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# Integration of economic and technical maritime transport sector challenges into International Maritime Organization (IMO) regulations

Morgane Querel

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Integration of  
economic and  
technical maritime  
transport sector  
challenges into  
International Maritime  
Organization (IMO)  
regulations



**OCEANEXT 2024**  
06/2024 - Nantes  
Querel Morgane



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# I – Introduction: IMO and climate change

## What is the International Maritime Organization (IMO)?



Article 1 alinéa a of the Convention on the International Maritime Organization,  
as amended in 1975

To provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade, and to encourage the general adoption of the highest practicable standards in matters concerning maritime safety and efficiency of navigation, [*the prevention and control of marine pollution from ships; and to deal with legal matters related to the purposes set out in this Article*]

# I – Introduction: IMO and climate change

## What is the impact of maritime transport sector ?

≈ 3% of global greenhouse gaz (GHG) emissions



In case of inaction, ≈ 17% of the global CO2 emissions in 2050



Pour chaque **TONNE** de marchandises transportées sur un kilomètre



Un navire émet **12 g de CO<sub>2</sub>**



Un train émet **14 g de CO<sub>2</sub>**



Un camion émet **76 g de CO<sub>2</sub>**

Research and trafic, 2013

# I – Introduction: IMO and climate change

## What are the competence of IMO regarding climate change?

Articles 1 alinéa a  
et 3 alinéas a et b



No. 4214. CONVENTION ON THE INTERNATIONAL MARITIME ORGANIZATION.\* DONE AT GENEVA ON 6 MARCH 1948<sup>1</sup>



Article 3

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, 1992

MULTILATERAL

United Nations Convention on the Law of the Sea (with annexes, final act and procès-verbaux of rectification of the final act dated 3 March 1986 and 26 July 1993). Concluded at Montego Bay on 10 December 1982

Authentic texts: Arabic, Chinese, English, French, Russian and Spanish.  
Registered ex officio on 16 November 1994.

Articles 194, 211,  
212 et 222



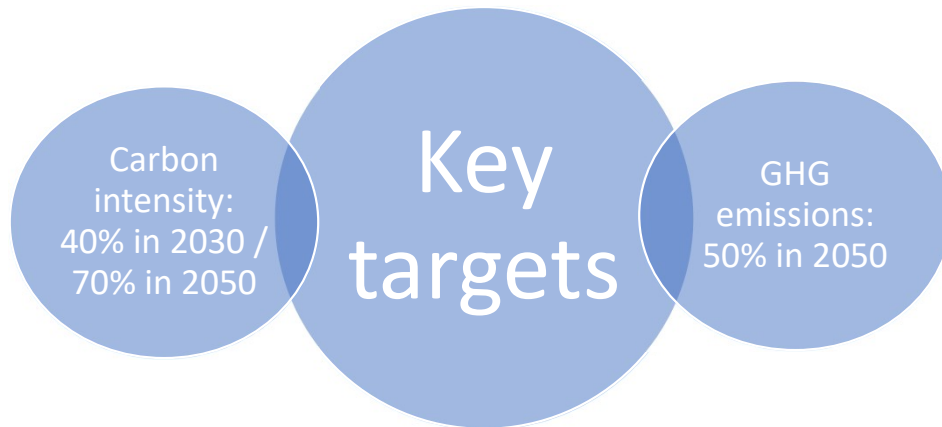
Article 2

KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, 1997



# I – Introduction: IMO and climate change

What is the first step of IMO actions regarding climate change?



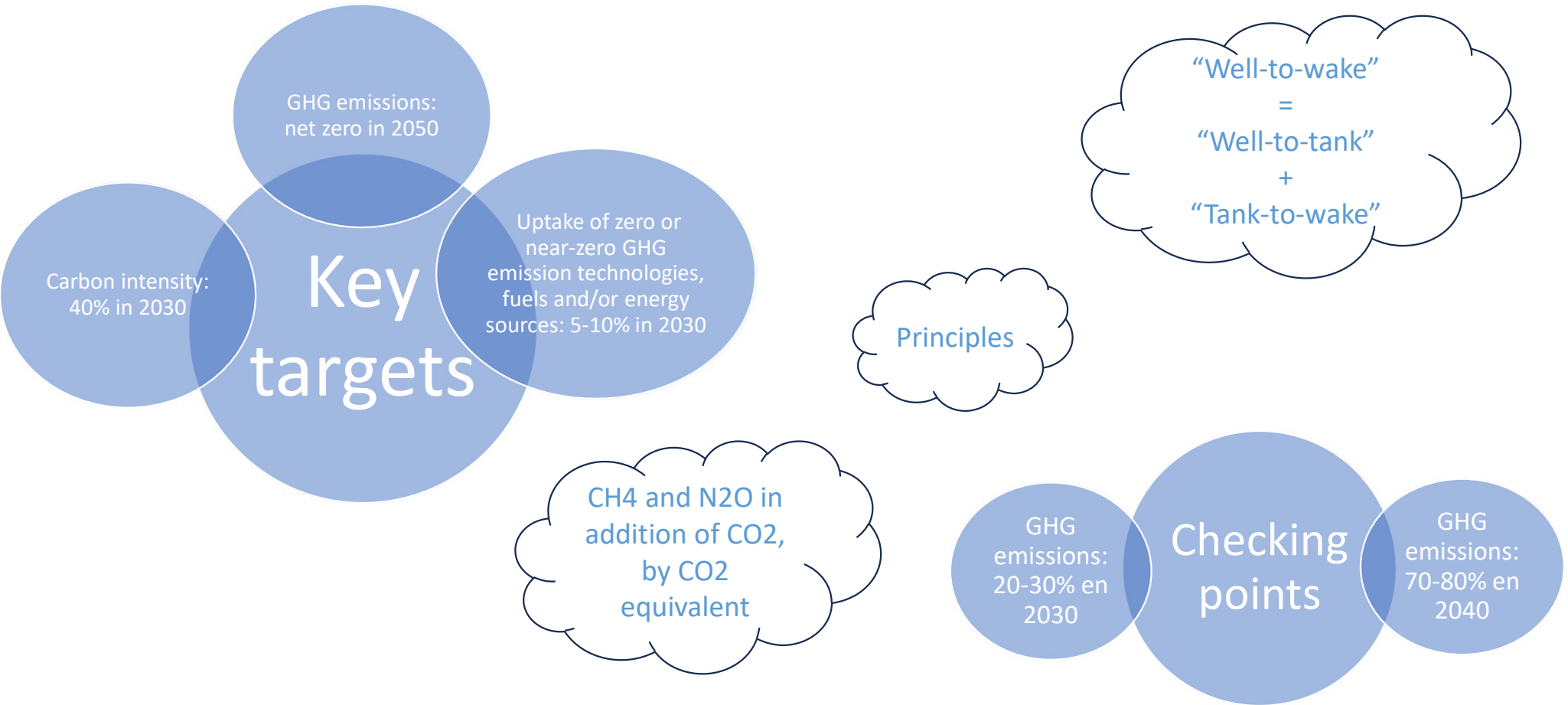
2018 Initial IMO Strategy on Reduction of  
GHG Emissions from Ships

