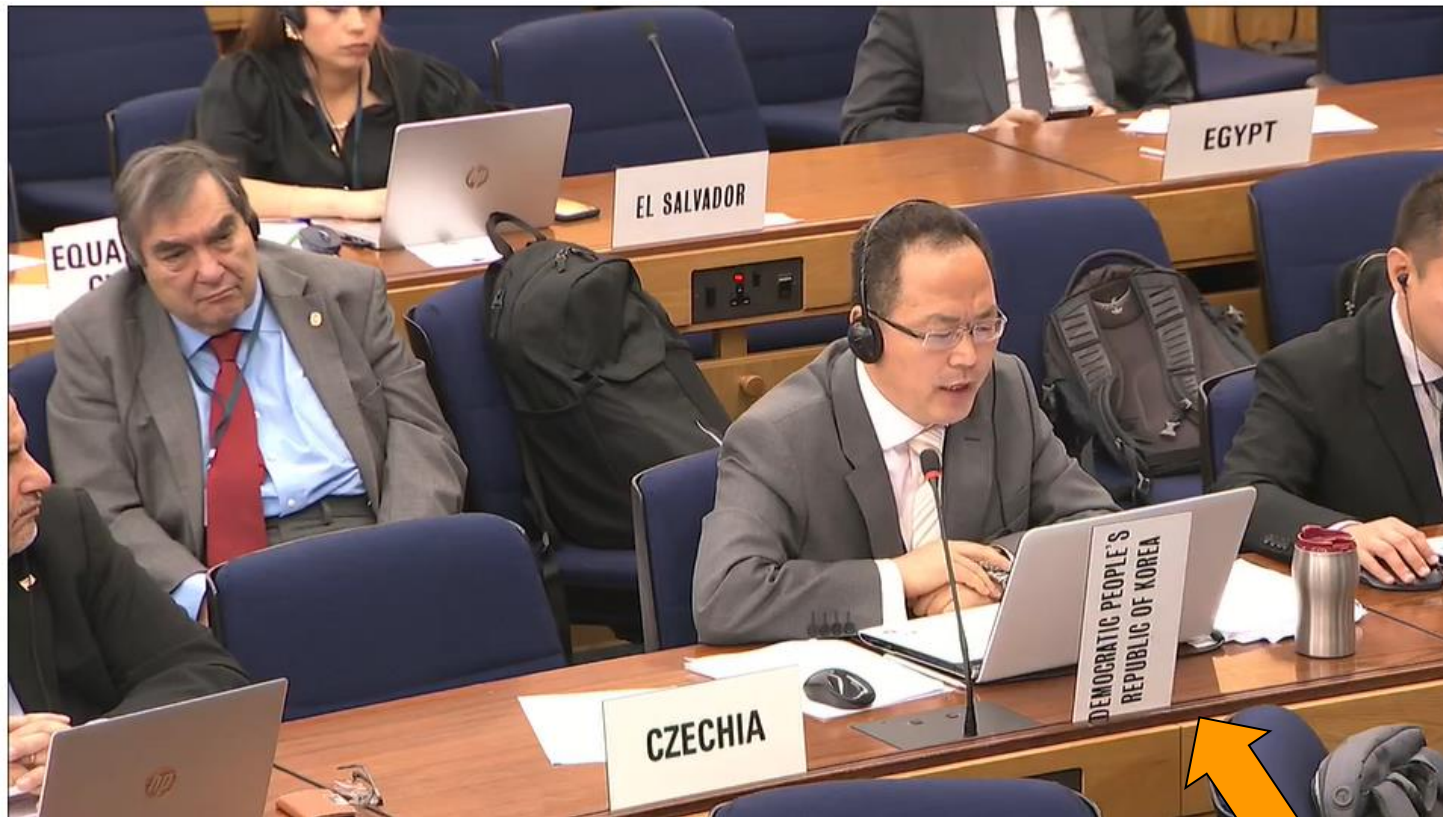


The saga of the greenhouse gas discussion at the IMO

Harilaos N. Psaraftis
Professor Emeritus
Technical University of Denmark



Many thanks to John!



- A prominent member of the North Korean delegation at the IMO!

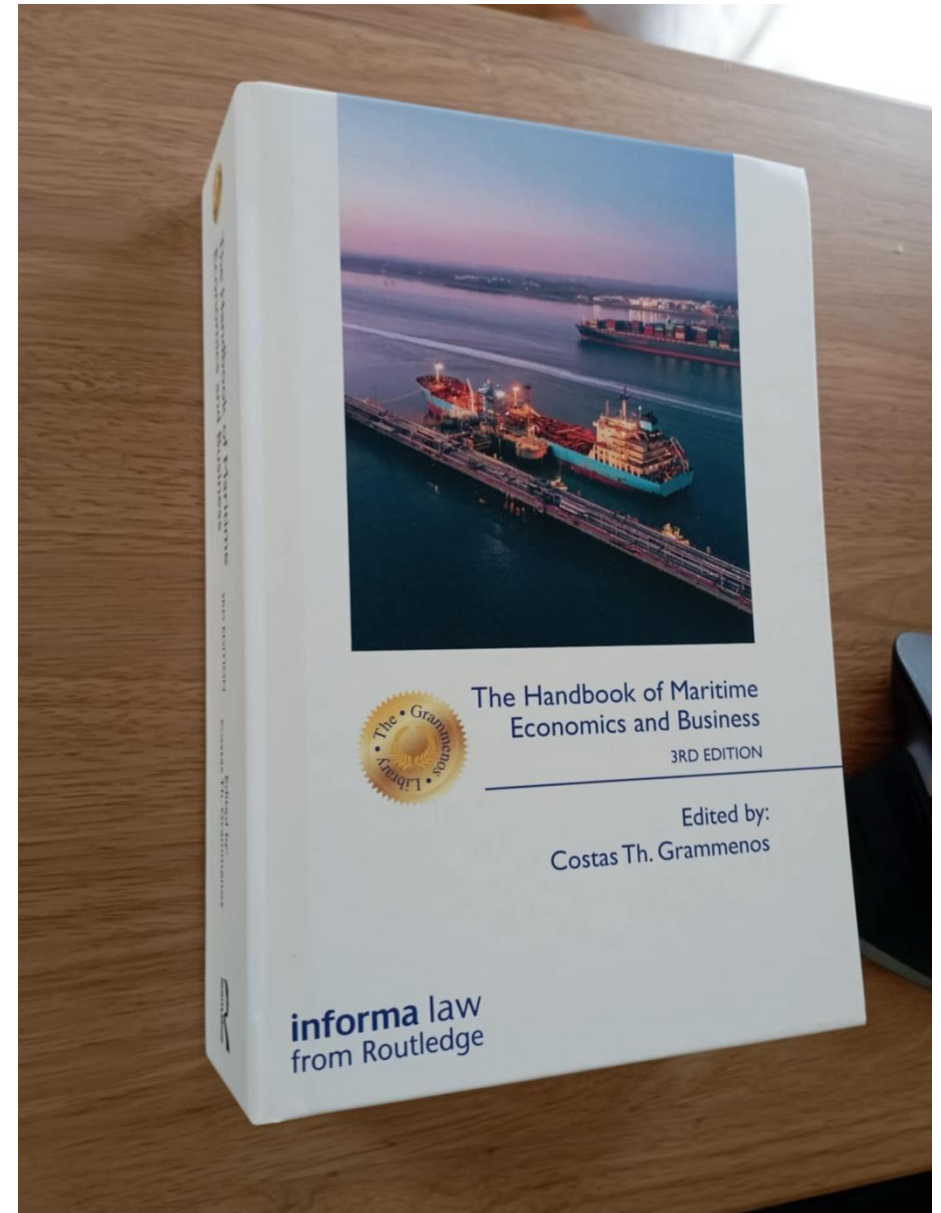
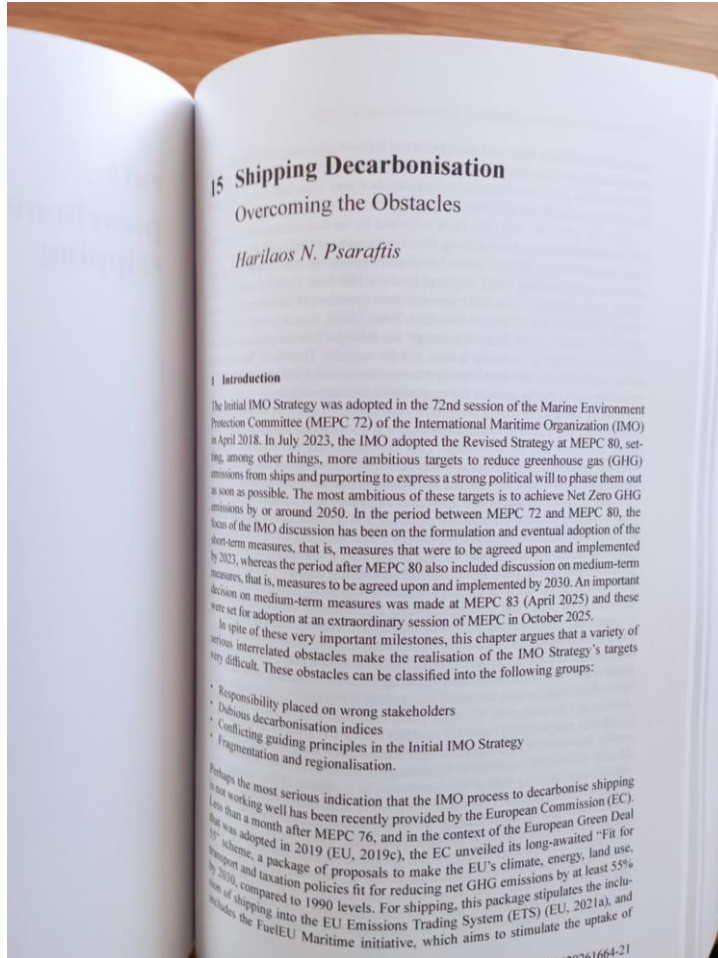
Purpose of talk

