Understanding the IMO Net-Zero Framework — its origins, key elements, compliance mechanisms, and implications for the Mediterranean region

3rd October 2025

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Brief introduction to the IMO Net-Zero Framework

Brief introduction to the IMO Net-Zero Framework

Background

- 1997 Resolution 8 “CO_2 emissions from ships”
- 2003 A.963(23) MEPC urged “to identify and develop the mechanism or mechanisms needed to achieve the limitation or reduction of GHG emissions from international shipping” and give priority to “the evaluation of technical, operational and market-based solutions”
- 2011 MEPC.203(62) Adoption of Chapter 4 of MARPOL Annex VI “Regulations on energy efficiency of ships” (EEDI & SEEMP)
- 2015 Paris Agreement that aims to limit the global temperature increase to well below 2°C above pre-industrial levels, with efforts to restrict the increase to 1.5°C
- 2018 Initial IMO Strategy on Reduction of GHG emissions from ships (resolution MEPC.304(72)) identified mid-term term measures including “new/innovative emission reduction mechanism(s), possibly including Market-based Measures (MBMs), to incentivize GHG emission reduction”

Brief introduction to the IMO Net-Zero Framework

2023 IMO Strategy on Reduction of GHG emissions from ships (resolution MEPC.377(80))

- carbon intensity to decline by design and reduce CO_2 emissions per transport by at least 40% by 2030 compared to 2008
- uptake zero/near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5%, striving for 10%, of energy used by international shipping by 2030
- net-zero GHG emissions by or around, i.e., close to 2050
- “should take into account the well-to-wake GHG emissions of marine fuels as addressed in the *Guidelines on life cycle GHG intensity of marine fuels* (LCA guidelines) developed by the Organization with the overall objective of reducing GHG emissions within the boundaries of the energy system of international shipping and preventing a shift of emissions to other sectors.”
- “a basket of candidate measure(s), delivering on the reduction targets, should be developed and finalized comprised of both:
  .1 a technical element, namely a goal-based marine fuel standard regulating the phased reduction of the marine fuel's GHG intensity; and
  .2 an economic element, on the basis of a maritime GHG emissions pricing mechanism.”

Brief introduction to the IMO Net-Zero Framework

Timeline for implementation (subject to adoption at MEPC/ES.2)

17 October 2025	MEPC/ES.2 to consider adoption of new chapter 5 MARPOL Annex VI “Regulations on the IMO Net-Zero Framework”	
1 September 2026	end of tacit acceptance period	(objection threshold is one-third of MARPOL Annex VI Parties or MARPOL Annex VI Parties representing 50% of global gross tonnage)
1 March 2027	expected entry into force date	
1 January 2028	start of first reporting period for annual GFI reported to Administration by ship by 31 March in following year	
30 September 2029	deadline for Administration to issue to the ship Statement of Compliance related to the annual GFI	
31 October 2029	Administration to report that SoC in the IMO GFI Registry	

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Chapter 5 of MARPOL Annex VI - Regulations on the IMO Net-Zero Framework

Regulation 30 Application

Regulation 30 Application

1 This chapter shall apply to all ships of 5,000 gross tonnage and above.

2 Notwithstanding paragraph 1 of this regulation, the provisions of this chapter shall not apply to:

.1 ships solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly. However, each Party should ensure, by the adoption of appropriate measures, that such ships act in a manner consistent with the requirements of chapter 5 of this Annex, so far as is reasonable and practicable;

.2 ships not propelled by mechanical means, and platforms including FPSOs and FSUs and drilling rigs, regardless of their propulsion; and

.3 semi-submersible vessels until further review of the application of this chapter.

Regulation 31 Goal

Regulation 31 Goal

The goal of this chapter is to reduce greenhouse gas (GHG) emissions from international shipping as soon as possible, delivering on the reduction targets set out in the 2023 IMO Strategy on Reduction of GHG emissions from ships, effectively promoting the energy transition of shipping and providing the world fleet with a needed incentive while contributing to a level playing field and a just and equitable transition.

Regulation 32 Functional requirements

Regulation 32 Functional requirements

In order to achieve the goal set out in regulation 31 of this Annex, a ship to which this chapter applies shall comply with the following functional requirements:

.1 requirements on the continuous improvement of the ship's GHG fuel intensity in accordance with regulation 35 of this Annex; and

.2 requirements on GHG emissions pricing contributions for excess emissions and on rewards for the uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources (ZNZs) in accordance with regulations 36 and 39.

Regulation 33 Attained annual GHG fuel intensity (attained annual GFI) #1

Regulation 33 Attained annual GHG fuel intensity (attained annual GFI)

1 **After the end of calendar year 2028 and after the end of each calendar year thereafter, each ship to which this chapter applies shall calculate the attained annual GFI over a 12-month period from 1 January to 31 December for the preceding calendar year (reporting period), using the data collected in accordance with regulations 27 and 37 of this Annex and specified in appendix XII to this Annex, taking into account the guidelines to be developed by the Organization.**

2 **The attained annual GFI of a ship in a given year (denoted as $GFI\ attained$) shall be calculated as follows, taking into account the guidelines to be developed by the Organization:**

$$GFI_{attained} = \frac{\sum_{j=1}^{J} EI_j \times Energy_j}{Energy_{total}}$$

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Regulation 33 Attained annual GHG fuel intensity (attained annual GFI) #2

$$GFI_{attained} = \frac{\sum_{j=1}^{J} EI_j \times Energy_j}{Energy_{total}}$$

where:

$GFI_{attained}$	**is the attained annual GFI of a ship in a given year;**
j	**is the fuel type;**
J	**is the total number of fuels used during the reporting period, as reported to the IMO Ship Fuel Oil Consumption Database;**
EI_j,	**expressed in gCO_2eq/MJ, is the GHG intensity, expressed on a well-to-wake basis of a fuel type j, calculated taking into account the guidelines developed by the Organization;**
$Energy_j$,	**expressed in MJ, refers to the energy consumption of fuel type j by the ship in the reporting period; and**
$Energy_{total}$	**expressed in MJ, refers to the total amount of energy used by the ship in the reporting period, including but not limited to fuel oil, electricity delivered from the shore power, and zero-emission energy sources, such as wind propulsion and solar power.**

Regulation 34
Sustainable fuels certification schemes #1

Regulation 34 Sustainable fuels certification schemes

1 The GHG intensity of a fuel shall be calculated using GHG emission factors and also taking into account all relevant metrics and indicators for each sustainability theme or aspect of a fuel as documented on the Fuel Life Cycle Label(s) (FLL).

2 GHG emission factors and sustainability themes or aspects of a fuel as documented on the FLL shall be certified, as appropriate, by a recognized Sustainable Fuels Certification Scheme (SFCS) taking into account guidelines to be developed by the Organization.

3 The certified information in the FLL may accompany the bunker delivery note referred to in regulation 18 of this Annex, taking into account guidelines to be developed by the Organization.

Regulation 34
Sustainable fuels certification schemes #2

4 An SFCS shall be recognized by the Committee taking into account the recognition process(es) and criteria specified in guidelines to be developed by the Organization. The recognition of an SFCS shall be subject to renewal every five years and periodic review, taking into account guidelines to be developed by the Organization.