Marine Environment Protection Committee  
(MEPC) 72



# I – Introduction: IMO and climate change

## What are the actual ambition of IMO?



# I – Introduction: IMO and climate change

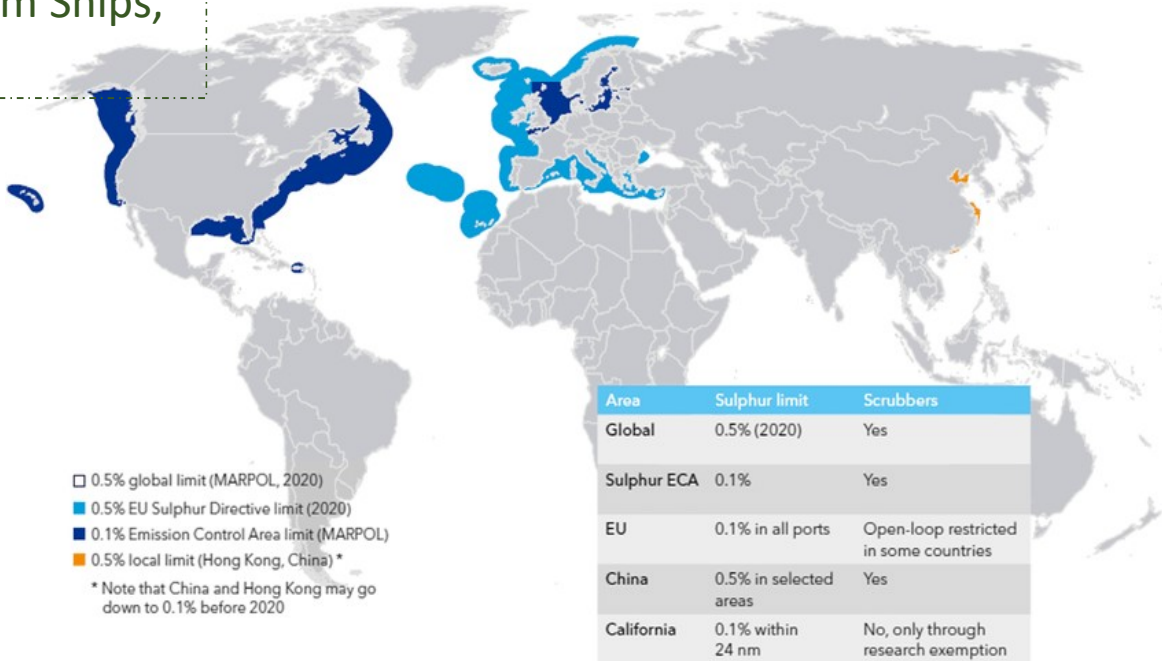
## What is MARPOL Convention?

International Convention for the Prevention of Pollution from Ships (MARPOL) 1973

Annex VI – Prevention of Air Pollution from Ships, 1997

Air quality

Climate change



Ioannis Mallidis, Stella Despoudi, Rommert Dekker et Dimitrios Vlachos, « The impact of sulphur limit fuel regulations on maritime supply chain network design », Article, 11/2020

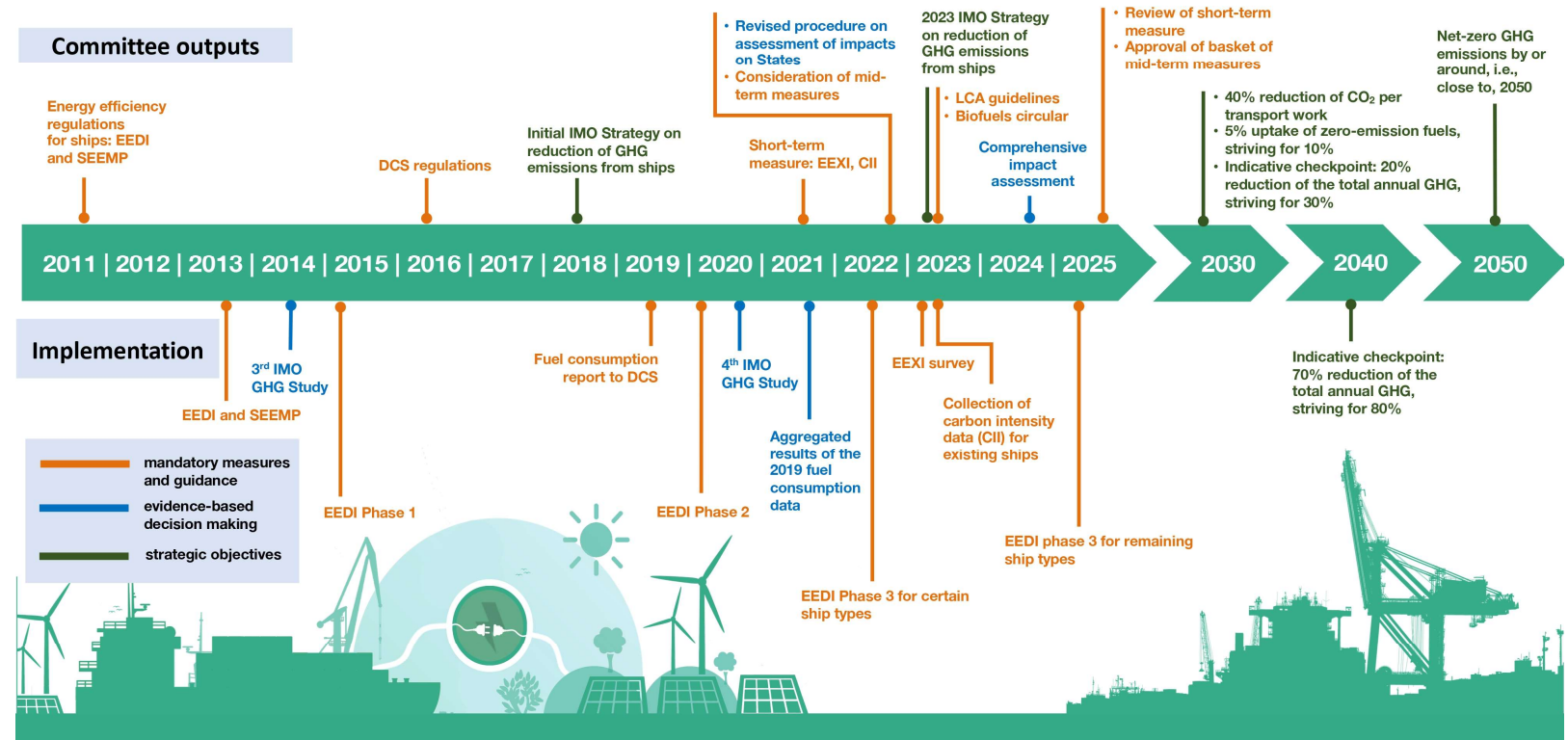
# I – Introduction: IMO and climate change

