SFC_{ME} \right)}{f_i \cdot f_c \cdot f_i \cdot Capacity \cdot V_{ref}}$$



Concept formula

$$\text{EEXI [g/ton · mile]} = \frac{\text{CO}_2 \text{ Conversion factor} \times \text{SFC [g/kW · h]} \times \text{Engine Power [kW]}}{\text{Capacity [ton]} \times \text{EEXI Speed [knots]}}$$



CO₂ emissions (gram) from a ship when ship sail transport 1 (ton) cargo for 1 (nautical mile)

CO ₂ Conversion factor (C _F)	C _F corresponds to the fuel used when determining SFC (DM grade: 3.206)
SFC	Fuel consumption at 75%MCR (M/E), at 50%MCR (A/E)
Engine Power	75% of the rated installed power (MCR) (In case of EPL, 83%MCR _{lim})
Capacity	Deadweight (For containerhips, 70% of the deadweight)
EEXI Speed (V _{ref})	Ship speed at 75%MCR under the draught condition corresponding to the capacity

Application of EEXI

The “calculation of EEXI (Attained EEXI)” and “conformity to required value (Required EEXI)” shall apply to the following ship type and size as with the case of EEDI.

Type of ship	Calculation of Attained EEXI	Conformity to Required EEXI
Bulk carrier	400 GT and above	10,000 DWT and above
Gas carrier	400 GT and above	2,000 DWT and above
Tanker	400 GT and above	4,000 DWT and above
Containership	400 GT and above	10,000 DWT and above
General cargo ship	400 GT and above	3,000 DWT and above
Refrigerated cargo carrier	400 GT and above	3,000 DWT and above
Combination carrier	400 GT and above	4,000 DWT and above
Ro-ro cargo ship (Vehicle carrier)	400 GT and above	10,000 DWT and above
Ro-ro cargo ship	400 GT and above	1,000 DWT and above
Ro-ro passenger ship	400 GT and above	250 DWT and above
LNG carrier	400 GT and above	10,000 DWT and above
Cruise passenger ship (non-conventional)	400 GT and above	25,000 GT and above

EEDI Reference Line

✓ Required EEXI is set based on the EEDI reference line

Type of ship		Reference Line
Bulk carrier	DWT ≤ 279,000	$961.79 \times \text{DWT}^{-0.477}$
	DWT > 279,000	$961.79 \times 279,000^{-0.477}$
Gas carrier		$1120.00 \times \text{DWT}^{-0.456}$
Tanker		$1218.80 \times \text{DWT}^{-0.488}$
Containership		$174.22 \times \text{DWT}^{-0.201}$
General cargo ship		$107.48 \times \text{DWT}^{-0.216}$
Refrigerated cargo carrier		$227.01 \times \text{DWT}^{-0.244}$
Combination carrier		$1219.00 \times \text{DWT}^{-0.488}$
Ro-ro cargo ship (vehicle carrier)	DWT/GT < 0.3	$(\text{DWT/GT})^{-0.7} \times 780.36 \times \text{DWT}^{-0.471}$
	DWT/GT ≥ 0.3	$1812.63 \times \text{DWT}^{-0.471}$
Ro-ro cargo ship	DWT ≤ 17,000	$1686.17 \times \text{DWT}^{-0.498}$
	DWT > 17,000	$1686.17 \times 17,000^{-0.498}$
Ro-ro passenger ship	DWT ≤ 10,000	$902.59 \times \text{DWT}^{-0.381}$
	DWT > 10,000	$902.59 \times 10,000^{-0.381}$
LNG carrier		$2253.7 \times \text{DWT}^{-0.474}$
Cruise passenger ship having non-conventional propulsion		$170.84 \times \text{GT}^{-0.214}$

Required EEXI (4/5)

Type of ship	Size	Reduction factor (X) %
Bulk carrier	200,000 DWT and above	15
	20,000 - 200,000 DWT	20
	10,000 - 20,000 DWT	0 - 20 *
Gas carrier	15,000 DWT and above	30
	10,000 - 15,000 DWT	20
	2,000 - 10,000 DWT	0 - 20 *
Tanker	200,000 DWT and above	15
	20,000 - 200,000 DWT	20
	4,000 - 20,000 DWT	0 - 20 *
Containership	200,000 DWT and above	50
	120,000 - 200,000 DWT	45
	80,000 - 120,000 DWT	35
	40,000 - 80,000 DWT	30
	15,000 - 40,000 DWT	20
	10,000 - 15,000 DWT	0 - 20 *

* Reduction factor to be linearly interpolated between the two values dependent upon ship size.