5 No later than 1 March 2027, the Secretary-General of the Organization shall publish a list of recognized SFCSs, and shall update the list periodically thereafter.

6 Within three months after the end of calendar year 2027, and within three months after the end of each following calendar year, the Organization shall ensure that the legal entity administering the recognized SFCS reports data relevant to their activity for that calendar year or portion thereof to ensure transparency, traceability, and environmental integrity in the certification process, taking into account guidelines to be developed by the Organization. On the basis of the reported data, the Secretary-General of the Organization shall produce an annual report to the Committee.

Regulation 35 Target annual GHG fuel intensity (target annual GFI) #1

Regulation 35 Target annual GHG fuel intensity (target annual GFI)

1 The target annual GFI (GFI_T) of a ship shall consist of the following two tiers:

.1 a Base target annual GFI (base target); and

.2 a Direct compliance target annual GFI (direct compliance target).

2 The GFI_T for each ship to which this regulation applies shall be determined/calculated as follows:

$$GFI_T = (1 - Z_T/100) \cdot GFI_{2008}$$

3 By 1 January 2032, the Committee shall determine the Z-factor (Z_T) for the Base target and Direct compliance target for the years 2036 to 2040. The 2040 Z_T for the Base target shall be set at 65%.

Regulation 35 Target annual GHG fuel intensity (target annual GFI) #2

$$GFI_T = (1 - Z_T/100) \cdot GFI_{2008}$$

where,

subscript T is the calendar year referred to in Table 4;

GFI_{2008} **is the GFI reference value equivalent to 93.3 gCO_2eq/MJ (Well-to-Wake), representing the average GFI of international shipping in year 2008; and**

Z_T **is the annual GFI reduction factor to ensure continuous improvement of the ship's GHG fuel intensity, consisting of both an annual reduction factor for the base target and for the direct compliance target, the values of which are specified in Table 4, as compared to the GFI reference value.**

Regulation 35 Target annual GHG fuel intensity (target annual GFI) #3

Table 4 - Annual GFI reduction factors (in percentage) for the target annual GFI relative to the GFI reference value

$Year_T$	Z_T for Base target	Z_T for Direct compliance target
2028	4.0	17.0
2029	6.0	19.0
2030	8.0	21.0
2031	12.4	25.4
2032	16.8	29.8
2033	21.2	34.2
2034	25.6	38.6
2035	30.0	43.0

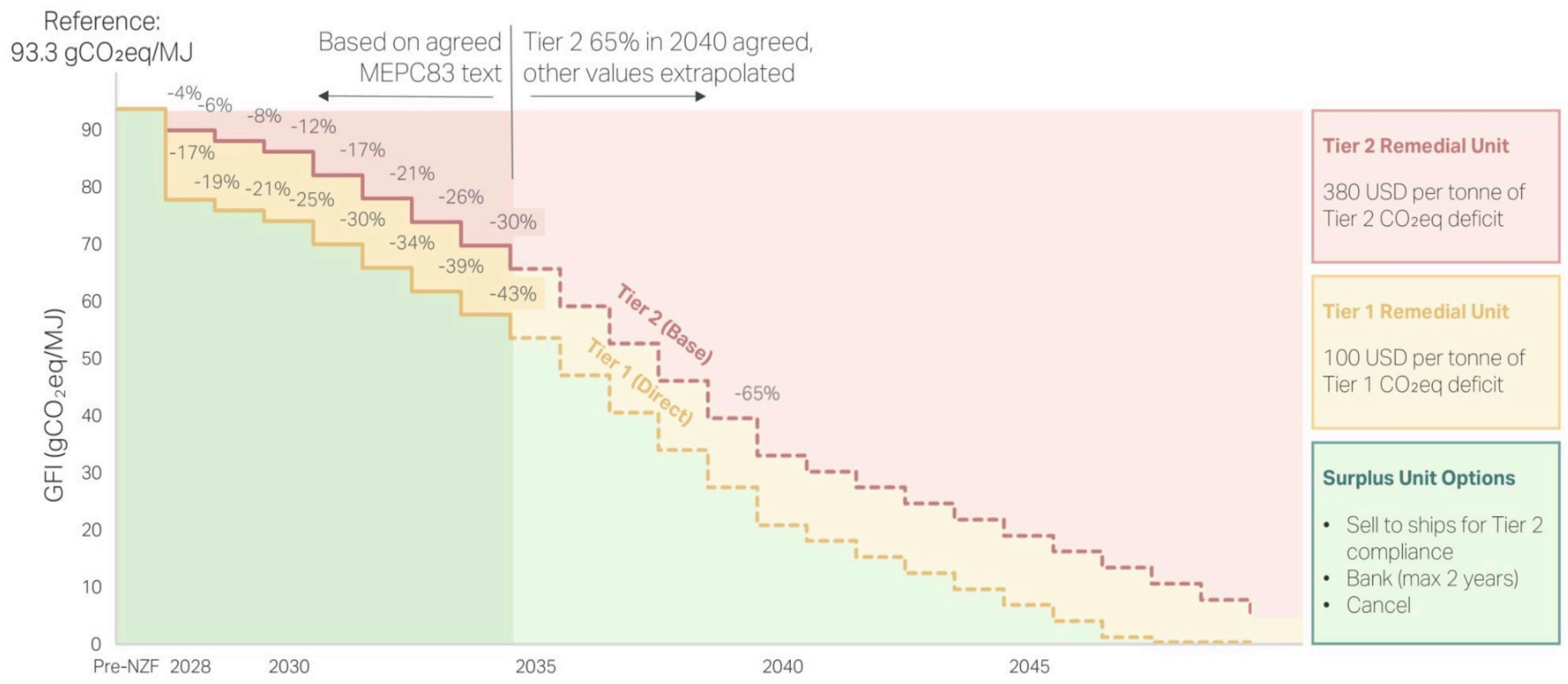
Annual GHG fuel intensity – Base target (Tier 2)

Year	GFI reference value	Base target reduction factor (%)	Annual GFI required to comply with Tier 2 (Base target) (gCO_2eq/MJ)
2028	93.3	4.0	89.6
2029	93.3	6.0	87.7
2030	93.3	8.0	85.8
2031	93.3	12.4	81.7
2032	93.3	16.8	77.6
2033	93.3	21.2	73.5
2034	93.3	25.6	69.4
2035	93.3	30.0	65.3
2040	93.3	65.0	32.7

Annual GHG fuel intensity – Direct compliance target (Tier 1)

Year	GFI reference value	Direct compliance target reduction factor (%)	Annual GFI required to comply with Tier 1 (Direct compliance) (gCO_2eq/MJ)
2028	93.3	17.0	77.4
2029	93.3	19.0	75.6
2030	93.3	21.0	73.7
2031	93.3	25.4	69.6
2032	93.3	29.8	65.5
2033	93.3	34.2	61.4
2034	93.3	38.6	57.3
2035	93.3	43.0	53.2

Two-tiered GHG Fuel Intensity (GFI) reduction pathways



Reference: https://www.zerocarbonshipping.com/imo-net-zero-framework

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Regulation 36 Annual GFI compliance approaches #1

Regulation 36 Annual GFI compliance approaches

1 **At the end of each reporting period as defined in regulation 33, each ship shall determine its GFI compliance balance, as follows, taking into account guidelines to be developed:**