## What are the key energy efficiency measures?



### Addressing climate change

Over a decade of **regulatory action** to cut GHG emissions from shipping



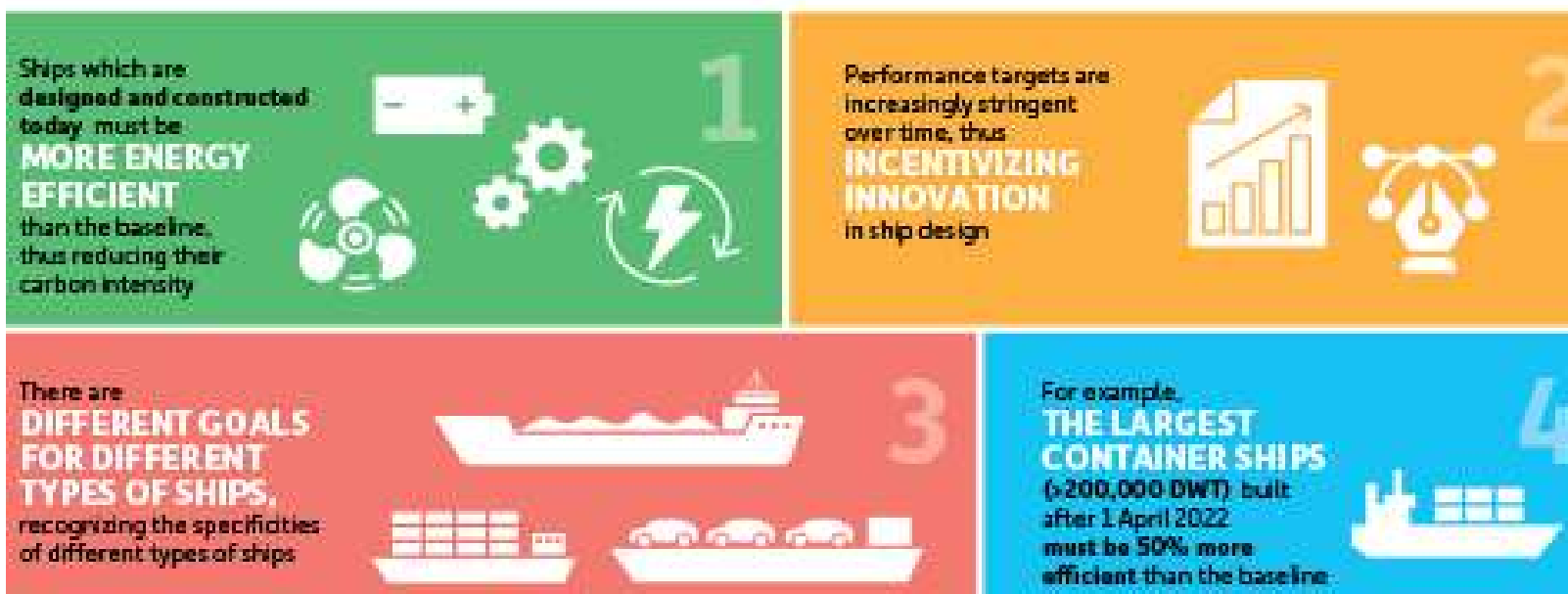
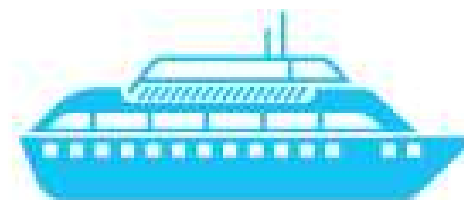
Internationale Maritime Organization (IMO)

# I – Introduction: IMO and climate change

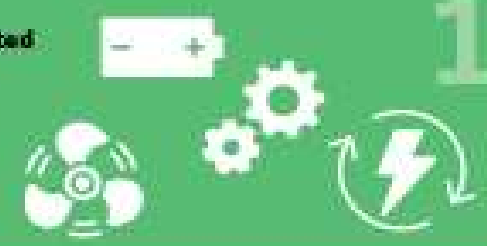
## What is the Energy Efficiency Design Index (EEDI)?


# EEDI

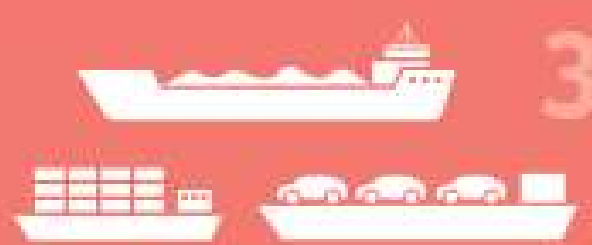
ENERGY EFFICIENCY DESIGN INDEX  
IMPROVING THE TECHNICAL  
PERFORMANCE OF NEW BUILD SHIPS

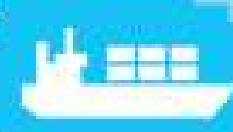


- Ships which are designed and constructed today must be **MORE ENERGY EFFICIENT** than the baseline, thus reducing their carbon intensity


- Performance targets are increasingly stringent over time, thus **INCENTIVIZING INNOVATION** in ship design


- There are **DIFFERENT GOALS FOR DIFFERENT TYPES OF SHIPS**, recognizing the specificities of different types of ships


- For example, **THE LARGEST CONTAINER SHIPS** (>200,000 DWT) built after 1 April 2022 must be **50% more efficient** than the baseline



Internationale Maritime Organization (IMO)

Centre de Droit Maritime et Océanique - Nantes Université  
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# I – Introduction: IMO and climate change

## What is the Energy Efficiency Existing Ship Index (EEXI)?

**EEXI**  
ENERGY EFFICIENCY EXISTING SHIPS INDEX IMPROVING THE TECHNICAL PERFORMANCE OF EXISTING SHIPS

- 1** The requirements for EEXI certification **ENTERED INTO FORCE** on 1 November 2022
- 2** All ships are required to calculate their **Attained Energy Efficiency EXISTING SHIP INDEX (EEXI)**
- 3** The EEXI is a **ONE-TIME CERTIFICATION** for existing ships targeting design parameters
- 4** There are a variety of technical means to **IMPROVE THE CARBON INTENSITY** of existing ships and achieve the **Required EEXI**
- 5** A **review clause** requires IMO to **REVIEW THE EFFECTIVENESS** of the implementation of the EEXI requirements, by 1 January 2026 at the latest, and, if necessary, **develop and adopt further amendments**

Internationale Maritime Organization (IMO)

# I – Introduction: IMO and climate change

## What is the Ship Energy Efficiency Management Plan (SEEMP)?

**Part I : Ship Energy Efficiency Management Plan – 400GT – 2013**

**Part II : IMO ship fuel oil consumption system (DCS) – 5 000 GT – 2019**

**Part III : carbon Intensity Indicator – 5 000 GT – 2023**



MeSeaTime, Capt Rajeev Jassal

# I – Introduction: IMO and climate change

What is the IMO ship fuel oil consumption system (DCS)?