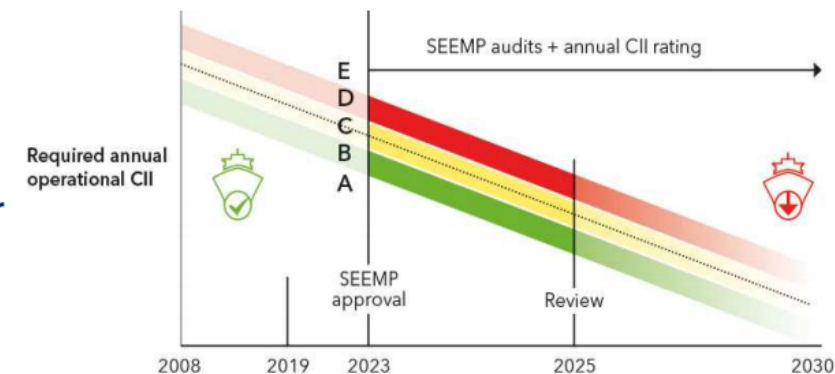
Required EEXI (5/5)

Type of ship	Size	Reduction factor (X) %
General cargo ship	15,000 DWT and above	30
	3,000 - 15,000 DWT	0 - 30 *
Refrigerated cargo carrier	5,000 DWT and above	15
	3,000 - 5,000 DWT	0 - 15 *
Combination carrier	20,000 DWT and above	20
	4,000 - 20,000 DWT	0 - 20 *
Ro-ro cargo ship (vehicle carrier)	10,000 DWT and above	15
Ro-ro cargo ship	2,000 DWT and above	5
	1,000 - 2,000 DWT	0 - 5 *
Ro-ro passenger ship	1,000 DWT and above	5
	250 - 1,000 DWT	0 - 5 *
LNG carrier	10,000 DWT and above	30
Cruise passenger ship having non-conventional propulsion	85,000 GT and above	30
	25,000 - 85,000 GT	0 - 30 *

* Reduction factor to be linearly interpolated between the two values dependent upon ship size.

Carbon Intensity Indicator rating

- **Scope: Cargo, ro-pax and cruise ships above 5000 GT**
- **Requirements:**
 - **Every year from 2023:** Annually calculate and report Carbon Intensity Indicator and rating A to E. Each ship needs to **achieve rating C or better**
- **Enforcement:**
 - If rating D for 3 consecutive years or rating E: develop and implement an **approved corrective action plan** as part of SEEMP to achieve rating C or better
 - Annual Statement of Compliance issued.
- **Other elements:**
 - Review to be conducted by 1 January 2026 – particularly:
 - Reduction factors for 2027-2030
 - Strengthened corrective actions
 - Need for enhancement of the enforcement mechanism
 - Carbon Intensity Code to be developed to ensure mandatory application



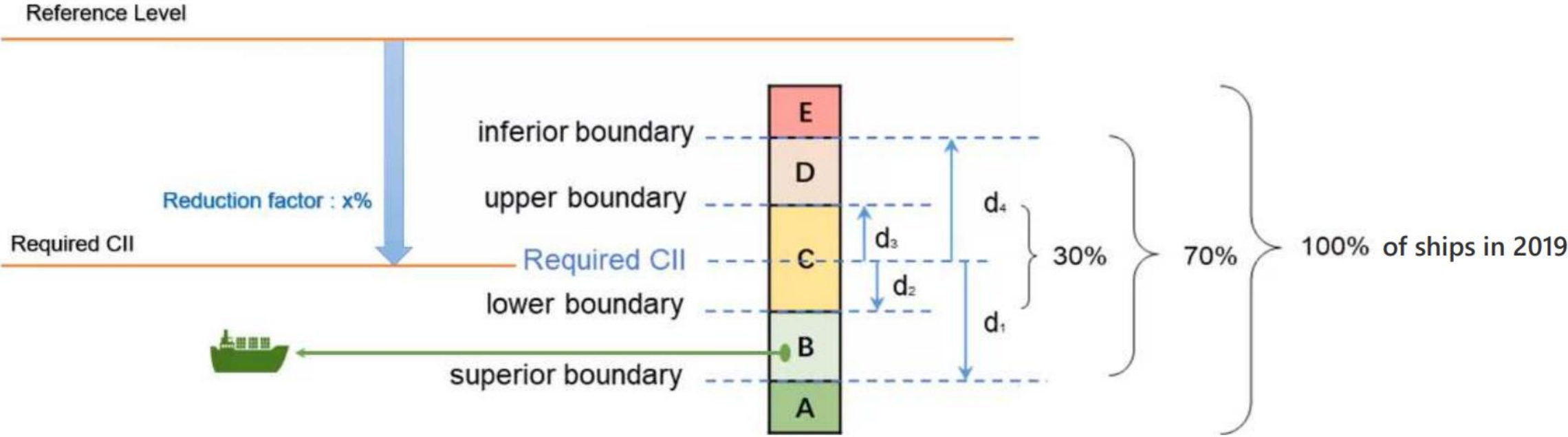
Year	Reduction from 2019 ref. (mid-point of C-rating band)
2023	5 %
2024	7 %
2025	9 %
2026	11 %
2027-2030	To be decided