- Takes stock at the long and tortuous road to reduce greenhouse gas (GHG) emissions from ships
 - Tries to explain why, under the current IMO governance, the realization of the IMO GHG reduction targets is extremely difficult
 - Major obstacles are identified, and alternatives on how to proceed are discussed
-
- Note: treatment is not encyclopedic!

Reference

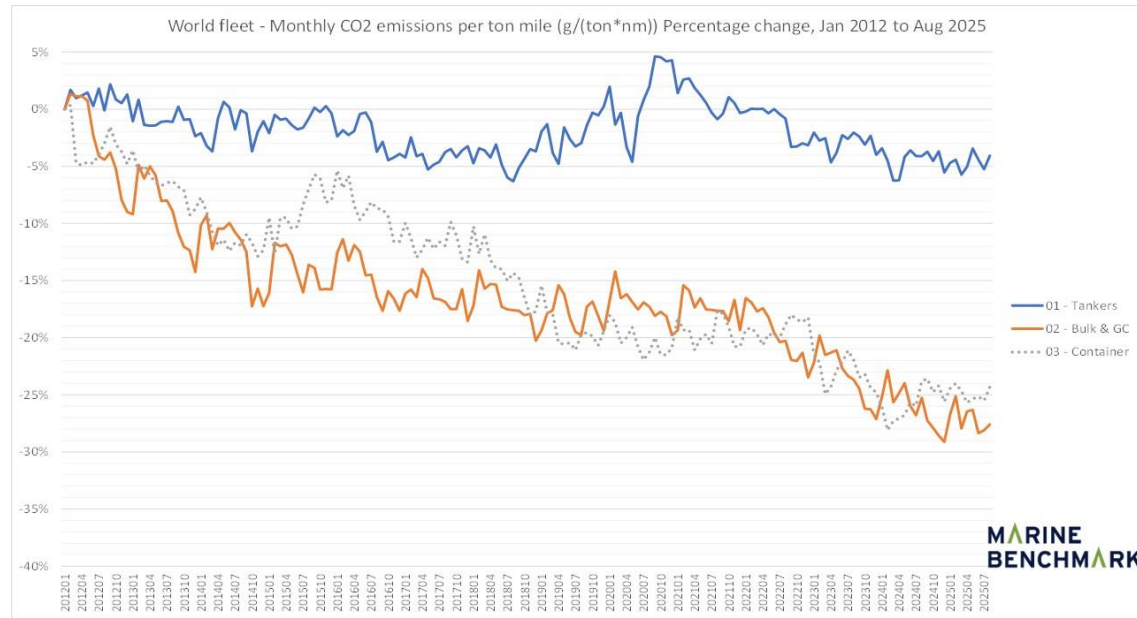
- >50 years of maritime R&D (MIT, NTUA, DTU)
- about 20 years involvement in the IMO process
- about 20 years of R&D on shipping emissions (GHG and other)

Reference (most recent)

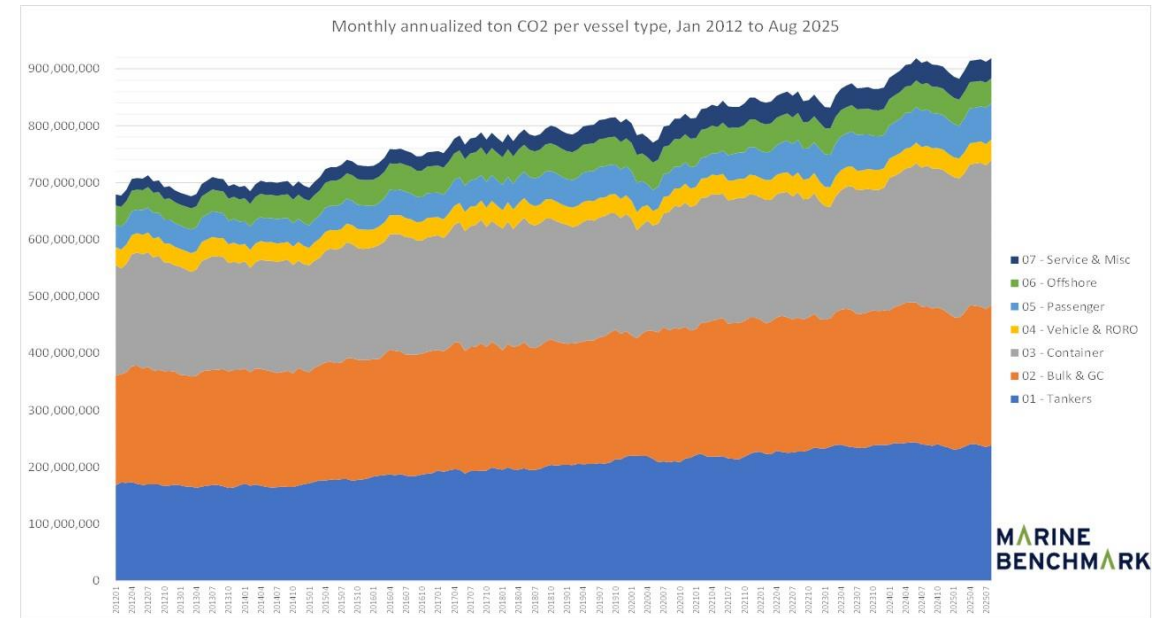


The big picture

CII



CO2



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IMO's Net Zero Framework (NZF)

- Voted upon at MEPC 83 (Apr. 2025)
- Derailed at MEPC/ES.2 (Oct. 2025)
- Adjourned for one year
- Unclear how or if it will go ahead
- Next meeting: MEPC 84 (Apr. 27 – May 1)



What is the NZF?

A. Technical element

- A goal-based Green Fuel Standard, intended to progressively lower the GHG intensity of marine fuels used by ships.
- Measures the so-called **Green Fuel Intensity (GFI)** of a ship in terms of CO₂e emissions per unit of energy (grams of CO₂e per MJ).

B. Embedded economic element

- A penalty mechanism to induce ships to lower their GFI.
- Involves 2 scales of penalties for ships with GFI above certain limits, one at **100 USD per tonne of CO₂e** and one at **380 USD per tonne of CO₂e**.

Looks like a more complex version of FuelEU Maritime, combined with an Emissions Trading Scheme on GFI!

Two main reasons for the NZF failure

Two main reasons for the NZF failure

1. NZF itself

- Too complex
- Does not collect enough money for the green transition
- No clear signal on how industry should respond

Two main reasons for the NZF failure

1. NZF itself

- Too complex
- Does not collect enough money for the green transition
- No clear signal on how industry should respond