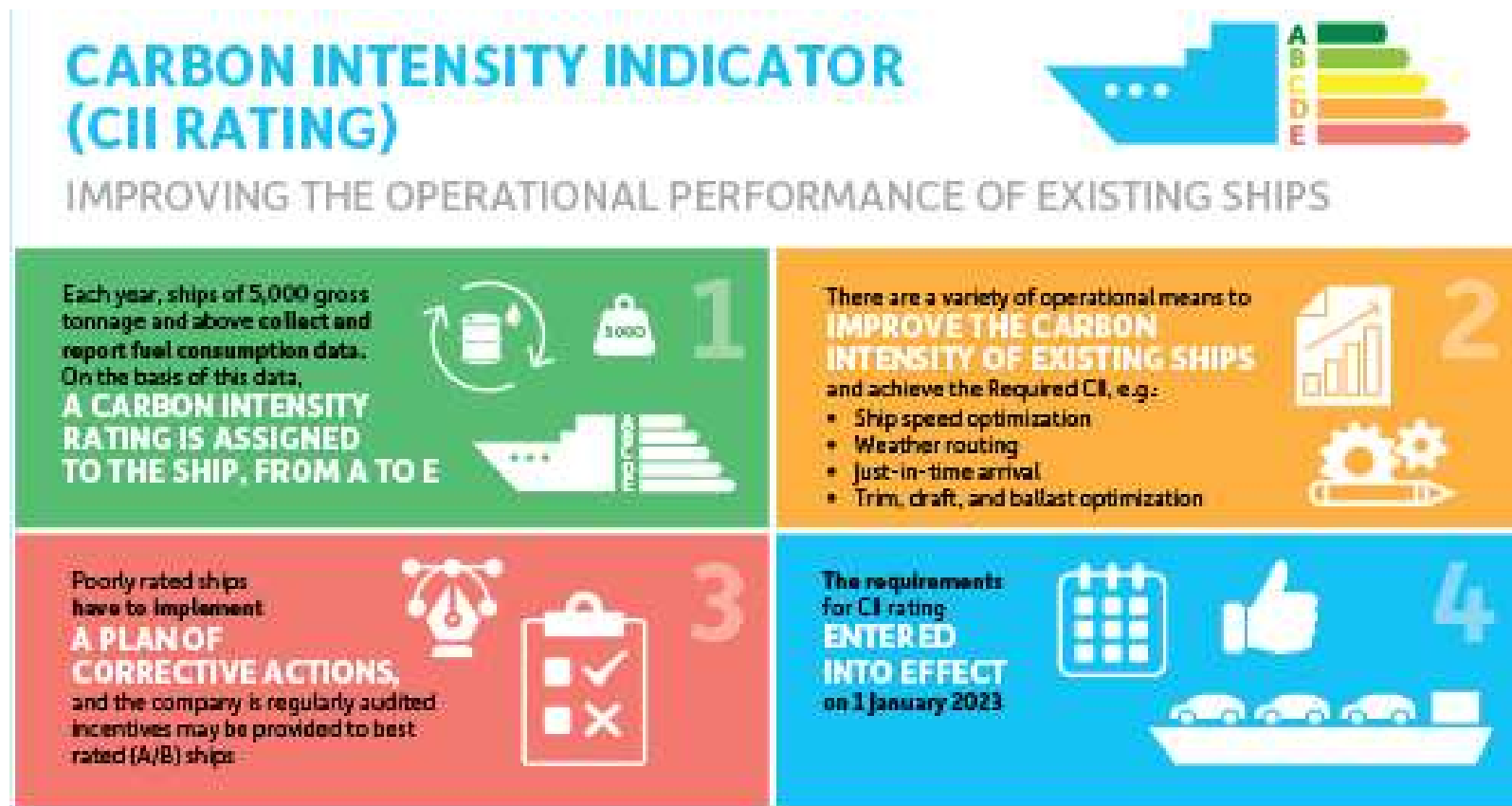


Det Norske Veritas (DNV)

- SEEMP Phase II
- Data collection system
- Ship above 5 000 GT
- 2019

# I – Introduction: IMO and climate change

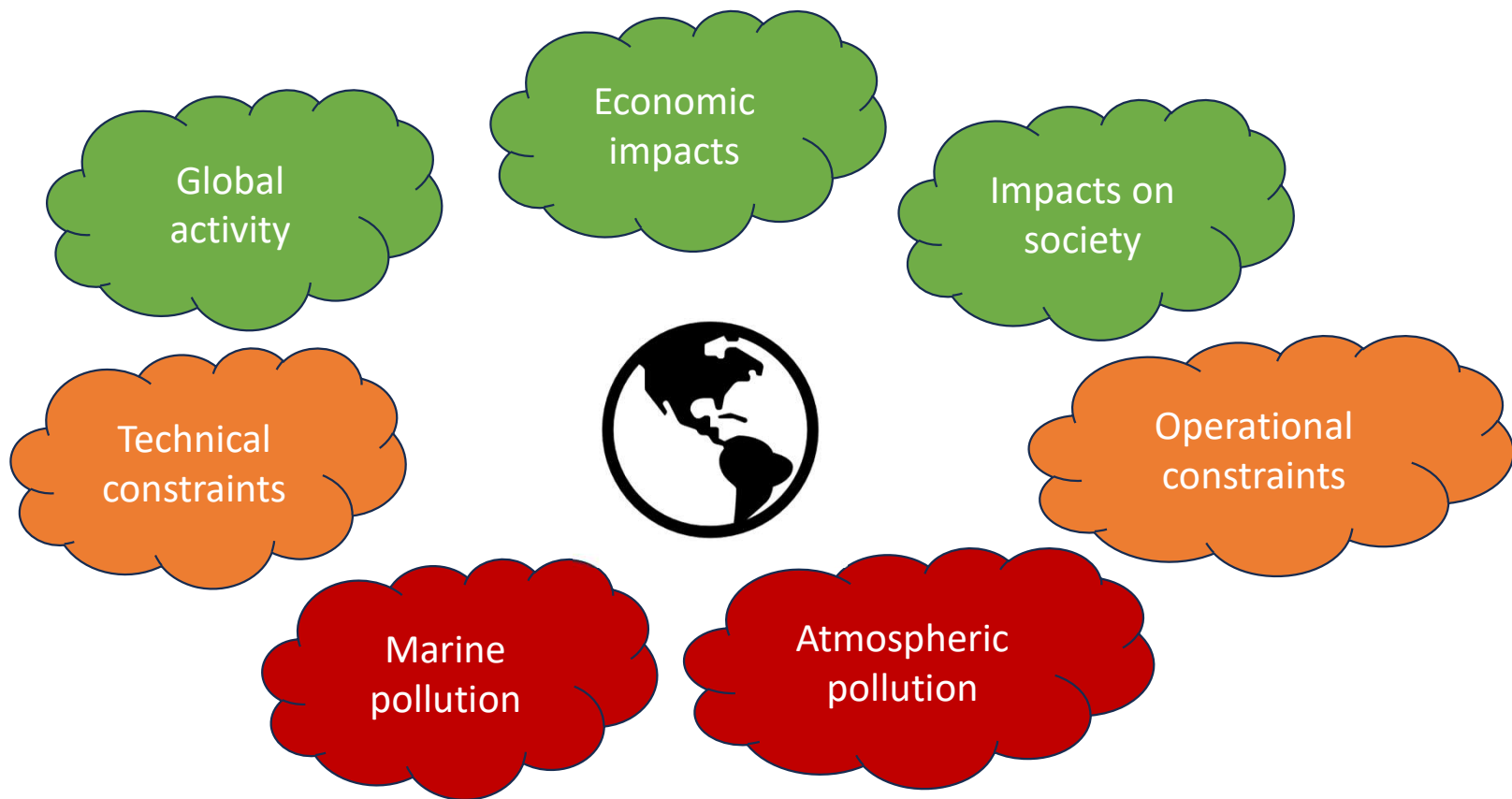
## What is the carbon Intensity Indicator (CII)?