Carbon Intensity Rating Scheme – the basics

Calculation of annual CII:

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

To be developed



Source: IMO CG informal session, 5 February 2021

CII guidelines – main decisions

- **Calculation guidelines (G1)**

- Calculation guidelines to be **adopted without any correction factors** for certain ship types, operational profiles and/or voyages (including no correction for ice class/operation)
- **New Correction Factor guidelines (G5) to be further discussed towards MEPC 78** through the Correspondence Group. Exemptions due to MARPOL Annex VI, Reg 3 to be taken into account. Other exemptions to be considered as corrections.
- Provision for Carbon Capture and Storage (CCS): not taken into account, the issue needs a broader discussion
- DWT to be used as Capacity metric for ro-ro cargo ships

- **Reference line guidelines (G2)**

- No acceptance of split reference line proposals for ro-ro cargo, vehicle, gas and LNG carriers
- No separate High Speed Craft category: should be addressed through correction factors

- **Reduction factor guidelines (G3)**

- Both supply and demand-based metrics will be used to monitor progress on the Carbon Intensity ambition in the GHG Strategy
- **Phased reduction rate: 2020-2022: 1.0% p.a., 2023-2026: 2.0% p.a. using 2019 as base year.** Further reduction rates from 2027-2030 to be decided as part of review by 1 January 2026. The same rate applies for all ship types.

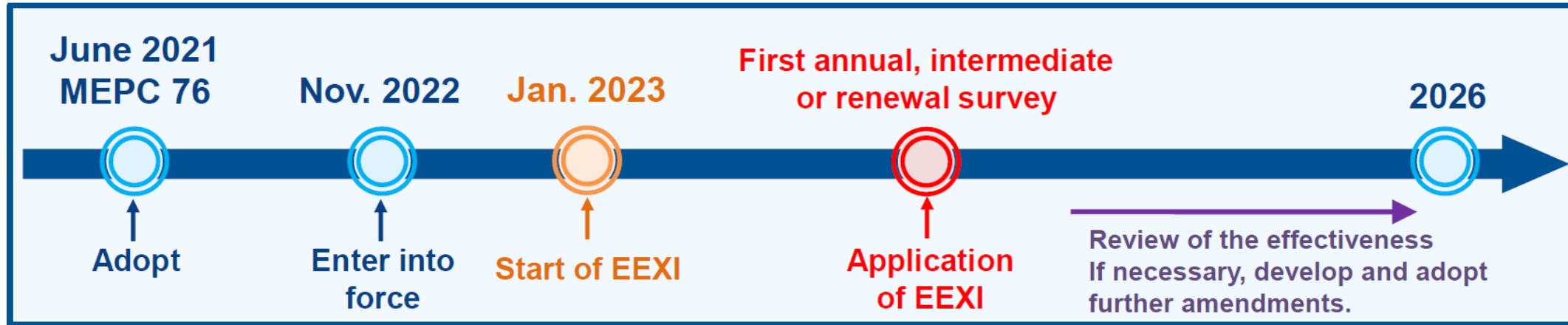
- **Rating guidelines (G4)**

- No proposals for adjustments of rating thresholds taken into account at this stage. Some issues may be addressed through correction factors. Potential future changes to thresholds should be based on additional data collection from DCS.

Enhanced SEEMP

- **Scope: Cargo, ro-pax and cruise ships above 5000 GT**
- **Requirements:**
 - By 1 January 2023 the SEEMP shall additionally include:
 - A description of the methodology that will be used to calculate the ship's attained annual operational CII and the processes that will be used to report this value to the ship's Administration;
 - The required annual operational CII for the next 3 years;
 - An implementation plan documenting how the required annual operational CII will be achieved during the next 3 years; and
 - A procedure for self-evaluation and improvement
- **Enforcement:**
 - The SEEMP shall be subject to verification and company audits taking into account Guidelines adopted by the Organization
 - Confirmation of Compliance issued when SEEMP is approved.