GFI compliance balance (expressed in tonne of CO_2eq) =
(Direct compliance target annual GFI – Attained annual GFI) × $Energy_{total}$

2 **If the GFI compliance balance is equal to or greater than zero, the ship shall be considered in direct compliance and be eligible to receive surplus units for its positive compliance balance in accordance with paragraph 11 of this regulation.**

3 **If the GFI compliance balance is less than zero, the ship shall determine its compliance deficit in accordance with paragraph 4 of this regulation and shall achieve compliance by balancing its deficit in accordance with the GFI compliance approaches in paragraphs 5 and/or 6, as applicable, of this regulation.**

Regulation 36 Annual GFI compliance approaches #2

Assessment of the compliance deficit

4 A ship's compliance deficit comprises the quantification of emissions in excess of the tier(s) of the target annual GFI and shall be determined as follows, taking into account guidelines to be developed:

.1 for ships whose attained annual GFI is equal or lesser than the base target but greater than the direct compliance target:

Tier 1 compliance deficit = (Direct compliance target annual GFI – Attained annual GFI) × Energy_{total}

Or

.2 for ships whose attained annual GFI is greater than the base target:

Tier 1 compliance deficit = (Direct compliance target annual GFI – Base target annual GFI) × Energy_{total}

And

Tier 2 compliance deficit = (Base target annual GFI – Attained annual GFI) × Energy_{total}

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Regulation 36 Annual GFI compliance approaches #3

Balance of the compliance deficit

5 A ship shall balance its Tier 1 compliance deficit through remedial units acquired by means of GHG emissions pricing contributions to the IMO Net-Zero Fund, priced at Tier 1 benchmark rates in accordance with paragraph 8 of this regulation, which shall be recorded on the ship account statement issued by the IMO GFI Registry in accordance with regulation 38.

6 A ship shall balance its Tier 2 compliance deficit through one or more of the following GFI compliance approaches, which shall be recorded on the ship account statement issued by the IMO GFI Registry in accordance with regulation 38.5, taking into account the guidelines developed by the Organization:

.1 surplus units transferred from other ships;

.2 surplus units banked from previous reporting periods; and/or

.3 remedial units acquired by means of GHG emissions pricing contributions to the IMO Net-Zero Fund priced at Tier 2 benchmark rates in accordance with paragraph 9 of this regulation.

Regulation 36 Annual GFI compliance approaches #4

7 A ship that has fully balanced its compliance deficit in accordance with paragraphs 5 and 6 of this regulation, as applicable, shall be considered as being compliant with its target annual GFI, without prejudice to the ship to recover any costs incurred in the application of this regulation that relate to the operational responsibility of the ship. For the purpose of this regulation, operational responsibility of the ship means determining the fuel used, the cargo carried or the route or the speed of the ship.

Remedial Units

8 For the reporting periods 2028 to 2030, the initial price of a Tier 1 remedial unit shall be US$ 100 per tonne of CO_2eq on a well-to-wake basis.

9 For the reporting periods 2028 to 2030, the initial price of a Tier 2 remedial unit shall be US$ 380 per tonne of CO_2eq on a well-to-wake basis.

10 By 1 January 2028, the Committee shall determine the mechanism for reviewing and defining the price of a Tier 1 and Tier 2 remedial unit for the reporting periods starting 2031 and onwards.

Regulation 36 Annual GFI compliance approaches #5

Surplus Units

11 The amount of surplus units a ship in direct compliance is eligible to receive shall be equal to its positive compliance balance, expressed in tonne of CO_2eq, taking into account guidelines to be developed by the Organization.

12 A surplus unit, subject to paragraphs 6 and 15 of this regulation, credited to the ship account in the IMO GFI Registry may be used once for one of the following purposes, which shall be recorded in the IMO GFI Registry, taking into account guidelines developed by the Organization:

.1 transfer to another ship to balance that ship's Tier 2 compliance deficit;

.2 banked for use in the following reporting periods; or

.3 voluntarily cancelled as a mitigation contribution.

13 A surplus unit shall only be transferred or cancelled once, but each one of a ship's surplus units may be used for any of the purposes provided for in paragraph 12 of this regulation.

14 An unassigned surplus unit shall be automatically banked.

15 A surplus unit shall have a validity of two calendar years following the calendar year of its issuance from the IMO GFI Registry. A surplus unit not used by the ship in whose account it has been credited by its expiry date shall be cancelled by the IMO GFI Registry as a mitigation contribution.

Regulation 37 Reporting and verification of the annual GFI #1

Regulation 37 Reporting and verification of the annual GFI

1 Within three months after the end of calendar year 2028 and by 31 March after each reporting period thereafter, the ship shall report to its Administration, or any organization duly authorized by it, the attained annual GFI, the target annual GFI and the GFI compliance balance of the ship for that reporting period, respectively calculated in accordance with regulations 33, 35 and 36 of this Annex, together with the data collected as specified in appendix XII of this Annex via electronic communication and using the standardized format to be developed by the Organization for the purpose of verifying the compliance of each ship with this chapter, taking into account guidelines to be developed by the Organization.

2 In the event of any transfer of a ship from one Administration to another and/or a change from one company to another completed after 1 January 2028, a ship shall, after the end of the calendar year in which the transfer and/or change takes place, comply with paragraph 1 of this regulation for the 12-month period from 1 January to 31 December of the calendar year during which the transfer and/or change took place.

3 Within six months after the end of 2028 and by 30 June after each following reporting period, the Administration, or any organization duly authorized by it, shall verify the reported data pursuant paragraph 1 of this regulation and report the verified data to the IMO GFI Registry, taking into account the guidelines to be developed by the Organization.

Regulation 37 Reporting and verification of the annual GFI #2

4 Within one month after the ship's verified data has been reported to the IMO GFI Registry pursuant to paragraph 3 of this regulation or on the 31 July at the latest, the ship shall determine and perform in the IMO GFI Registry its selected GFI compliance approach(es) in accordance with regulation 36 of this Annex.

5 By 31 August after each reporting period, the IMO GFI Registry shall issue, for each ship account and reporting period, a ship account statement reflecting the transactions recorded in accordance with paragraph 4 of regulation 38. The ship account statement shall be made available to the ship, its Administration, or any organization duly authorized by it, taking into account guidelines to be developed by the Organization.

6 By 30 September after each reporting period, the Administration, or any organization duly authorized by it, shall on the basis of the reported data and selected GFI compliance approach(es) as recorded on the ship account statement in the IMO GFI Registry, issue a Statement of Compliance related to the annual GFI in accordance with paragraph 9 of regulation 6 of this Annex. The Administration, or any organization duly authorized by it, shall report that Statement of Compliance in the IMO GFI Registry ship account by 31 October after each reporting period.

Regulation 37 Reporting and verification of the annual GFI #3

7 In the event of a transfer of a ship from one Administration to another and/or a change from one company to another as referred to in paragraph 2 of this regulation, the ship shall, on the day of completion of the transfer and/or change or as close as practical thereto, report the data specified in appendix XII for the portion of the calendar year corresponding to that Administration and/or company to the losing Administration, or any organization duly authorized by it, in the case of a transfer of Administration or to its Administration, or any organization duly authorized by it, in the case of a change of company. The Administration or any organization duly authorized by it shall verify the data pursuant to paragraph 1 of this regulation and issue a Statement of Compliance pursuant to 6.10. Within one month following the issuance of the Statement of Compliance, the Administration shall report the verified data and that Statement of Compliance to the IMO GFI Registry, taking into account guidelines developed by the Organization.