2. D.J.T.



Donald J. Trump  
@realDonaldTrump

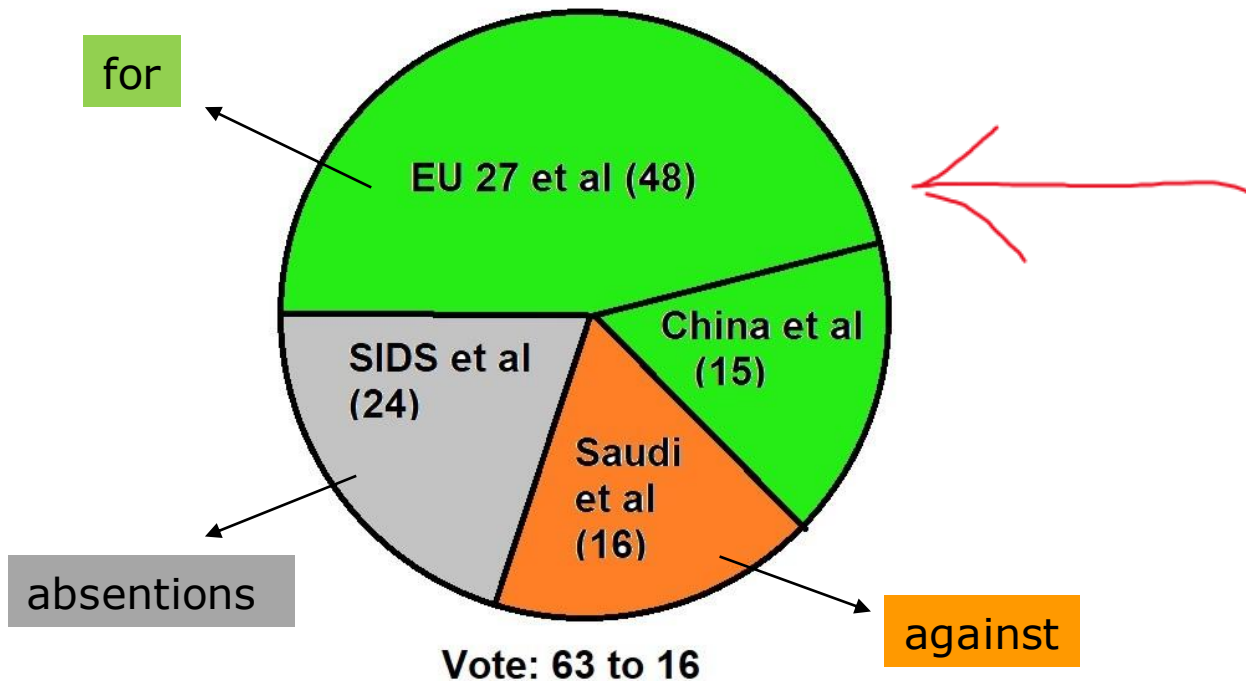
I am outraged that the International Maritime Organization is voting in London this week to pass a global Carbon Tax. The United States will NOT stand for this Global Green New Scam Tax on Shipping, and will not adhere to it in any way, shape, or form. We will not tolerate increased prices on American Consumers OR, the creation of a Green New Scam Bureaucracy to spend YOUR money on their Green dreams. Stand with the United States, and vote NO in London tomorrow!

3.44k ReTruths 13.9k Likes 10/16/25, 7:41 PM

Two different votes

1. MEPC 83 (April 2025)

- VOTE: For or against **NZF**



A heterogeneous collection of countries, which were in opposing camps for much of the IMO GHG discussion, but agreed at MEPC 83

The disappearance of the levy

A MONTH BEFORE MEPC 83

NZF as supported by EU et al, plus SIDS, consisted of:

- Fuel standard + penalties
- **Plus a levy on CO₂e emissions**
- **It was the majority option!**

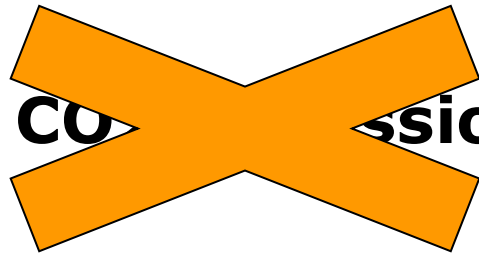
- ISWG-GHG 18/2/5: Consolidation of the proposals for an economic element of the mid-term measures based on a GHG levy/contribution. Submitted by [Austria](#), [Bahamas](#), [Belize](#), [Belgium](#), [Bulgaria](#), [Croatia](#), [Cyprus](#), [Czechia](#), [Denmark](#), [Estonia](#), [Fiji](#), [Finland](#), [France](#), [Georgia](#), [Germany](#), [Greece](#), [Hungary](#), [Ireland](#), [Italy](#), [Jamaica](#), [Japan](#), [Kenya](#), [Latvia](#), [Liberia](#), [Lithuania](#), [Luxembourg](#), [Malta](#), [Marshall Islands](#), [Montenegro](#), [Netherlands \(Kingdom of the\)](#), [Nigeria](#), [Palau](#), [Panama](#), [Poland](#), [Portugal](#), [Republic of Korea](#), [Romania](#), [Seychelles](#), [Slovakia](#), [Slovenia](#), [Solomon Islands](#), [Spain](#), [Sweden](#), [Tonga](#), [Tuvalu](#), [Ukraine](#), [United Kingdom](#), [Vanuatu](#), [European Commission](#) and [ICS](#).

The disappearance of the levy

A MONTH BEFORE MEPC 83

NZF as supported by EU et al, plus SIDS, consisted of:

- GFI + penalties
- **Plus a levy on CO₂ emissions**

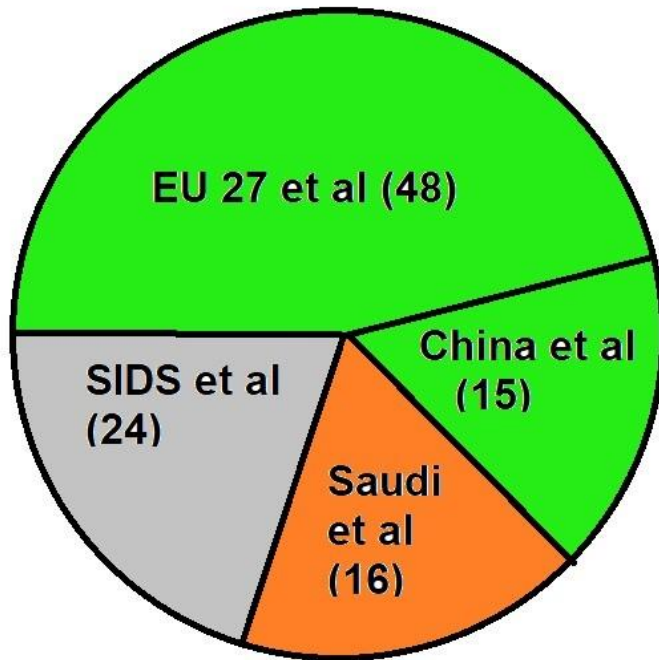


JUST BEFORE MEPC 83

- **Levy taken off the table!!!**

Was that beneficial?

YES: bring China et al. onboard

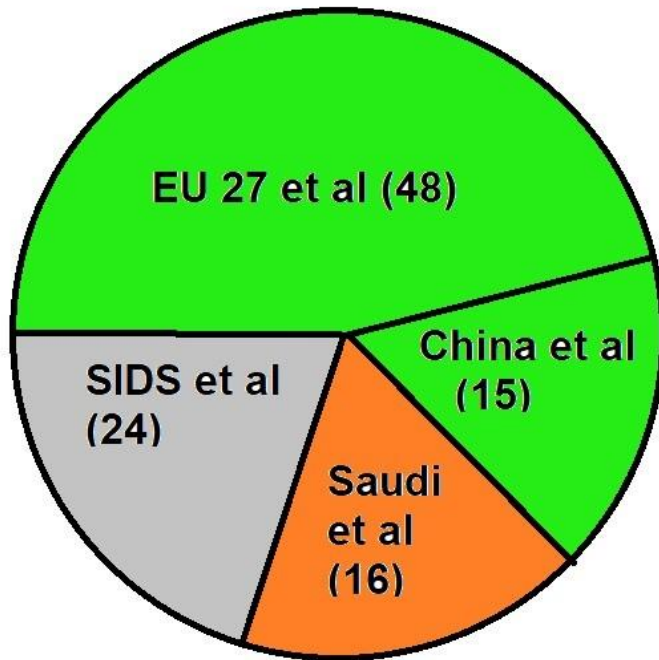


Vote: 63 to 16

Was that beneficial?

YES: bring China et al. onboard

NO:



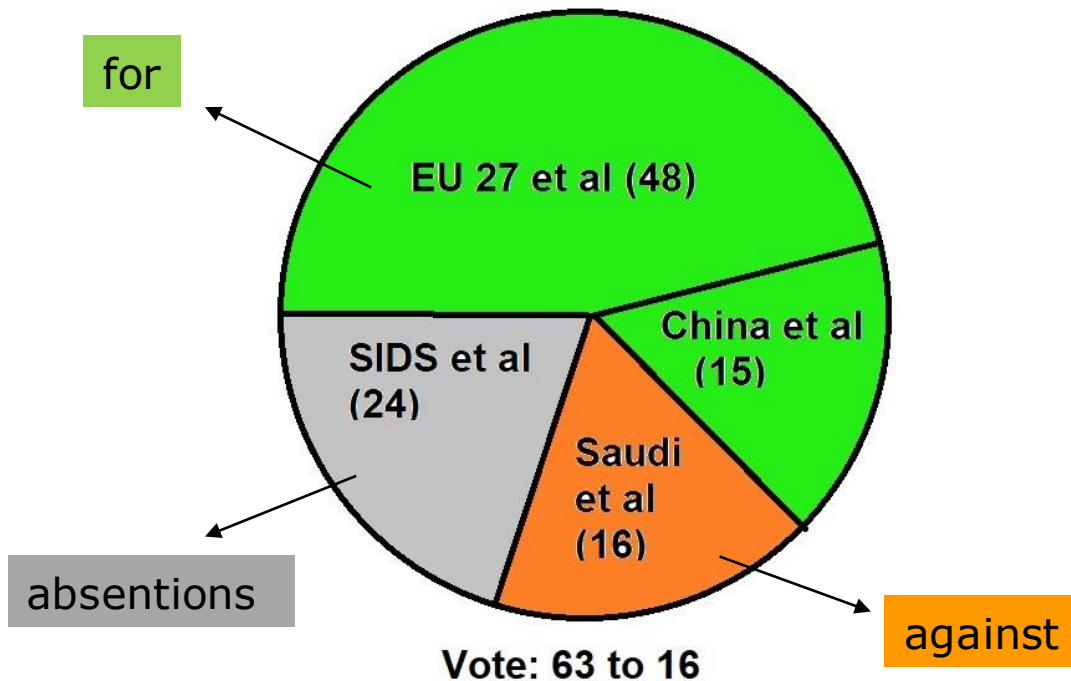
Vote: 63 to 16

- LOST SUPPORT OF SIDS
- MUCH LESS MONEY TO BE COLLECTED
- WEAK SIGNAL TO INVESTORS

Two different votes

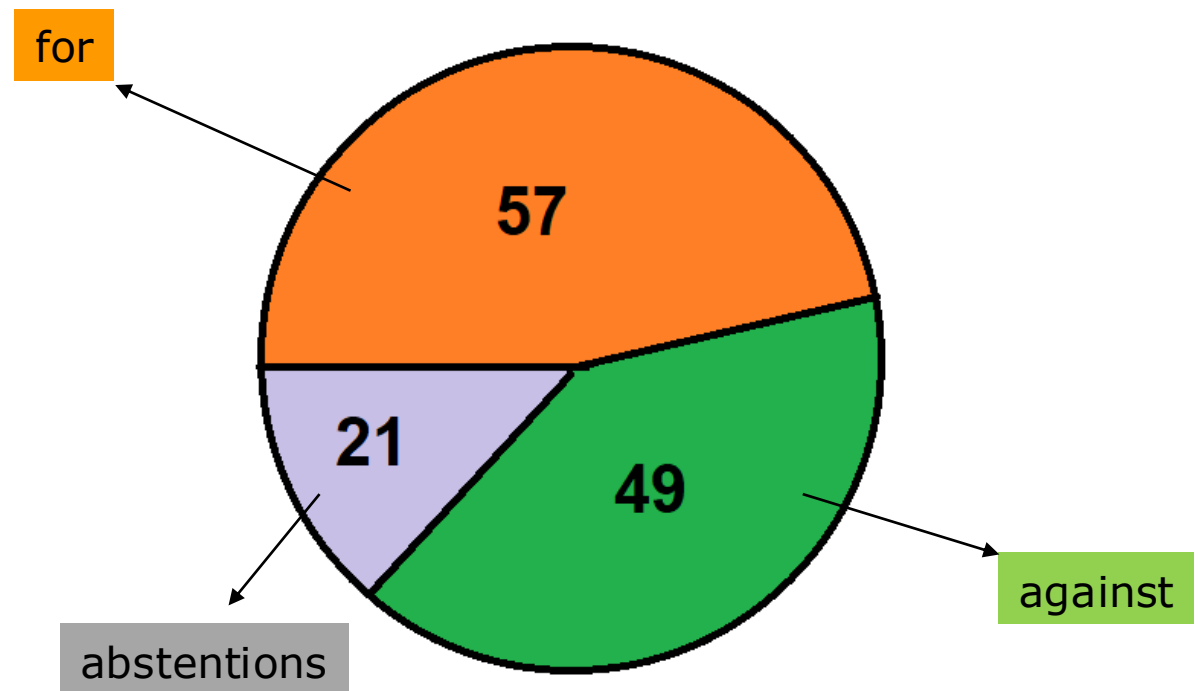
1. MEPC 83 (April 2025)

- VOTE: For or against **NZF**



2. MEPC ES.2 (October 2025)

- VOTE: For or against **adjournement**



Before MEPC/ES.2 (October 2025)

USA

- CAMPAIGN AGAINST NZF
- THREATS TO RETALIATE



Before MEPC/ES.2 (October 2025)

USA

- CAMPAIGN AGAINST NZF
- THREATS TO RETALIATE

Class

- DNV: reservations
- ABS: freeze it

Greek ship owners

- Against it

The MEPC/ES.2 vote

For adjournement (57)

- US
- Saudi Arabia
- Russia
- China
- Liberia
- Panama
- Israel
- Many petro-states
- Selected South American countries (Argentina & Venezuela)
- etc

Against adjournement (49)

- EU (minus Cyprus & Greece)
- Australia
- Brazil
- Canada
- Chile
- UK
- Norway
- Singapore
- SIDS that abstained in MEPC 83 (Marshall islands, Solomon Islands, etc)
- etc

Abstentions (21)

- Cyprus
- Greece
- Honduras
- Indonesia
- Japan
- Republic of Korea
- New Zealand
- etc
- Note: Austria, Hungary & Slovakia were not present to vote

The 2 votes

Source: International Windship Association

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD							
1	MEPC-ES - Ajourment Vote													No	Absta	Yes																					
2																																					
3		MEPC83		MEPC-ES2		MEPC83		MEPC-ES2		MEPC83		MEPC-ES2		MEPC83		MEPC-ES2		MEPC83		MEPC-ES2		MEPC83		MEPC-ES2		MEPC83		MEPC-ES2		MEPC83		MEPC-ES2					
4																																					
5	ANGOLA	xxx				DPR OF KOREA***				INDIA					MEXICO						SAINT KITTS AND NEVIS					TUVALU											
6	ANTIGUA AND BARBUDA					DRC	xxx		xxx	INDONESIA					MONACO	xxx					SAINT LUCIA		xxx			UGANDA**											
7	ARGENTINA					DENMARK				IRAN (ISLAMIC REPUBLIC OF)					MONTENEGRO	xxx					SAINT VINCENT AND THE					UKRAINE			xxx								
8	ALBANIA	xxx		xxx		DOMINICA	xxx		xxx	IRAQ					MOROCCO						SAMOA					UNITED ARAB EMIRATES											
9	ALGERIA***					DOMINICA	xxx		xxx	IRELAND					MOZAMBIQ	xxx		xxx			SAN MARINO**					UNITED KINGDOM											
10	AUSTRALIA					ECUADOR				ITALY					NAMIBIA						SAUDI ARABIA					UNITED STA	xxx										
11	AUSTRIA			xxx		EGYPT				ISRAEL	xxx				NAURU***	xxx		xxx			SENEGAL					URUGUAY	xxx										
12	AZERBAIJAN					EL SALVADOR			xxx	JAMAICA					NETHERLANDS (KINGDOM OF)						SERBIA	xxx				VANUATU											
13	BAHAMAS					ERITREA	xxx			JAPAN					NEW ZEALAND						SEYCHELLES					VENEZUELA (BOLIVARIAN)											
14	BAHRAIN	xxx				ESTONIA				JORDAN	xxx				NIGERIA	xxx					SIERRA LEO	xxx				YEMEN											
15	BANGLADESH					ETHIOPIA	xxx			KENYA					NORWAY						SINGAPORE					VIETNAM											
16	BARBADOS					FIJI				KIRIBATI					OMAN***						SLOVENIA**																
17	BELGIUM					FINLAND				KUWAIT					PAKISTAN						SOLOMON ISLANDS																
18	BELIZE					FRANCE				LATVIA					PALAU						SOMALIA**	xxx															
19	BRAZIL					GAMBIA**	xxx		xxx	LEBANON	xxx				PARAGUAY						SOUTH AFRICA																
20	BULGARIA	xxx				GEORGIA**	xxx			LIBERIA					PAPUA NEW	xxx					SPAIN																
21	CAMBODIA**					GERMANY				LIBYA	xxx				PERU						SRI LANKA																
22	CANADA					GHANA				LITHUANIA					PANAMA						SURINAME																
23	CHILE					GREECE				LUXEMBOURG					PHILIPPINES						SWEDEN																
24	CHINA					GRENADA			xxx	MADAGASCAR**					POLAND						SWITZERLAND																
25	COLOMBIA**					GUATEMAL	xxx			MALAWI**	xxx				PORTUGAL						TANZANIA	xxx															
26	COOK ISLANDS					HONDURAS				MALAYSIA					QATAR						THAILAND																
27	COSTA RICA	xxx		xxx		ICELAND***				MALDIVES	xxx		xxx		REPUBLIC OF KOREA						TOGO	xxx					Yes			57							
28	CROATIA***					HAITI	xxx		xxx	MALTA					ROMANIA						TONGA	xxx					Abstention				21						
29	CUBA***	xxx		xxx						MARSHALL ISLANDS					RUSSIAN FEDERATION						TRINIDAD A	xxx					Not Present				8						
30	CYPRUS									MAURITIUS	xxx		xxx								TÜRKIYE																
31	CÔTE D'IVO	xxx		xxx						MOLDOVA	xxx										TUNISIA	xxx															
32	CROATIA	xxx																																			
33	CZECHIA	xxx																																			

Lead up to MEPC 84 (April 27 to May 1)

For NZF

- SIDS (minus Marshall Islands)
- Brazil

- EU-27: divided

Against NZF

- Petro-states, Russia
- Argentina, Liberia & Panama
- United States

The Argentina, Liberia & Panama submission

- A set of criteria for eligible marine fuels is proposed.
 - The **affordability criterion** would exclude from consideration fuels whose price is above 115% of the current market average for standard marine fuels, such as VLSFO.
 - The **availability criterion** includes stringent sub-criteria on market share, port coverage, geographical distribution, and maximum distance between consecutive bunkering ports.
 - The **scalability criterion** stipulates that only fuels with credible pathways towards widespread adoption are incorporated into regulatory planning.
 - There is **no criterion for GHG reduction ambition** of the eligible marine fuels.
- A "do-nothing" proposal!