# I – Introduction: IMO and climate change

## What is the maritime transport sector?





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# II – Integration of economic maritime transport sector challenges into IMO regulations

How much cost of a ship?

Long term investment

Depending of ship characteristics



Shipbuilding, retrofit and maintenance

Operational costs



# II – Integration of economic maritime transport sector challenges into IMO regulations

How is visible the economical importance of maritime transport sector?

Impact on global and States GDP

Maritime jobs

- 80% of world trade in value
- 90% of world trade by volume

+ 12 million tonnes of goods per year

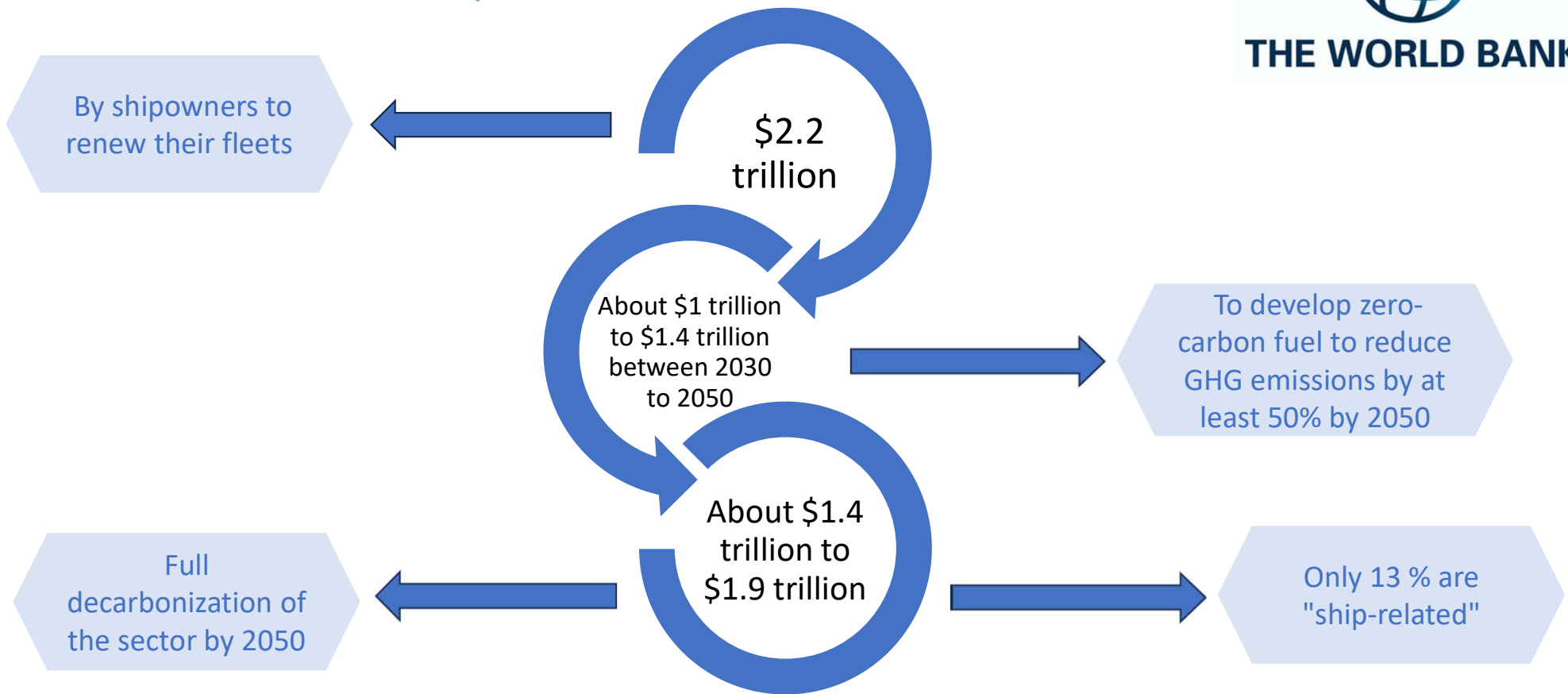
UNCTAD – Review of Maritime Transport 2023

Basic necessities

Many other related industries

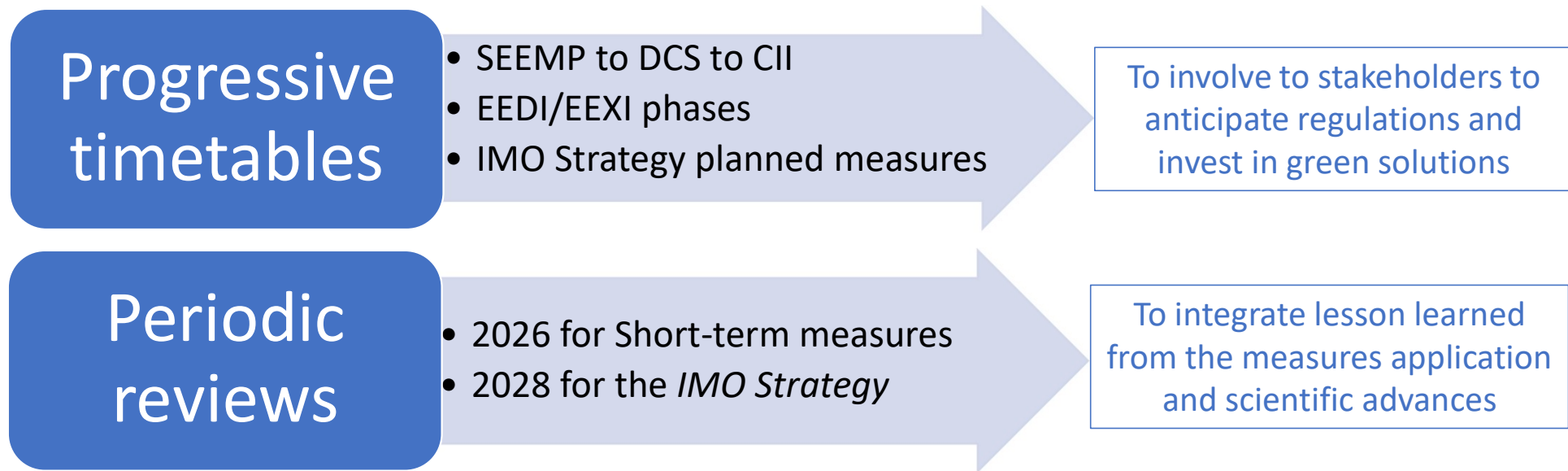
# II – Integration of economic maritime transport sector challenges into IMO regulations