■ Timing of EEXI application

- ✓ The amendments to MARPOL ANNEX VI will enter into force on 1 November 2022.
- ✓ EEXI requirements will start from **1st January 2023**.
- ✓ The EEXI verification shall take place at the following timing.

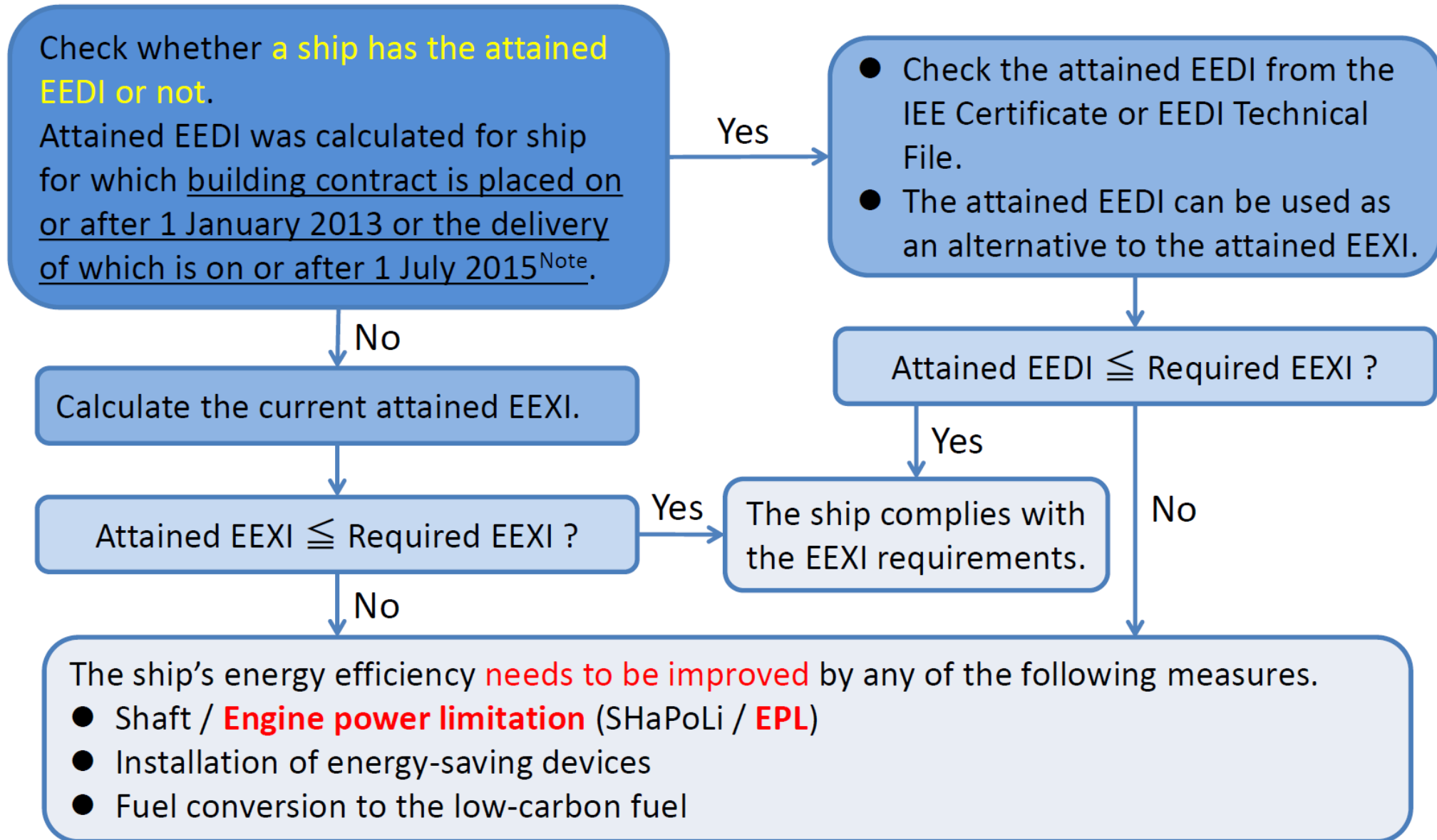
**Ships delivered before
1 January 2023**

First annual, intermediate or renewal survey of the International Air Pollution Certificate (IAPP Certificate), whichever is the first, **on or after 1 January 2023**

**Ships delivered on or after
1 January 2023**

Initial survey of the International Energy Efficiency Certificate (IEE Certificate)

Flow chart of EEXI application



Note : In case of LNG carrier and Cruise passenger ship, building contract is placed on or after 1 September 2015 or the delivery of which is on or after 1 September 2019.