The US “diplomatic demarche”

- No economic element
- No fund
- Fossil fuels, LNG, nuclear OK
- Rescind regional schemes including EU ETS
- “explicit” rather than “tacit” acceptance

U.S. Position on an Alternative to the International Maritime Organization (IMO) Net-Zero Framework (NZF)

The United States remains strongly opposed to the IMO NZF. As Secretary of State Rubio said, if the NZF or a substantially similar measure were to be brought back up at the IMO, our coalition will be ready to oppose, and it will be larger. Secretary of Energy Wright has also been clear that there is zero chance that countries will reach net-zero by 2050. However, the United States, in the interest of benefiting the U.S. maritime and energy industries, technologies, and consumers, offers the below positions to inform any alternative proposal led by industry or another Member State.

Rather than pursuing a global emissions scheme that would restrict energy types, the IMO should look to foster an environment of energy abundance. The IMO must avoid rigid mandates and economic burdens. The IMO must not pick an arbitrary target in the future and try to reverse-engineer compliance, nor should it disadvantage any types of fuel. Specifically, the United States requests that any new proposal advanced at the IMO meet the following conditions:

1. **No economic element.** There must be no financial penalty, carbon tax, or multilateral fund. The United States will vigorously oppose any tax levied by the IMO on the shipping industry. The United States will not tolerate an IMO-administered fund of any kind built on revenues from a global carbon tax.
2. **No penalties or limits on fuel types.** Proposals should not have limits on conventional crude or diesel, LNG, nuclear, or any other type of marine propulsion technology. Proposals should welcome an “energy-all” approach that does not restrict or constrain current or breakthrough fuel types.
3. **Ensure reliability for the shipping industry’s existing fleet to avoid any disruption to global trade.** Any proposal must eliminate penalties on LNG; recognize biofuels as a viable marine fuel; and support industry-led advances in alternative fuels, technologies, and other technologies without picking “winners and losers” via regulations.
4. **Mandatory withdrawal/phaseout of any existing regional shipping emissions reduction scheme including the European Union’s ETS.** Member States and regional organizations must commit to terminate their existing regional schemes to avoid a duplicative system of frameworks/agreements. Proposals should not add additional layers of carbon trading or pricing in the existence of aggressive EU schemes.
5. **Any NZF alternative regulation should follow the explicit acceptance procedure.** Considering the significance of a global shipping agreement, and the potential impact on the shipping and energy industries, any NZF alternative regulation should use the explicit acceptance procedure for entry into force. The tacit acceptance procedure, whereby member states support is assumed unless otherwise so stated, is not appropriate given the magnitude of the issue.

The US submission FURTHER ASKS FOR:

- NZF **to be ditched!**
- MEPC/ES.2 **NOT to resume!!**

MARINE ENVIRONMENT PROTECTION
COMMITTEE
84th session
Agenda item 7

MEPC 84/7/41
6 March 2026
Original: ENGLISH
Pre-session Public release:

REDUCTION OF GHG EMISSIONS FROM SHIPS

Comments on document MEPC 84/7/30 related to Principles and Approaches to
Shipping Emissions Reduction

Submitted by the United States

SUMMARY

Executive summary: This document provides comments on the proposals in MEPC 84/7/30 (Algeria et al.) and presents policy positions that should guide any possible international regulation to reduce greenhouse gas shipping emissions, emphasizing affordability, availability, and scalability of fuels. Specifically, any framework must avoid economic penalties or levies, carbon taxes, or multilateral funds that would burden the shipping industry and its consumers. Regulations must not disadvantage any fuel types, including conventional fuels, LNG, nuclear, biomass-based fuels, or other marine propulsion technologies, and should welcome an "energy-all" approach. Any framework must ensure reliability for existing fleets and avoid disruption to global trade, with emissions reduction targets based on current market conditions rather than arbitrary end-state goals. Regional schemes such as the European Union Emissions Trading System (EU ETS) must be phased out to avoid duplicative frameworks. Finally, given the significance of any global emissions agreement, any GHG emissions regulation should use the explicit acceptance procedure for entry into force.

*Strategic direction,
if applicable:* 3

Output: 3.2

Action to be taken: Paragraph 10

QUESTIONS:

- 1. How did we arrive at this mess?**
- 2. What can be done to fix it?**

Flash back 2011: MEPC 62

- IMO's adoption of EEDI July 2011
- Adopted as an amendment to MARPOL's Annex VI
- Fierce resistance by China, India, Brazil, Saudi Arabia and other developing countries
- Matter highly political



MEPC 62



Energy Efficiency Design Index (EEDI)

- Defined as

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

- Ratio of CO2 emissions divided by (capacity*speed)
[gr CO2/ton-mile]

EEDI contd

- Mandatory for newbuildings of 400 GT and above, built after 2012
- All have to have: $EEDI \leq \text{EEDI ref. line}$
- $EEDI \text{ ref. line} = f(\text{ship type, DWT}) = a(\text{DWT})^{-C}$
- Ref. line more stringent in future years

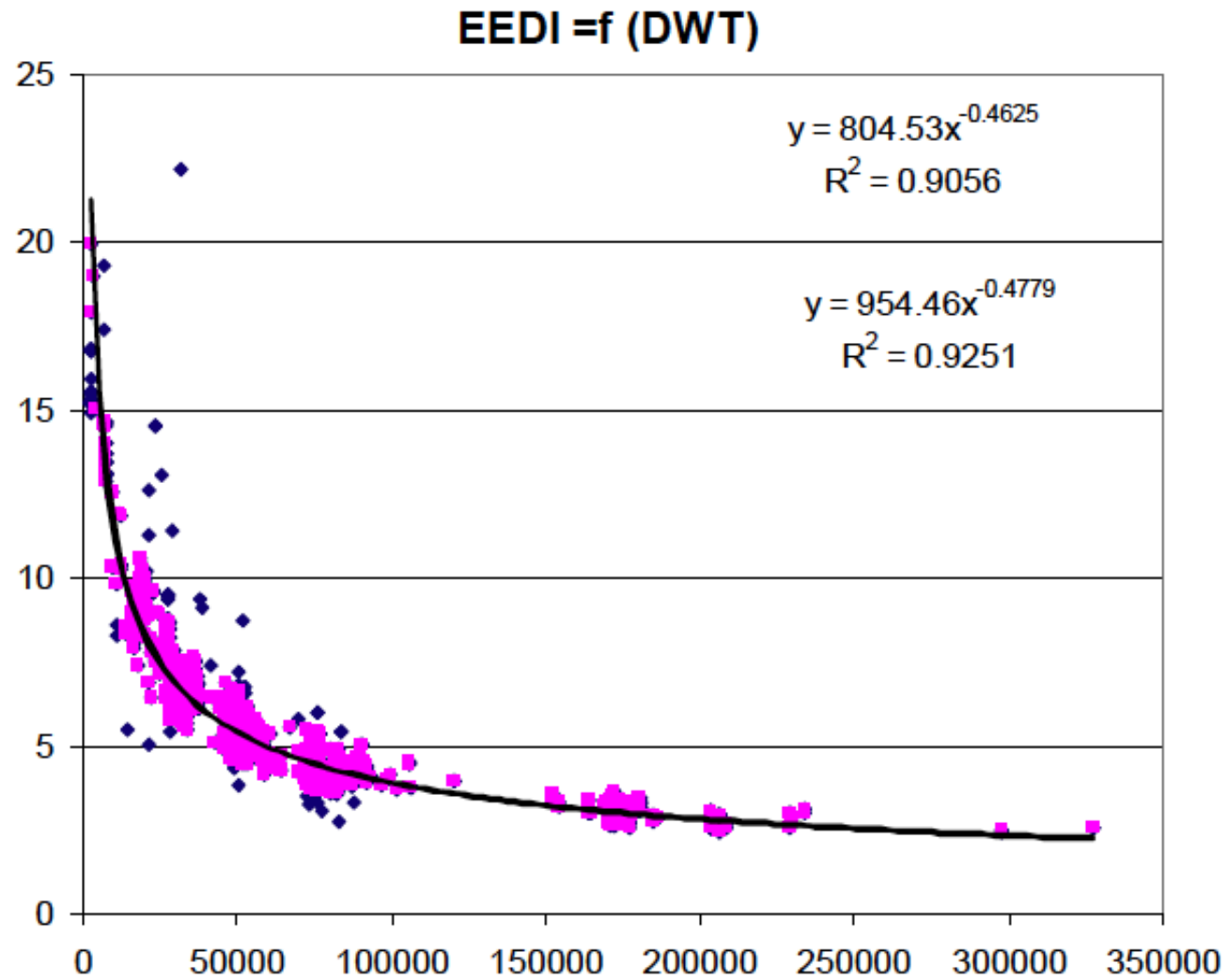


Figure 1: Dry bulk carriers
All data: 2,259 ships. Without outliers (shown in blue \blacklozenge): 2,218 ships