8 From 1 January 2028, if a ship is permanently withdrawn from service during a reporting period, the ship shall fulfil its reporting duties for the time during which the ship was operational within that period and comply with the requirements of this chapter on the day of completion of the withdrawal or as close as practical thereto, taking into account guidelines to be developed by the Organization.

Regulation 38 IMO GFI Registry #1

Regulation 38 IMO GFI Registry

Establishment

1 The Secretary-General of the Organization shall establish and administer the IMO GFI Registry to facilitate the implementation of regulation 36, taking into account the guidelines to be developed by the Organization.

Ship specific obligations

2 Each ship to which this chapter applies shall open by 1 October 2027 an account with the IMO GFI Registry and shall pay by 30 June 2028, and by 30 June of each year thereafter, the annual administration fee to the IMO GFI Registry.

3 The Secretary-General of the Organization shall determine the annual administration fee to cover the administrative costs of the IMO GFI Registry, taking into guidelines developed by the Organization.

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Regulation 38 IMO GFI Registry #2

Functionalities

4 In accordance with regulation 36, the IMO GFI Registry shall in each ship account, as applicable:

.1 credit the amount of surplus units a ship in direct compliance is eligible to receive;
.2 record banked surplus units between reporting periods;
.3 record all transferred surplus units from one ship account to another ship account;
.4 cancel surplus units when:
  .1 used by a ship to balance its Tier 2 compliance deficit for a reporting period;
  .2 voluntarily cancelled at the request of the ship; and/or
  .3 expired; and
.5 credit remedial units to a ship account, equal to the amount and the tier type of remedial units acquired by means of GHG emissions pricing contributions to the IMO Net-Zero Fund, and cancel the remedial unit following proof of payment.

5 By the 31 August after the end of each reporting period, the IMO GFI Registry shall issue for each ship account and reporting period a ship account statement reflecting all the transactions recorded in accordance with paragraph 4 of this regulation and the GFI compliance balance.

Regulation 38 IMO GFI Registry #3

6 The IMO GFI Registry shall record for each ship account for each reporting period the following information:

.1 the ship account statement;

.2 the verified attained annual GFI;

.3 the total energy consumption;

.4 the total energy consumption of each ZNZs;

.5 the GHG emissions avoided by the uptake of ZNZs;

.6 Statement of Compliance related to the annual GHG fuel intensity, and

.7 any other information, taking into account guidelines to be developed by the Organization.

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Regulation 38 IMO GFI Registry #4

Access to the IMO GFI Registry

7 The Secretary-General of the Organization shall grant access to the Administration of a ship, or any organization duly authorized by that Administration, to all recorded data in the ship's account in order to verify and report the ship's data in accordance with regulation 37 taking into account guidelines developed by the Organization.

8 The Secretary-General of the Organization shall maintain the IMO GFI Registry and grant access to users, taking into account guidelines to be developed by the Organization.

Reporting to the Marine Environment Protection Committee

9 On the basis of the information maintained in accordance with this regulation, the Secretary-General of the Organization shall produce an annual report to the Committee summarizing the data collected, specifying the ships with an active ship account, transaction patterns in the issuance, transferring, usage and cancellation of surplus units and remedial units, share of zero or near-zero GHG emission technologies, fuels and/or energy sources (ZNZs) used by ships in IMO GFI Registry and other relevant information as may be requested by the Committee.

Regulations 37 & 38 Reporting and verification of the annual GFI - Overview

1 January –31 December reporting period

By 31 March of following year ship to report attained annual GFI to Administration*

By 30 June Administration* to verify reported data (Appendix XII) and report verified data to IMO GFI Registry

By 30 July ship to determine and record in IMO GFI Registry its selected GFI compliance approach(es)

By 31 August the IMO GFI Registry issues a ship account statement and shall make this available to the ship's Administration*

By 30 September based on the ship account statement the Administration* shall issue a Statement of Compliance related to the annual GFI

By 31 October the Administration* shall report the Statement of Compliance related to the annual GFI in the IMO GFI Registry

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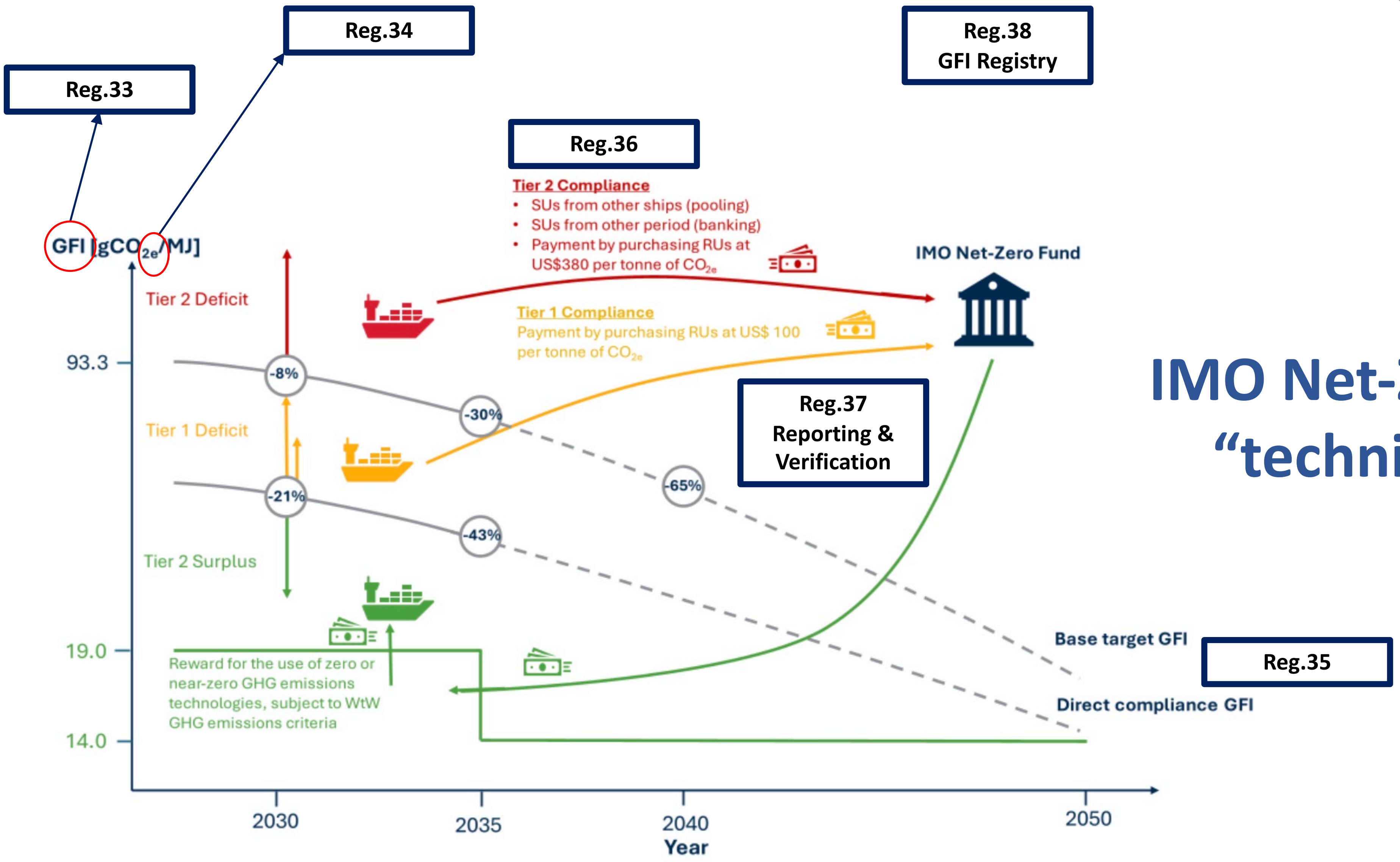
* "or any organization duly authorized by it"