## How maritime transport sector decarbonization will cost?



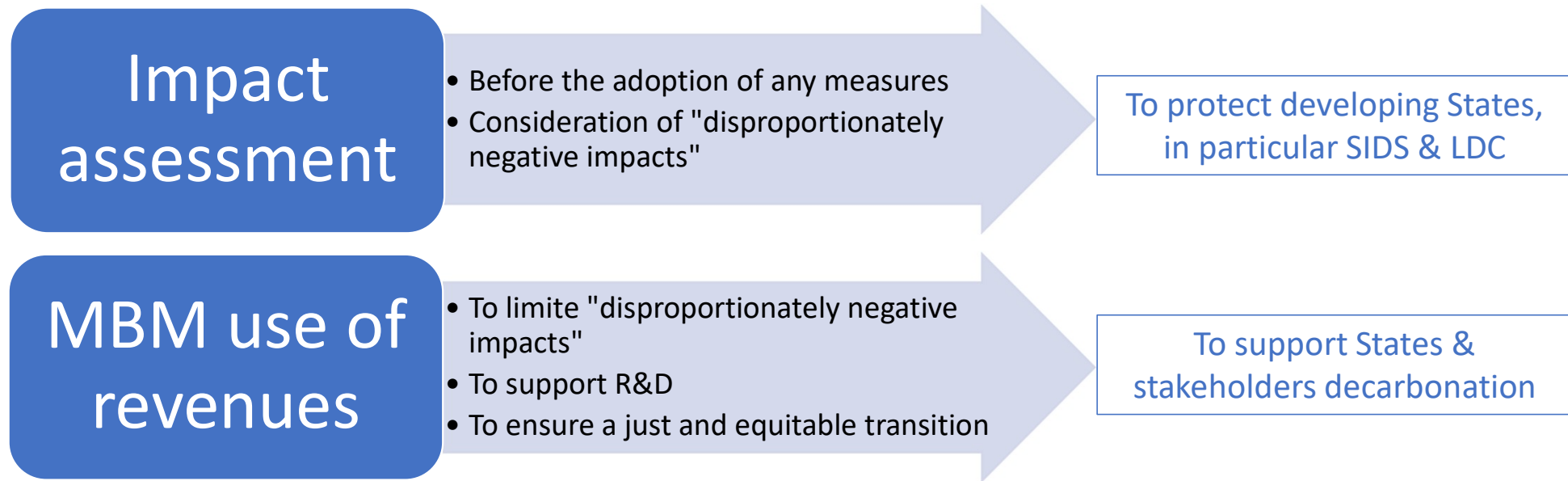
## II – Integration of economic maritime transport sector challenges into IMO regulations

How are integrated the economic maritime transport challenges into IMO regulations?



## II – Integration of economic maritime transport sector challenges into IMO regulations

How are integrated the economic maritime transport challenges into IMO regulations?



## II – Integration of economic maritime transport sector challenges into IMO regulations

What are the options for a market-based-measures (MBM)?

International Maritime  
Sustainability Funding and  
Reward (IMSF&R)

Tax

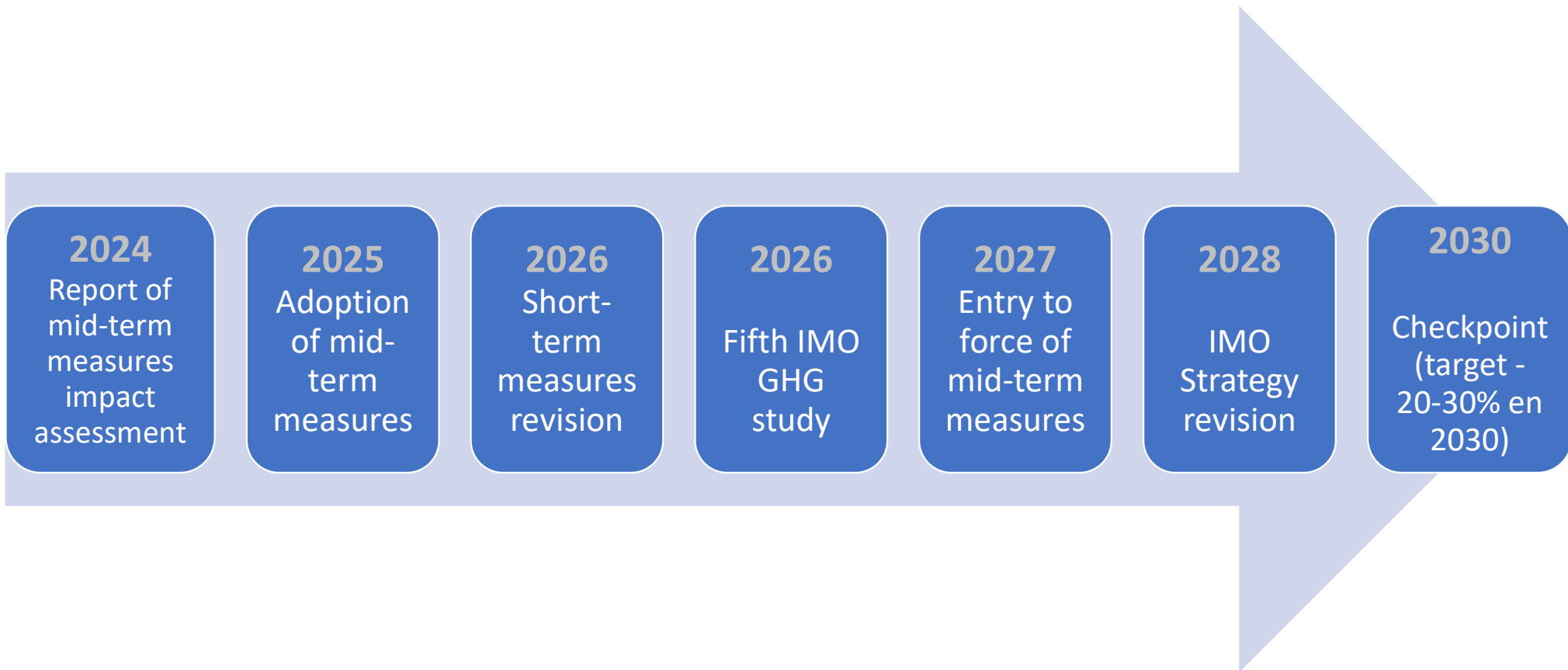
All included  
support to  
States &  
stakeholders

Emissions Trading System  
(ETS)



## II – Integration of economic maritime transport sector challenges into IMO regulations

What is IMO calendar for further actions?





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# III – Integration of technical maritime transport sector challenges into IMO regulations

## What are the technical constraints of maritime transport sector?

Bulk carriers, tankers, container ships, ro-ro, cargo ships, passenger ships and service ships

Travelling in all seas and oceans

105 493 ships of more than 100 GT in January 2023



UNCTAD – Review of Maritime Transport 2023

Weather and Meteorology conditions

0 to + 20 years old

# III – Integration of technical maritime transport sector challenges into IMO regulations

Which energy source will be available tomorrow?