EEDI side effects

- To comply with required EEDI, **the correct solution** is to **optimize hull, engine and propeller**
- **The easy solution** is to **reduce installed power (or design speed)**
- This could lead to **underpowered ships**
- Any **energy-INEFFICIENT** ship can achieve EEDI compliance by installing a smaller engine

Greece's attempt to fix EEDI

- Proposed modified Reference Line formula
- $EEDI \leq a(DWT)^{-c} V^k$
- With $k=2$ or 3

Table 15.2 Regression Results for EEDI (Reference Line)

<i>Ref. Line</i>	<i>Reference</i>	<i>Bulk Carriers</i>	<i>Tankers</i>	<i>Containerships</i>
Standard eq. (2)	IMO (2011)	$961.79DWT^{-0.477}$ ($R^2 = 0.93$)	$1,218.80DWT^{-0.488}$ ($R^2 = 0.96$)	$186.52DWT^{-0.200}$ ($R^2 = 0.62$)
Modified eq. (7), $k = 2$	IMO (2010)	$10.913DWT^{0.555}V^2$ ($R^2 = 0.91$)	$19.164DWT^{0.599}V^2$ ($R^2 = 0.96$)	$12.74DWT^{0.534}V^2$ ($R^2 = 0.92$)
Modified eq. (7), $k = 3$	Psaraftis (2019)	$1.1712DWT^{0.594}V^3$ ($R^2 = 0.89$)	$2.3366DWT^{0.652}V^3$ ($R^2 = 0.95$)	$3.5918DWT^{0.707}V^3$ ($R^2 = 0.93$)

Greece's attempt to fix EEDI

- Proposed modified Reference Line formula
- $EEDI \leq a(DWT)^{-c} V^k$
- With $k=2$ or 3

REJECTED

Table 15.2 Regression Results for EEDI (Reference Line)

Ref. Line	Reference	Carriers	Tankers	Containerships
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MEPC 73: Initial IMO strategy

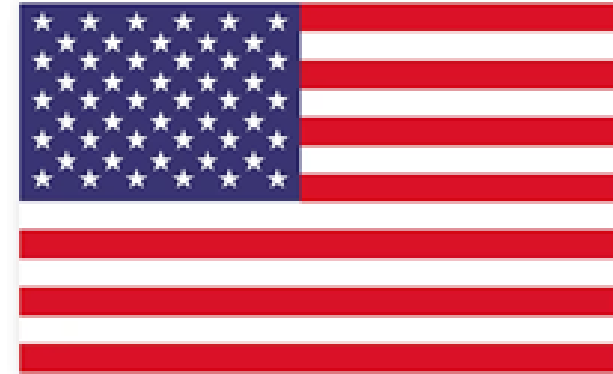
CENTRAL AMBITION

- Reduce annual GHG emissions **by $\geq 50\%$ by 2050** (vs 2008 levels)
- Reduce annual CO₂ emissions per transport work **by $\geq 40\%$ by 2030**, pursuing efforts towards **70%** by 2050 (vs 2008 levels)



Which countries opposed it?

Which countries opposed it?



Initial IMO Strategy (2018)

LONG LIST OF CANDIDATE MEASURES

SAMPLE MEASURES

- **SHORT TERM** (until 2023)

Combined EEXI/SEEMP/CII

- **MEDIUM TERM** (2023-2030)

Market Based Measures


- **LONG TERM** (2030-2050)

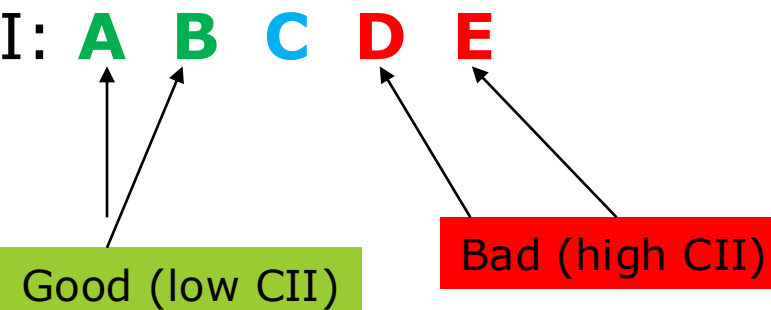
Alternative fuels

Short-term measures

- MEPC 76 (June 2021) adopted a **combined EEXI/SEEMP/CII** measure
- EEXI (Energy Efficiency Existing Ship Index): Apply EEDI to existing ships
- SEEMP: Ship Energy Efficiency Management Plan

Carbon Intensity Indicator (CII)

- Critical for the 2030 target (**$\geq 40\%$ reduction**)
 - Defined as ratio of
 - **CO₂ emitted by a ship in a year**
 - **Transport work of that ship in that year**
- 

- Ships rated by CII: **A B C D E**


Good (low CII)

Bad (high CII)

Two ways to measure CII

AER (supply-based)

Annual Efficiency Ratio

- Ratio of CO₂ divided by (DWT*miles sailed) in a year

EEOI (demand-based)

Energy Efficiency Operational Indicator

- Ratio of CO₂ divided by actual tonne-miles carried by the ship in a year
- Need to know detailed cargo info to compute it

Further CII reductions needed to reach the 2030 target

If AER is used

If EEOI is used

● 22%

● 11%



TO BE USED

Source: 4th IMO GHG study

Is CII a good index?

- Can manipulate CII to achieve compliance (but increase CO2 in the process)
- True for both AER and EEOI

Communications in Transportation Research 1 (2021) 100005



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journal homepage: www.journals.elsevier.com/communications-in-transportation-research



Paradox of international maritime organization's carbon intensity indicator

Shuaian Wang^a, Harilaos N. Psaraftis^b, Jingwen Qi^{a,*}

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^b Department of Technology, Management and Economics, Technical University of Denmark, Denmark



Is CII a good index?

MSC demands changes to CII: Rules punish at random and will reduce fleet capacity

Swiss-Italian MSC, the world's largest container carrier, goes on the offensive against the incoming CII regulation, which will pressure shipping to sail in a more energy-efficient manner and deal out ratings for carbon emissions. The rules should be changed because they penalize the wrong entities, says MSC.



MSC CEO Søren Toft attacks the IMO's forthcoming climate regulation as the calculation methods will penalize ships at random, says MSC. | Photo: MSC - PR



Further reading

Documentation for CII paradox: Non-active ships receive worst climate rating

Consortium including ONE takes over Seaspan owner for

Market based measures (MBMs)

Initial IMO Strategy

- Included under **medium term measures**.
 - But only **OBLIQUELY**:



.3 new/innovative emission reduction mechanism(s), possibly including Market-based Measures (MBMs), to incentivize GHG emission reduction;

MBMs: not new at the IMO

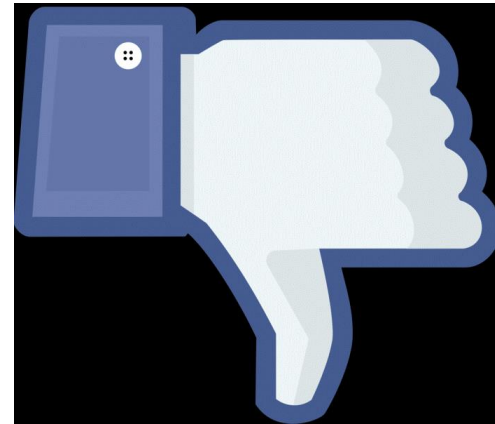


Prior MBM history

- 11 MBM proposals at MEPC 60 (March 2010)
- Expert Group formed by IMO Sec. General
- Feasibility study (300-page report)
- Work: May- August 2010
- Report presented at MEPC 61 (Sep. 2010)
- **NO PREFERENCE FOR AN MBM**
- Various discussions since then

And after many discussions...