IMO Net-Zero Framework “technical elements”



Source of non-annotated graphic: ABS

Regulation 39 Uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources (ZNZs)

1 ZNZs shall include technologies, fuels and energy sources and be evaluated on a well-to-wake basis, taking into account guidelines to be developed by the Organization. The GFI threshold for ZNZs shall be set at not greater than 19.0 gCO_2eq/MJ for an initial period until 31 December 2034, and from 1 January 2035, the threshold shall be set at not greater than 14.0 gCO_2eq/MJ taking into account guidelines developed and to be developed by the Organization. Notwithstanding, the Committee may approve additional ZNZs taking into account guidelines to be developed by the Organization.

2 Ships may receive rewards from the IMO Net-Zero Fund for the ZNZs used, taking into account guidelines to be developed by the Organization.

3 No later than 1 March 2027 and every 5 years thereafter the Committee shall define the reward referred to in paragraph 2 of this regulation, and the methodology to determine such reward, taking into account guidelines to be developed by the Organization.

4 The Organization shall monitor and publish the share of ZNZs in the total annual energy used on board by ships falling under the scope of chapter 5 of this Annex.

Regulation 40 The IMO Net-Zero Fund #1

1 The Secretary-General of the Organization shall establish the IMO Net-Zero Fund to support the implementation of this chapter and achieve its goal as set out in regulation 31 of this Annex. Any costs associated with the operation of the Fund and its Governing Board shall be borne by the Fund.

2 The IMO Net-Zero Fund shall receive and manage GHG emissions pricing contributions made by ships pursuant to regulation 36, and disburse collected revenue in accordance with regulation 41.

3 The Committee shall adopt the governing provisions for the IMO Net-Zero Fund and appoint a Governing Board to oversee the day-to-day operations of the Fund on its behalf in accordance with the governing provisions.

4 The governing provisions, referred to in paragraph 3 of this regulation, shall include provisions specifying which entities may be eligible to receive funds from the IMO Net-Zero Fund; the types of financing mechanisms by which funds may be disbursed; the operating procedures of the IMO Net-Zero Fund and its Governing Board; which entities and organizations the IMO Net-Zero Fund may cooperate with in the disbursement of revenue; and allocations of revenue to the different purposes set out in regulation 41 of this Annex including those that promote a just and equitable transition in the context of this measure.

Regulation 40 The IMO Net-Zero Fund #2

5 **The Governing Board shall have a gender and geographically balanced composition, ensuring adequate representation of developing countries, in particular of Small Island Developing States (SIDS) and Least Developed Countries (LDCs).**

6 **The Governing Board shall produce an annual report to the Committee containing an overview of its operations, including total contributions received, commitments and disbursement of revenue to the different purposes set out in regulation 41, and other relevant information as may be requested by the Committee.**

7 **On the basis of the Governing Board's annual report referred to in paragraph 6 of this regulation, the Committee shall periodically review the allocation of revenue to the different purposes set out in regulation 41.**

8 **The Fund shall be subject to audits.**

Regulation 41 Disbursement of revenue #1

Regulation 41 Disbursement of revenue

1 The IMO Net-Zero Fund shall disburse collected revenue for the following purposes, as shall be specified in its governing provisions:

.1 rewards for the use of ZNZs, in accordance with regulation 39 of this Annex;

.2 in the context of the implementation of this chapter and, promoting a just and equitable transition in States by facilitating environmental and climate protection, adaptation and resilience building within the boundaries of the energy transition in shipping, paying particular attention to the needs of developing countries, in particular least developed countries (LDCs) and small islands developing States (SIDS), and allocating sufficient revenue, by:

.1 researching, developing and making globally available and deploying zero and near-zero GHG emission technologies, fuels and/or energy sources, supporting the energy transition of shipping, and developing the necessary maritime, coastal and port-related infrastructure and equipment;

Regulation 41 Disbursement of revenue #2

Regulation 41 Disbursement of revenue

.2 enabling a just transition for seafarers and other maritime workforce;

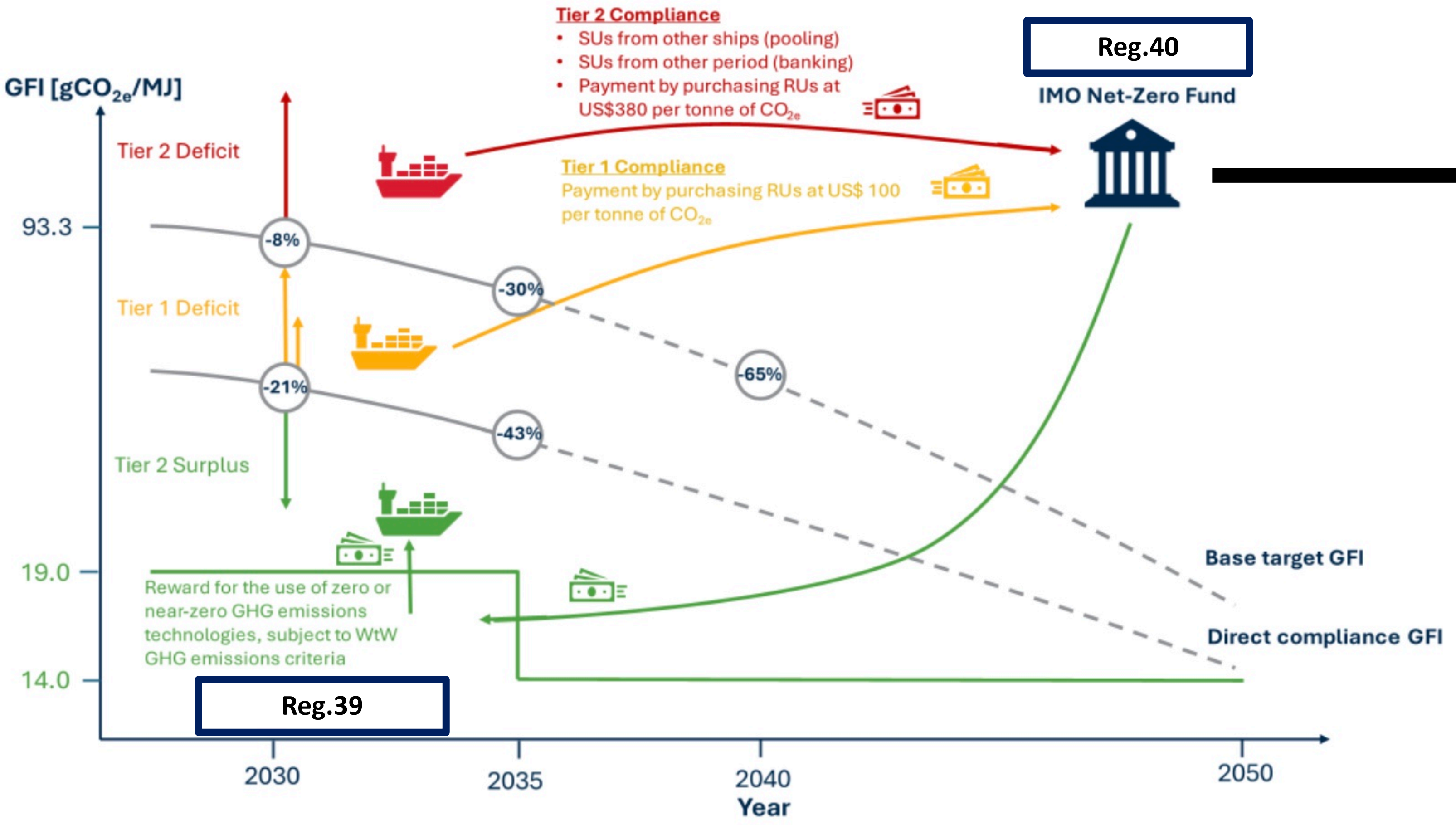
.3 facilitating information sharing, technology transfer, capacity-building, training and technical cooperation supporting the implementation of the regulations in this chapter;

