

# Overview of Revised IMO GHG Strategy for Ships



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# Outline

- Background
  - Overview of International Maritime Organization (IMO)
  - Initial IMO GHG Strategy
  - IMO GHG Standards
- Revised IMO GHG Strategy
- Next Steps
  - Technical element
  - Economic element
  - Timeline



# International Maritime Organization



- IMO is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by international shipping
- The Marine Environment Protection Committee (MEPC) addresses environmental issues, including GHG emissions
- EPA serves on the U.S. delegation to IMO

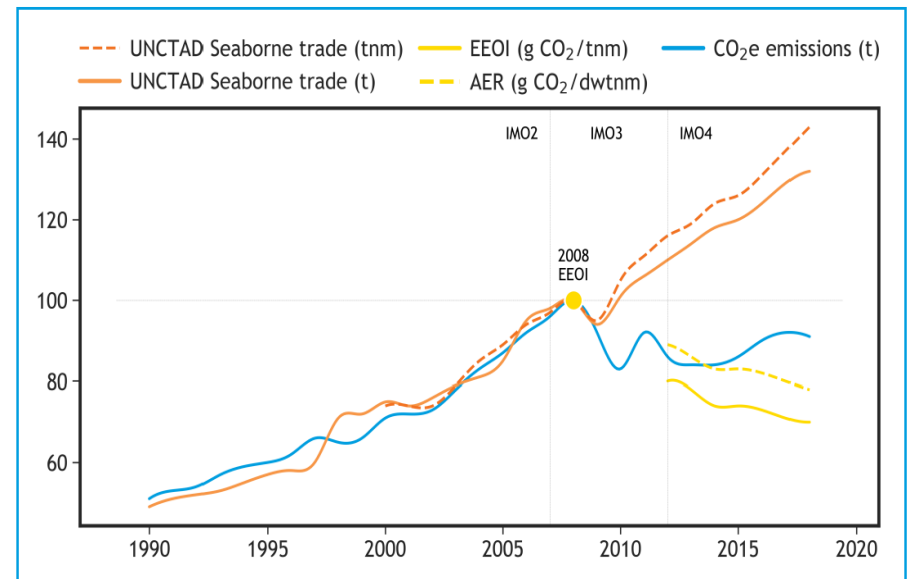


# GHG Targets



- International shipping 2.9% of global anthropogenic GHG in 2018
  - Source: 4th IMO GHG Study
  - Highest GHG emissions in 2008

Figure 2 - international shipping emissions and trade metrics, indexed in 2008, for the period 1990-2018, according to the voyage-based allocation<sup>2</sup> of international emissions<sup>3</sup>.



- Initial IMO GHG Strategy (adopted in 2018, since revised):
  - 40% reduction in CO<sub>2</sub>/transport work in 2030 (relative to 2008)
  - 70% reduction in CO<sub>2</sub>/transport work in 2050 and reduction in total annual emissions by at least 50% (relative to 2008)
  - Aiming to phase GHG emissions out as soon as possible in this century.