- In 2013, MBM discussion was **suspended!**



The 2 dollar per tonne charge for R&D

- Proposed by ICS and some other shipping associations
- Supported by some IMO member states
- International Maritime R&D Board
- ONLY for R&D
- **NOT an MBM**
- Some member states said it was an MBM via the back door
- MEPC 76/7/7: Proposed draft amendments to MARPOL Annex VI (establishment of the international maritime research and development board and the IMO maritime research fund). Submitted by **Denmark, Georgia, Greece, Japan, Liberia, Malta, Nigeria, Palau, Singapore, Switzerland, ICS, BIMCO, INTERTANKO, CLIA, INTERCARGO, IPTA, IMCA, INTERFERRY and WSC**

The 2 dollar per tonne charge for R&D

- Proposed by ICS and some other shipping associations
- Supported by some member states
- International Maritime Board
- ONLY for R&D
- NOT an MBM
- Some member states it was an MBM via the back door
- MEPC 76/7/7: Proposed draft amendments to MARPOL Annex VI (establishment of the international research and development board and the IMO research fund).
 Submitted by **Denmark, Bulgaria, Greece, Japan, Malta, Nigeria, Palau, Switzerland, ICS, BIMB, TERTANKO, CLIA, INTERFERGO, IPTA, IMCA, INTERFERRY and WSC**

The historic MEPC 80 (July 2023)

- Revised IMO 2023 strategy
- More ambitious targets
- Net Zero by 2050!

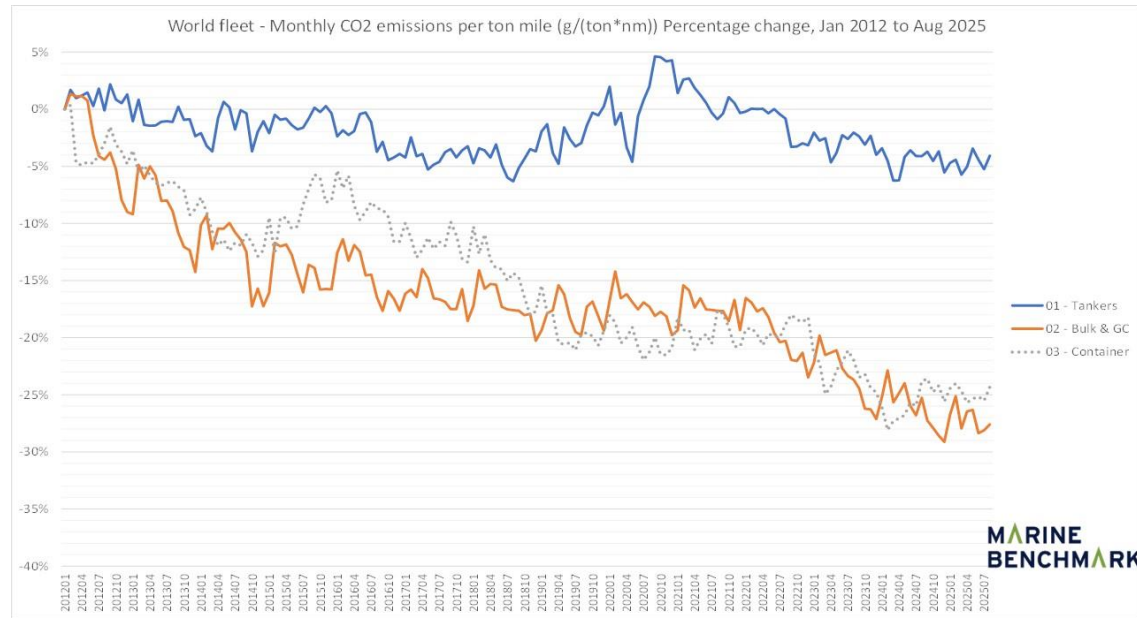


New target: net-0 by \approx 2050

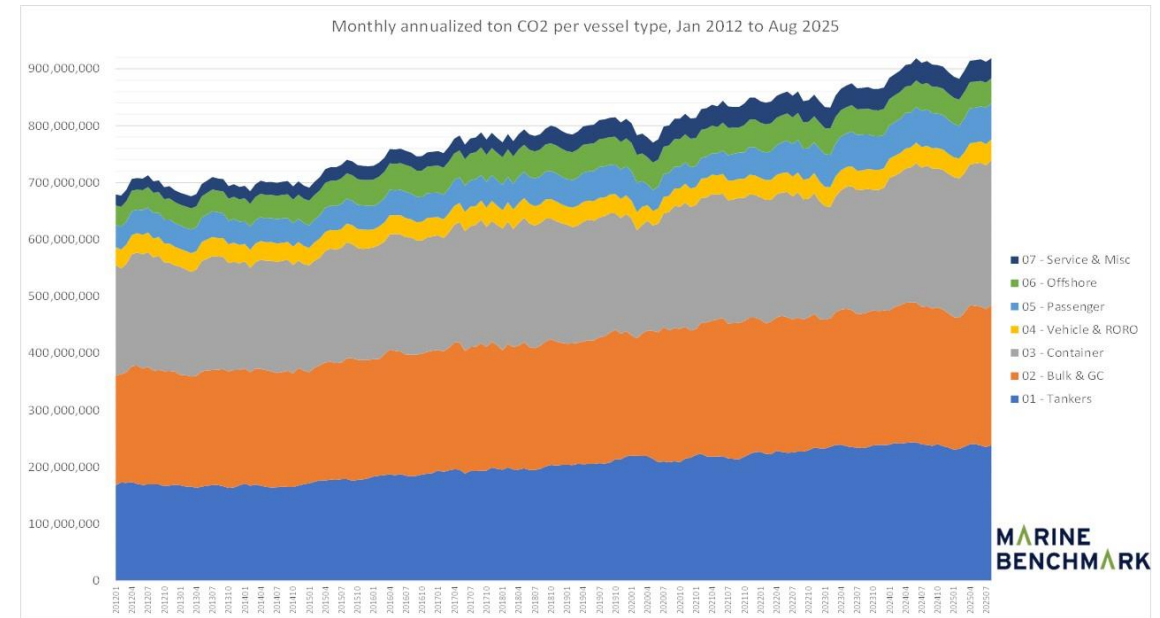
- to peak GHG emissions from international shipping as soon as possible and
- to reach net-zero GHG emissions **by or around, i.e., close to, 2050, taking into account different national circumstances,**
- Intermediate checkpoints: reductions of at least:
 - ❖ 20% (strive for 30%) by 2030, vs 2008
 - ❖ 70% (strive for 80%) by 2040, vs 2008

The big picture

CII



CO2



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What has gone wrong?

What has gone wrong?

THESE OBSTACLES BLOCK PROGRESS:

- Dubious decarbonization indices
- Responsibilities placed on wrong stakeholders
- Conflicting guiding principles
- Fragmentation and regionalization

Dubious decarbonization indices

- EEDI is dubious
- EEXI is dubious
- CII is dubious (both AER and EEOI)
- GFI is super dubious!

Stakeholders responsibilities

Road transport

- Main GHG reduction responsibility is on the **manufacturer**
- Targets and non-compliance penalties are on a **fleet level**
- No responsibility on the **owner** or **driver** of vehicle

Maritime transport

- Main GHG reduction responsibility is on the **ship owner**
- Targets and non-compliance penalties are (mainly) on an **individual ship level**
- Super intricate mechanisms to **pool carbon KPIs**

Stakeholders responsibilities

Road transport

- **Driving cycle** concept for measuring emissions (city, highway, other)

Maritime transport

- Nothing equivalent in shipping
- Calm weather + a 15% weather margin assumed
- Some have proposed a weather-defined EEDI



Article

The Need to Amend IMO's EEDI to Include a Threshold for Performance in Waves (Realistic Sea Conditions) to Achieve the Desired GHG Reductions

Elizabeth Lindstad ^{1,*}, Henning Borgen ¹, Gunnar S. Eskeland ², Christopher Paalson ³, Harilaos Psaraftis ⁴ and Osman Turan ⁵

Conflicting guiding principles

1. No More Favorable Treatment 2. CBDR

- All ships should be treated equally
- What is CBDR?

What is CBDR?

- The principle of **Common But Differentiated Responsibilities (CBDR)** has been a widely accepted principle that underlines such international agreements as the Kyoto Protocol.
- CBDR has two aspects. The first is **common responsibility**, which is raised from the concept of common heritage and common concern of humankind and reflects the duty of countries to equally share the burden of environmental protection for common resources.
- The second is **differentiated responsibility**, which addresses different social and economic situations across countries.