.4 supporting the development and implementation of National Action Plans (NAPs), including fleet renewal and upgrade; and

.5 addressing, as appropriate, disproportionately negative impacts on States, including on food security, resulting from the implementation of the regulations in this chapter; and

.3 cover the administration and operational costs of the Fund and its Governing Board.

IMO Net-Zero Framework "economic elements"



Reg.41 Disbursement of collected revenues used to promote a "just and equitable transition in States"

Regulation 42 Promotion of technical cooperation and transfer of technology relating to the continuous improvement of the ship's GHG fuel intensity

1 Administrations shall, in cooperation with the Organization and other international bodies, promote and provide support, as appropriate, directly or through the Organization to States that request technical assistance, especially developing States.

2 The Administration of a Party shall cooperate actively with other Parties, subject to its national laws, regulations and policies, to promote the development and transfer of technology and exchange of information to States which request technical assistance, particularly developing States, in respect of the implementation of measures to fulfil the requirements of chapter 5 of this Annex.

3 The Organization shall promote information sharing, technology transfer, capacity-building and technical cooperation to enable the development of the necessary maritime, coastal and port-related infrastructure and equipment to support supply of zero or near-zero GHG emission fuels and/or energy sources in developing States.

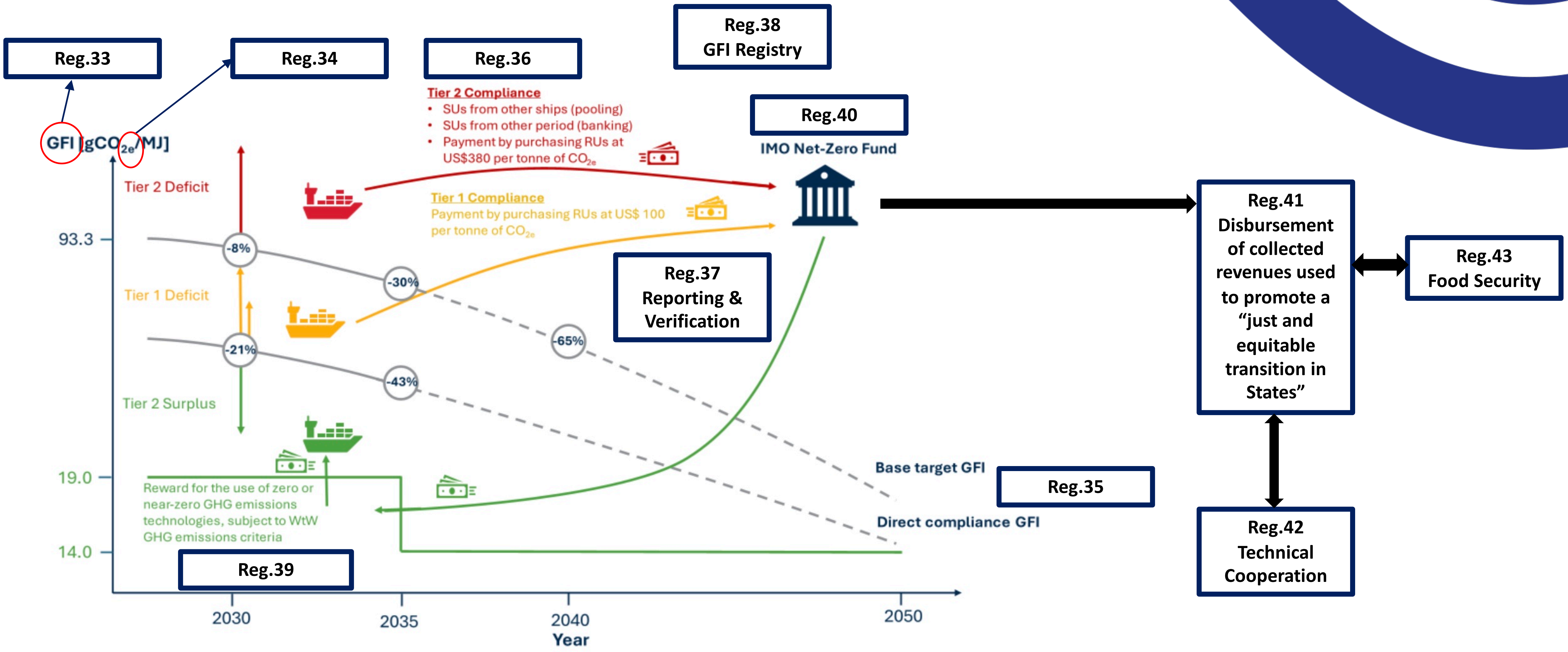
Regulation 43 Food security

The Committee shall:

.1 **shall address, including avoiding, remedying and mitigating, the disproportionately negative Impacts of this chapter on food security, paying particular attention to countries exposed to food insecurity; and**

.2 **keep the potential impacts of this chapter on food security under continuous review.**

IMO Net-Zero Framework



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Regulation 44 Review of the chapter

Regulation 44 Review of the chapter

1 To ensure the continued achievement of the goal of this chapter, every 5 years a review shall be completed by the Organization to assess the effectiveness of this chapter in achieving its goal as set out in regulation 31 of this Annex, based on which it shall consider:

.1 amending the annual GFI reduction factor (base target and direct compliance target) in regulation 35 of this Annex;

.2 amending the threshold values for ZNZs as defined in regulation 39 of this Annex; and

.3 the possible application of this chapter to ships of 400 gross tonnage and above.