## FUTURE MARINE FUELS

### PATHWAYS TO DECARBONIZATION

IMO has developed the ambitious target of a minimum **50% reduction** in greenhouse gas (GHG) emissions **by 2050**.

Shipowners have **alternative fuel options** to help them meet IMO's ambitions, each with its own advantages and challenges.

- Advantages
- Challenges

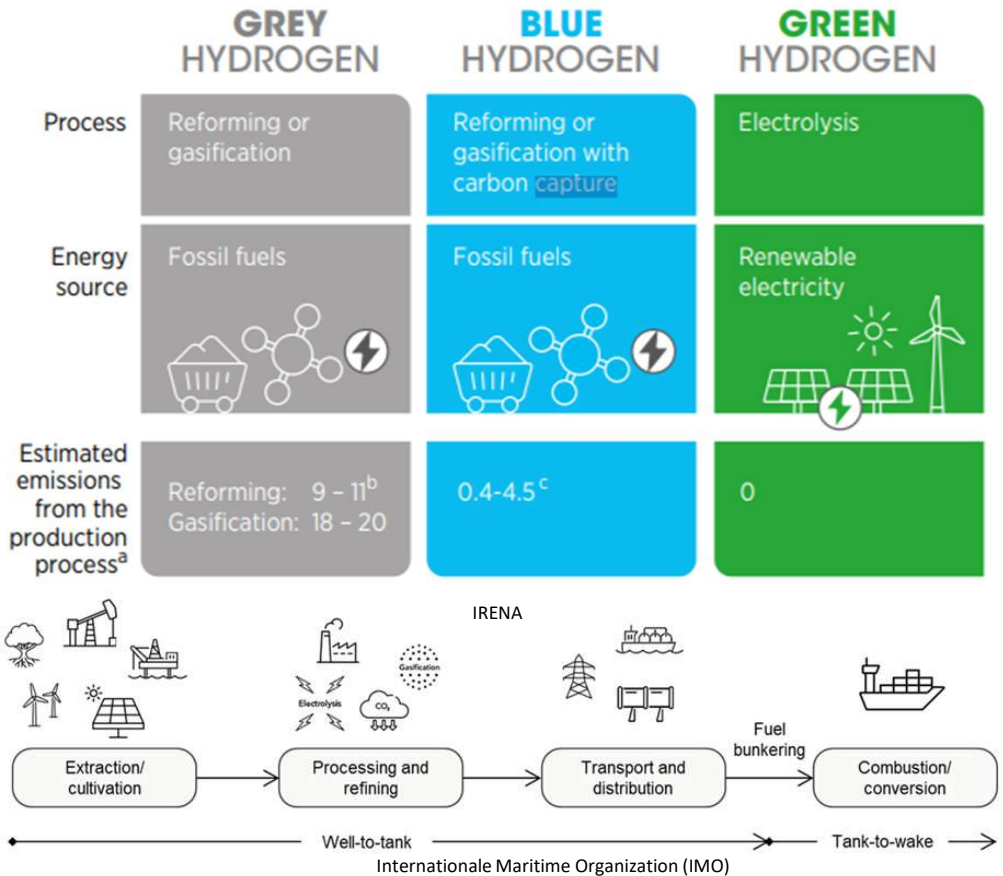


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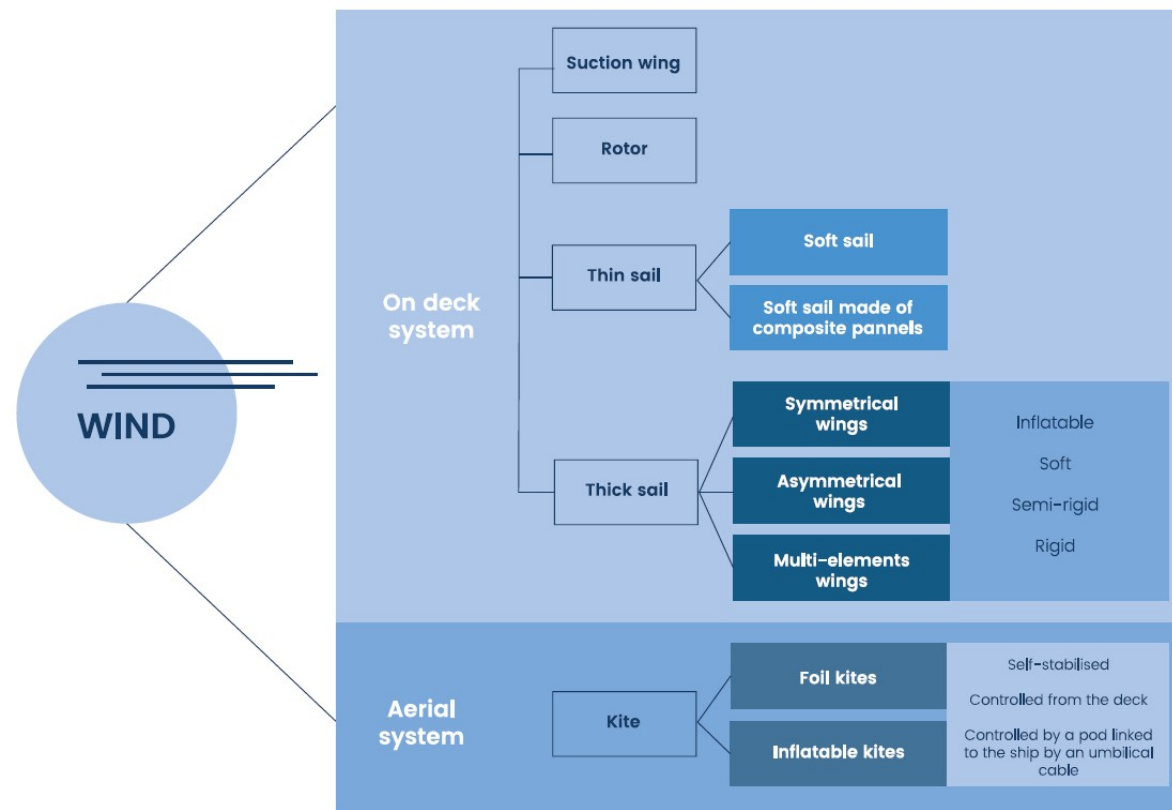
# III – Integration of technical maritime transport sector challenges into IMO regulations

## What are the challenges regarding alternative fuels?



# III – Integration of technical maritime transport sector challenges into IMO regulations

Which are the energy source available today?



Other categories : turbines to produce electricity, hull form, ...