CBDR supporters

CBDR supporters (sample)



Fragmentation/regionalization

- Upon taking office (summer 2019), the new European Commission President Ursula von der Leyen said that **she wants shipping into the EU ETS**



Fragmentation/regionalization

- Upon taking office (summer 2019), the new European Commission President Ursula von der Leyen said that **she wants shipping into the EU ETS**
- **This is the elephant in the IMO room**



EU measures to decarbonize shipping

- FuelEU Maritime Regulation
- Directive on the inclusion of shipping into the EU ETS





FuelEU Maritime Regulation

- Encourages use of low or zero carbon fuels
- Mandates use of cold ironing for passenger and container ships by 2030
- Well-to-wake basis
- Allows pooling



FuelEU Maritime Regulation

- Encourages use of low or zero carbon fuels
 - Mandates use of cold ironing for passenger and container ships by 2030
 - Well-to-wake basis
 - Allows pooling
- **LLOYD'S REGISTER:** *"a pool of ten boxships could avoid around €277m in FuelEU Maritime penalties in five years (2030-2034) if they are joined by a single vessel fuelled with e-methanol. That saving far outweighs the likely cost of building the methanol-fuelled containership."*



EU ETS for shipping

- The inclusion monitors and charges:
 - 100% of CO₂ emissions from all intra-EU trips
 - 100% of CO₂ emissions in EU ports
 - 50% of CO₂ emissions from trips between non-EU and EU ports
- CO₂ emissions allowances are purchased at EU carbon prices
- Phase-in period 2024 to 2026
- Extends to other GHGs as of 2026

From FEPORT

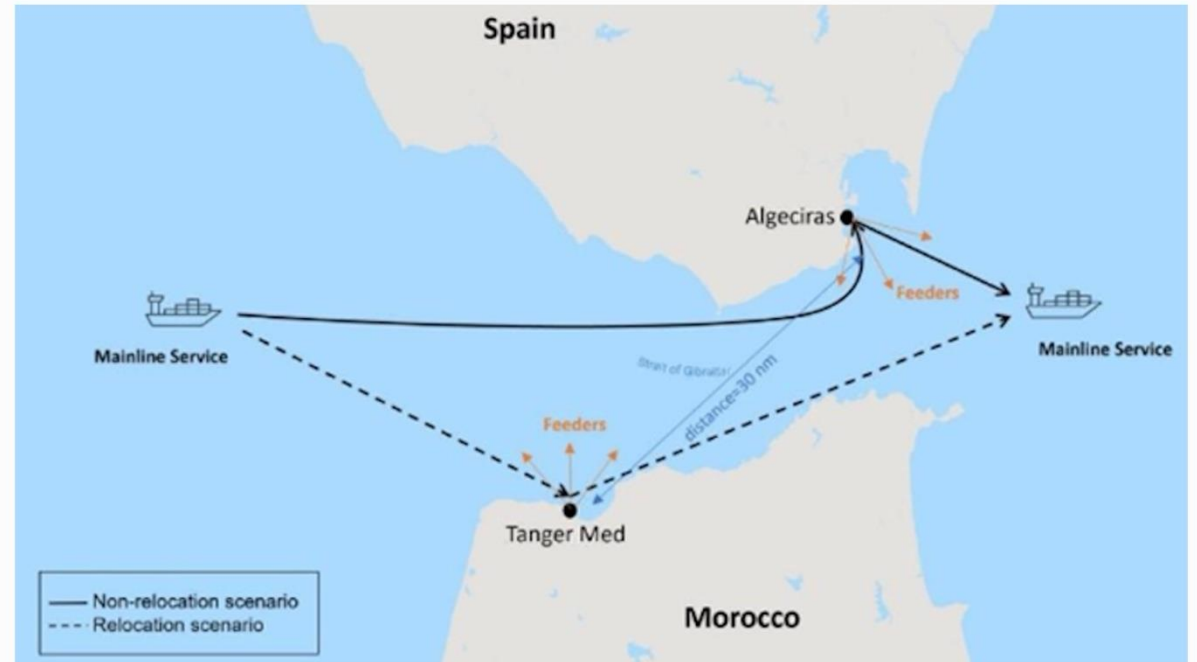


The Federation of European Private Port Companies and Terminals

Newsletter – Oct. 2025



ETS for Maritime should not become ETS against EU ports



The picture is part of an academic article that can be consulted via this

[link:https://lnkd.in/eBudSnei](https://lnkd.in/eBudSnei)



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Maritime Transport Research

journal homepage: www.elsevier.com/locate/martra



3/2022: paper

- Switch to non-EU (EEA) transshipment hubs close to the EU just to avoid paying into the EU ETS
- Switch is attractive for carbon prices well below 25 €/tonne of CO₂.
- **Risk of carbon leakage**
- **Risk of lost ETS revenue**
- **Risk of lost EU port income**



Implications of the EU Emissions Trading System (ETS) on European container routes: A carbon leakage case study

Sotiria Lagouvardou *, Harilaos N. Psaraftis

Department of Technology, Management and Economics, Technical University of Denmark (DTU), Kgs. Lyngby, Denmark



PARENTHESIS: Flash-back 29 yrs ago



lloydslist
.com

Ports Report: Piraeus puts itself back on the hub map: Transshipment

GIOVANNI PACI

Section: News

Release Date: Friday October 24 1997

- QUIZ: Who was CEO when port of Piraeus became a transshipment hub in 1997?

Evolution of the Directive

PROPOSAL (7/2021): Commission (581 pages)



Brussels, 14.7.2021
COM(2021) 551 final

2021/0211 (COD)

- Did not consider possible **relocation of transshipment hubs**
- No provisions to mitigate associated risk

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas **emission trading scheme** and Regulation (EU) 2015/757

Evolution of the Directive ii

PROPOSAL (7/2021): Commission

- Did not consider possible relocation of transshipment hubs
- No provisions to mitigate associated risk

FINAL version (5/2023): Parliament+Council

- Explicitly acknowledged the risk
- Substantial language to mitigate it
- 300 nm exclusion zone
- List of relevant non-EU ports

Several versions in 2022 & 2023

Plugging the transshipment loophole: the 300 nm exclusion zone

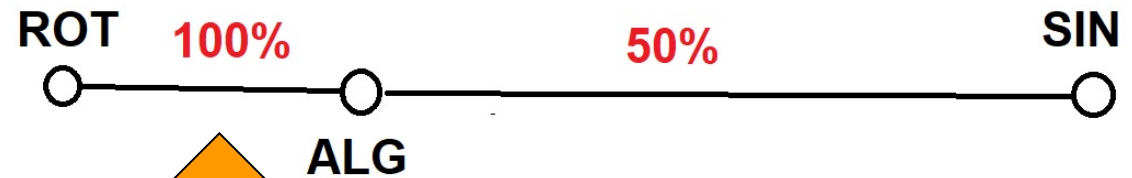
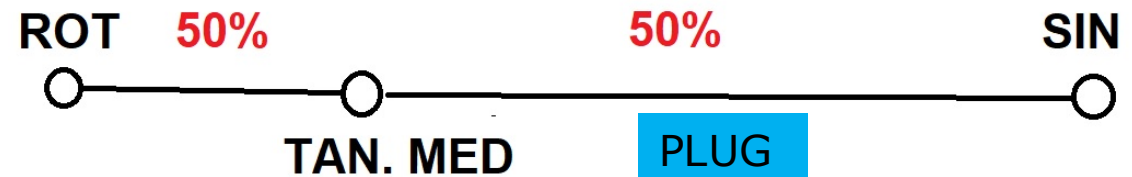
What it means:

- If the ship comes from Singapore, tranships at Tanger Med, and then goes to Rotterdam, the entire trip from Singapore to Rotterdam will count for EU ETS purposes
- Q: Does this plug the loophole?

A crude example: Singapore to Tanger Med to Rotterdam

- Original Directive
- Final Directive
- Still cheaper than Algeciras!

% of CO2 emissions charged



A crude example ii

- 10,000 TEU vessel
- FC = 145 tonnes/day at 22 knots
- # of transshipment moves = 3,000
- Algeciras (or Tanger Med) to Rotterdam: ~1,365 nm
- Transit time: 2 days 14 hrs
- Total FC = 374 tonnes
- Total CO₂ = 1,126 tonnes
- ETS price = 70 €/tonne
- **EU ETS revenue lost ~ 40,000 € per trip**
- **EU port revenue lost: Much more! (~ 200,000 € per trip)**



More evasion!

- The **Piraeus-Crete** route is ordinarily charged full ETS price
- But if **Milos** is added as an intermediate stop, **route is fully exempted, and no CO2 is charged!**
- Many ships now stop at Milos!



Connection between IMO and EU?

- Very little or none
 - Two processes in parallel
 - Many of the same people involved
 - Little or no coordination
 - NZF has some elements of FuelEU, plus ETS on GFI
 - No one knows how EU measures intersect EEXI/SEEMP/CII
 - Different reporting requirements
-
- Q: will both be applied if NZF passes?

WHAT NEXT FOR NZF?

- **Option A: Keep NZF as is**
- **Option B: Modify NZF (eg, remove the economic element)**
- **Option C: Suspend NZF discussion until things get better**
- **Option D: Ditch NZF**

POLL: which option is best?

- **Option A: Keep NZF as is**
- **Option B: Modify NZF (eg, remove the economic element)**
- **Option C: Suspend NZF discussion until things get better**
- **Option D: Ditch NZF**

THANK YOU

hnpsar@dtu.dk