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Regulation 2 Definitions (examples)

Fuel **means any energy source or energy carrier used on board a ship for propulsion or for the operation of any equipment on board a ship.**

Greenhouse gas (GHG) emissions **means any release of carbon dioxide (CO_2), methane (CH_4) or nitrous oxide (N_2O) into the atmosphere.**

Remedial unit (RU)**, expressed in tonnes of CO_2eq, is a non-transferable unit acquired by means of GHG emissions pricing contributions to the IMO Net-Zero Fund, for use by the ship to balance its compliance deficit in accordance with regulation 36.**

Ship account statement **means the annual ship account statement issued by the IMO GFI Registry reflecting the transactions recorded in that account in accordance with regulation 38.**

Surplus unit (SU)**, expressed in tonnes of CO_2eq, means a transferable unit a ship in direct compliance is eligible to receive in accordance with regulation 36.**

Sustainable fuel certification scheme (SFCS) **is a scheme, administered by a legal entity, which certifies that a fuel is compliant with the requirements set out in chapter 5 and its associated guidelines.**

Overview of guidelines adopted and to be developed to implement the IMO Net-Zero Framework

Well-to-Wake GHG intensity of fuels – new governance regime for marine fuels

Regulation 34 Sustainable fuels certification schemes

1 The GHG intensity of a fuel shall be calculated using GHG emission factors and also taking into account all relevant metrics and indicators for each sustainability theme or aspect of a fuel as documented on the Fuel Life Cycle Label(s) (FLL).

2 GHG emission factors and sustainability themes or aspects of a fuel as documented on the FLL shall be certified, as appropriate, by a recognized Sustainable Fuels Certification Scheme (SFCS) taking into account guidelines to be developed by the Organization.

3 The certified information in the FLL may accompany the bunker delivery note referred to in regulation 18 of this Annex, taking into account guidelines to be developed by the Organization.

4 An SFCS shall be recognized by the Committee taking into account the recognition process(es) and criteria specified in guidelines to be developed by the Organization. The recognition of an SFCS shall be subject to renewal every five years and periodic review, taking into account guidelines to be developed by the Organization.

5 No later than 1 March 2027, the Secretary-General of the Organization shall publish a list of recognized SFCSs, and shall update the list periodically thereafter.

6 Within three months after the end of calendar year 2027, and within three months after the end of each following calendar year, the Organization shall ensure that the legal entity administering the recognized SFCS reports data relevant to their activity for that calendar year or portion thereof to ensure transparency, traceability, and environmental integrity in the certification process, taking into account guidelines to be developed by the Organization. On the basis of the reported data, the Secretary-General of the Organization shall produce an annual report to the Committee.

2024 Guidelines on the Life Cycle GHG Intensity of Marine Fuels (MEPC.391(81)) identifies information required to calculate GFI in the form of a "Fuel Lifecycle Label" (FLL)

Part A-1	Part A-2	Part A-3	Part A-4	Part A-5
Fuel type (blend)	Fuel Pathway Code	Lower Calorific Value (LCV, MJ/g)	share in fuel blend ($\%MJ_{(LCV)}$ / $MJ_{(LCV)}$)	WtT GHG emission factor (GWP100, $gCO_{2eq}/MJ_{(LCV)}$)

+

Part B-1	(Part B-2)[15]
Emissions credits related to biogenic carbon source (e_c, in gCO_2/g fuel based on GWP100)	Emissions credits related to source of captured carbon (e_{ccu}, in gCO_2/g fuel based on GWP100)

+

Part C-1	Part C-2	Part C-3
Value 1 (carbon source NOT taken into account): TtW GHG emission factor (GWP100, $gCO_{2eq}/MJ_{(LCV)}$)	Value 2 (carbon source taken into account): TtW GHG emission factor (GWP100, $gCO_{2eq}/MJ_{(LCV)}$)	Energy Converter

+

Part D	Part E
WtW GHG emission factor (GWP100, $gCO_{2eq}/MJ_{(LCV)}$) Note: Part D = Part A-5 + Part C-2	Sustainability (Certification)[16]

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Calculation of GHG Intensity of fuel (EIj) using default emission values in 2024 LCA Guidelines

Example: VLSFO (0.1% < 0.5% S)

Lower Calorific Value (LCV) = 0.0402 (MJ/g)

WTT GHG emission intensity	**= 16.8 gCO_2eq/MJ**
Cf (TTW GHG emissions / gram of fuel)	**= 3.1631 gCO_2eq/g fuel**
TTW GHG emissions / LCV	**= 3.1631 / 0.0402**
TTW GHG emission intensity	**= 78.68 gCO_2eq/MJ**
Total GHG Intensity of fuel (WTT +TTW)	**= 16.8 + 78.68 = 95.48 gCO_2eq/MJ**

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Possible format of Fuel Life-cycle Label (FLL)?

FLL WtT (p. 1)

Unique serial number	....
Date of Issuance	....
BDN number	....

Supplier		Recipient ship	
Name	....	Name	....
Address	....	IMO number	....
Certificate number	....	Contract Number	....

Address shipping point	....
Date of dispatch	....

Fuel Information

Type of Product	....

Detailed blend information

	IMO pathway	Qty (MT)	Energy (MJ)	LCV (MJ/kg)	WtT GHG (gCO2/MJ)	PoS number
Biofuel 1	....	....	....	....	....	....
Biofuel 2	....	....	....	....	....	....
...						
Fossil fuel	....	....	....			

Life cycle-based aspects (section 7.1 LCA guidelines)

Sustainability criteria according to LCA guidelines section 7.1	....

FLL WtT (p. 2)

Emission credits

Emission credits related to biogenic carbon source (e_c, in gCO_2/g fuel)	....
Emission credits related to source of captured carbon (e_{ccu}, in gCO_2/g fuel)	....