Wind Whip



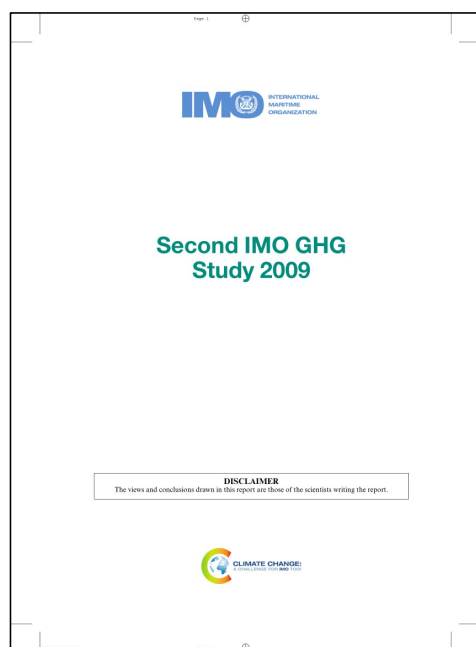
# III – Integration of technical maritime transport sector challenges into IMO regulations

How are the technical innovations integrated on ships?

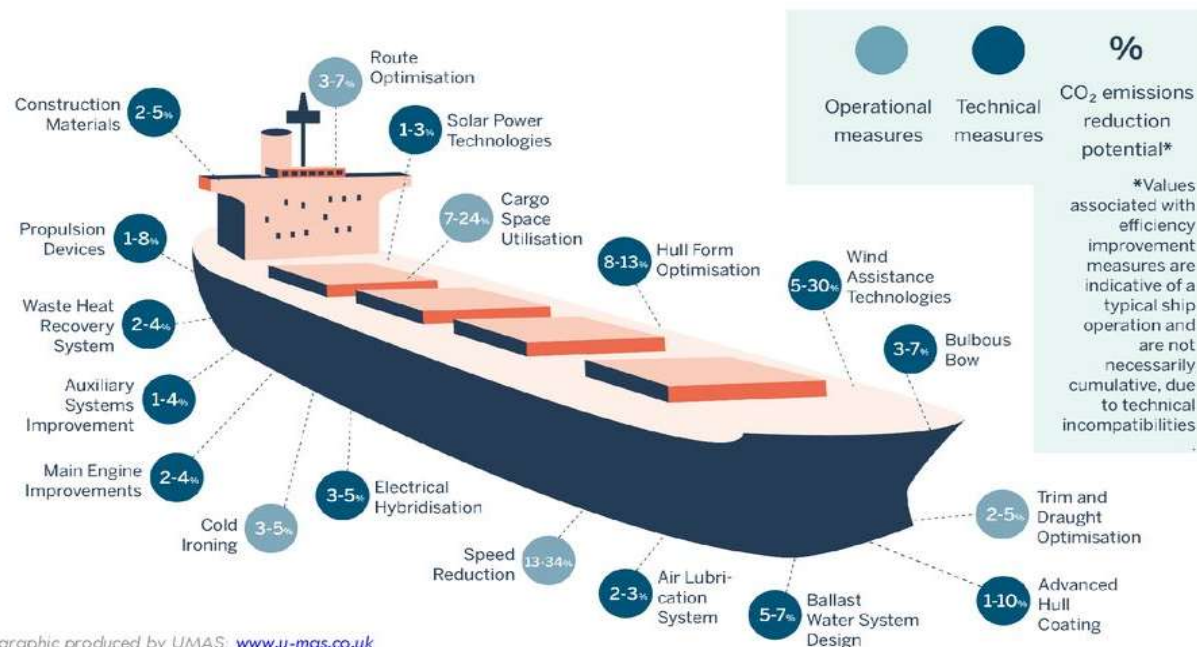
## Efficiency measures



Some of the needed emissions reductions can be achieved immediately using **technical and operational energy efficiency measures.**



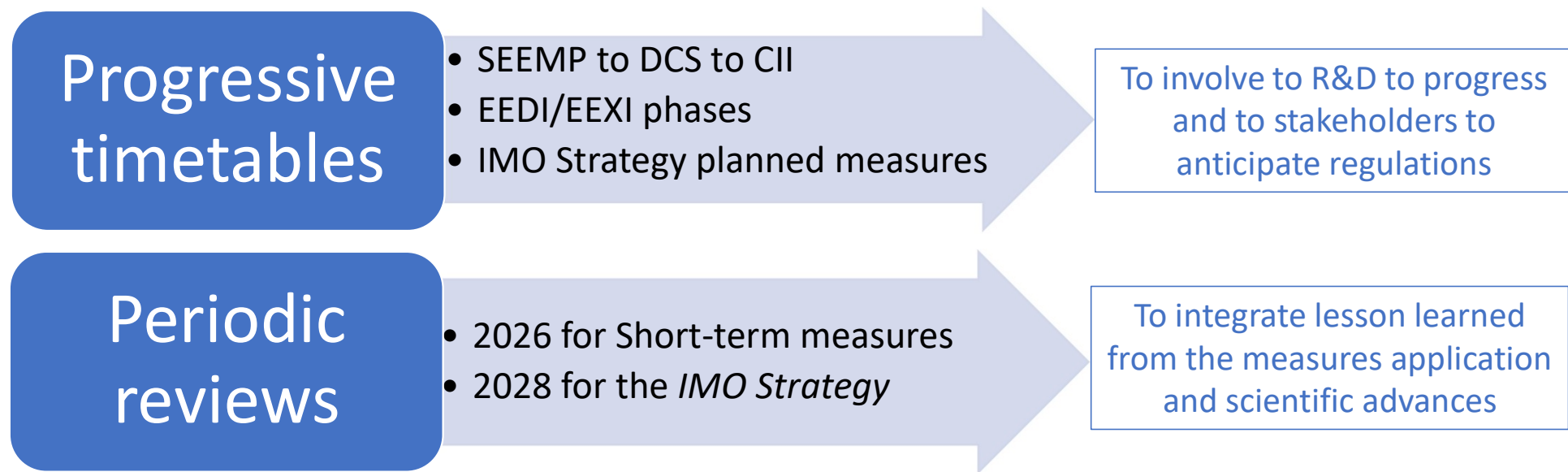
2009



Infographic produced by UMAS: [www.u-mas.co.uk](http://www.u-mas.co.uk)

# III – Integration of technical maritime transport sector challenges into IMO regulations

How are integrated the technical maritime transport challenges into IMO regulations?





# III – Integration of technical maritime transport sector challenges into IMO regulations

Which are the mid-term measures to ensure green fuels on WtW basis ?



## Guidelines on life cycle GHG intensity of marine fuels (LCA Guidelines)



- Adopted in 2023;
- To provide a corresponding calculation basis for the new *IMO Strategy*;
- Define the emission factor attributed to a fuel according to its production pathways;
- To be improved by the MEPC.

## III – Integration of technical maritime transport sector challenges into IMO regulations

Which are the mid-term measures to ensure green fuels on WtW basis ?

### **GHG Fuel Standard (GFS)**

- Currently under discussion as mid-term measures;
- To gradually limit GHG intensity from fuels used by ship;
- On a WtW basis, and including CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O.



# SOCIAL AND ECONOMIC IMPACT OF CLIMATE CHANGE



The cost of adapting coastal areas to rising sea levels

Relocation of whole towns



Loss of the capacity to work due to heat

Shrinking productivity of harvests



More wars to gain access to limited resources

Prices of basic foodstuffs and consumer goods will rise



Fresh water will be in short supply in some areas

Extreme meteorological phenomena will cause widespread poverty



Diseases will spread due to higher temperatures







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**Thank you**

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