# IMO GHG Standards



## Technical requirements (improvements in design)

**Energy Efficiency Design  
Index for new ships (EEDI)  
EEDI for existing ships (EEXI)**

**All ships >400 GT must report;  
mandatory limits for certain  
types of ships, by ship size**

## Operational requirements (reduction in fuel consumption)

**Carbon Intensity Index (CII)  
Data Collection System  
(DCS)  
Ship Energy Efficiency  
Management Plan (SEEMP)**

**Applicable to certain ship types,  
by ship size**

**All ships >400 GT must have  
SEEMP**

# EEDI

$$EEDI = \frac{P \cdot SFC \cdot C_f}{DWT \cdot V_{ref}}$$

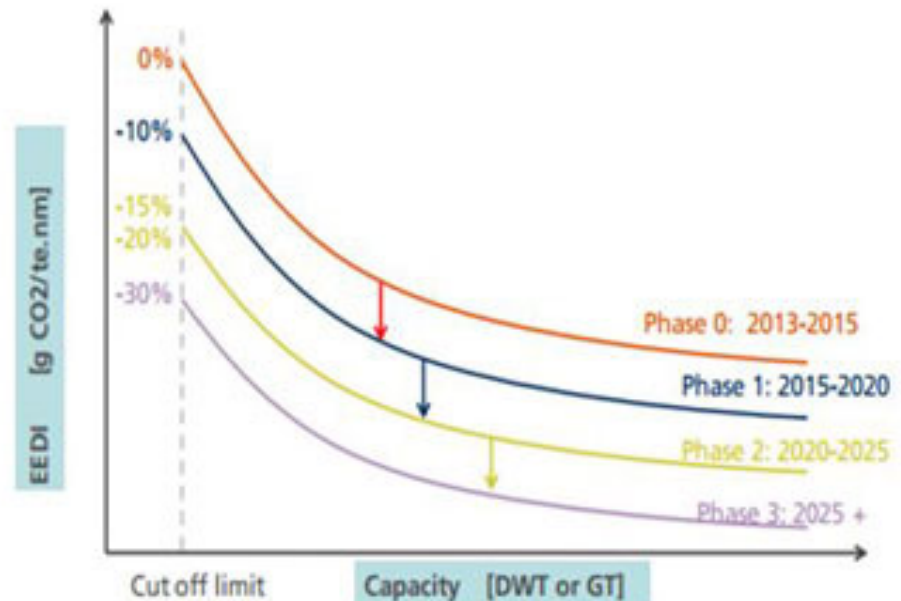


- The Energy Efficiency Design Index expresses the energy efficiency of a particular ship based on its design parameters
  - expressed in grams of carbon dioxide (CO<sub>2</sub>) per ship's capacity-mile (the smaller the EEDI the more energy efficient ship design) EEDI must be calculated for each new ship >400 GT
  - EEDI limit is reduced over time (for new ships only) – 3 Phases of stringency

- Reduction factor is the % reduction in Required EEDI relative to Reference Line.

- Cut off levels:

- Bulk Carriers: 10,000 DWT
- Gas carriers: 2,000 DWT
- Tankers: 4,000 DWT
- Container ship: 10,000 DWT
- Gen./ref. Cargo: 3,000 DWT



# EEXI

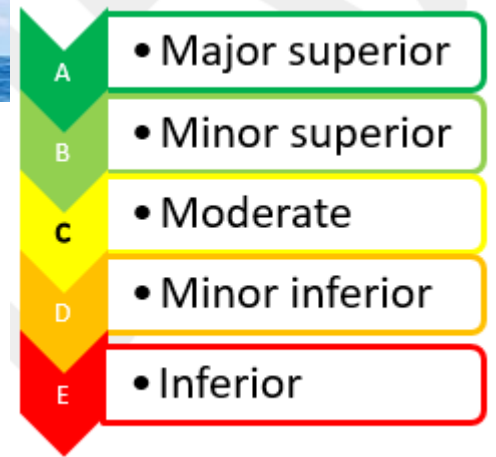
- EEXI is similar to EEDI but applies to existing ships
  - went into effect this year
- EEXI must be calculated for all ships not subject to EEDI
- Some ship types also subject to a declining limit, beginning at about EEDI Phase 2 stringency level Compliance is expected to require modifications for many existing ships
  - Addition of energy-saving technology; ships can also use power limitation approaches



# Carbon Intensity Indicator

Calculation of annual CII:

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



- The CII expresses the energy efficiency of a particular ship is based on actual fuel consumption per year per mile travelled
  - Applies to certain types of ships > 5,000 GT
  - Ships assigned rating: A, B, C, D, E, based on comparison to a pre-determined reference value
  - Ships must take remedial measures if it is rated D for 3 consecutive years or E for 1 year
- Stringency
  - Declining standard through 2026 (11% below 2018)
  - Review in 2026 may result in further stringency for 2027-2030



# DCS and SEEMP



## Data Collection System (DCS):

- Ships >5,000 GT are required to report their annual fuel consumed (at port and underway), by fuel type, miles travelled and hours of operation
- Goal is a better understanding of what ships are doing (IMO GHG inventories are estimates)

## Ship Energy Efficiency Management Plan (SEEMP):

- All Ships >400 GT are required to have such a plan
  - Provides a plan for improving energy efficiency generally (Part I)
  - Contains more information for ships subject to DCS and CII (Parts II and III)
- SEEMPs are be subject to audit in the context of the CII rating

# Revised GHG Strategy



## 2030

- Reduce total annual GHG by at least 20%, striving for 30% in 2030, compared to 2008
- Reduce CO<sub>2</sub>/transport work by 40%, relative to 2008
- Uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5%, striving for 10%, of the energy used by international shipping

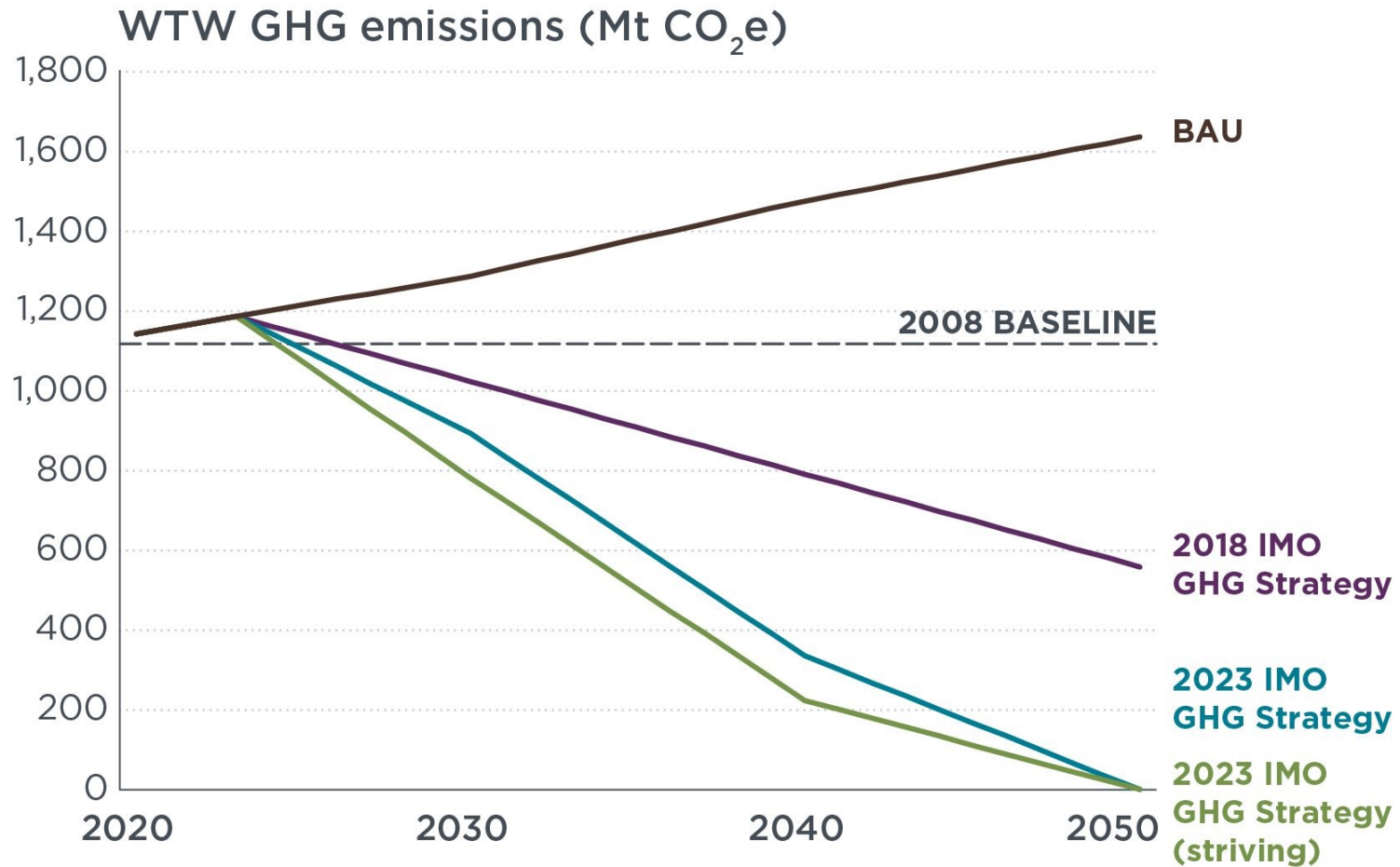
## 2040

- Reduce the total annual GHG emissions from international shipping by at least 70%, striving for 80% by 2040, compared to 2008

## 2050

- Reach net-zero GHG emissions by or around, i.e., close to, 2050, considering different national circumstances

# Effect of Revised Strategy



“IMO’s newly revised GHG strategy: What it means for shipping and the Paris Agreement - International Council on Clean Transportation” Source: [theicct.org](https://www.theicct.org/).

# Next Steps in GHG Strategy



- Candidate GHG reduction measures
  - Technical Element
    - Global fuel GHG standard
      - Standard regulating the phased reduction of the marine fuel's GHG intensity
    - First version of the IMO Guidelines on Lifecycle Analysis for marine fuels adopted at MEPC 80 – but further work to be done
  - Economic element
    - On the basis of a maritime GHG emissions pricing mechanism
    - Several concepts under consideration
- Key Dates
  - Fall 2024 - Complete impact assessment of candidate measures
  - Spring and Fall 2025 – Potential approval and adoption of candidate measures