Detailed GHG emission information

Biofuel 1	Raw material	Country of Origin

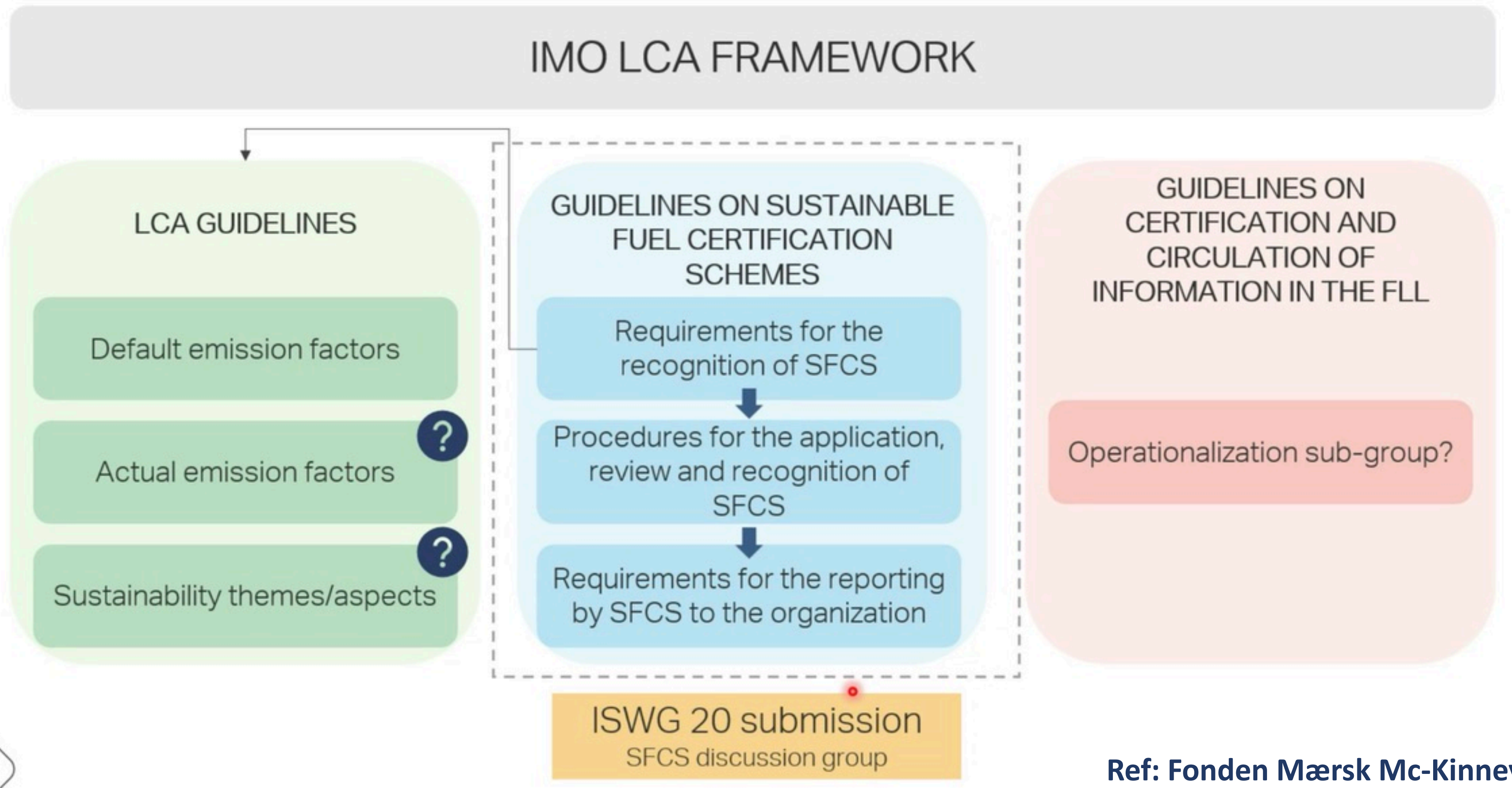
E=		Efecu		El		Ep		Etd		Esca		Eccs
...	=	...	+	...	+	...	+	...	+	...	+	...

Biofuel 2	Raw material	Country of Origin

E=		Efecu		El		Ep		Etd		Esca		Eccs
...	=	...	+	...	+	...	+	...	+	...	+	...

...

Guidelines for sustainable fuels certification



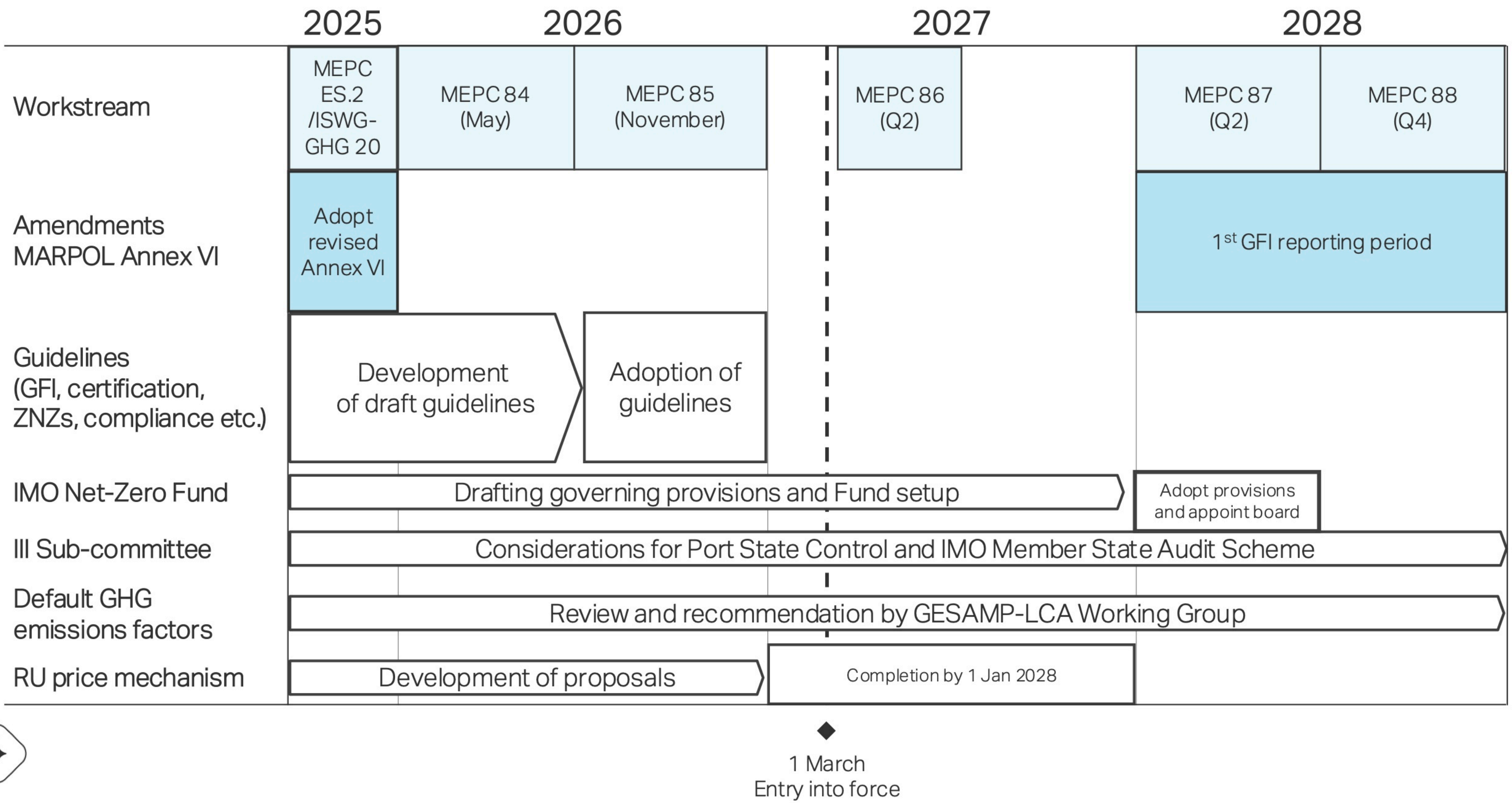
Ref: Fonden Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping

Summary and scheduled adoption of IMO NZF guidelines

Category	Guideline(s)	Expected Adoption
GHG Fuel Intensity (GFI) and GFI compliance approaches	• Calculation of the attained annual GFI • Annual GFI compliance approaches • Reporting and verification of the annual GFI • (Submission of data for GFI of ships from a state not party to MARPOL Annex VI -- guidance rather than guideline))	MEPC 85 (November 2026)
"Zero- or near-zero GHG emission technologies, fuels and/or energy sources" (ZNZs)	• Evaluation, approval, and monitoring of ZNZ uptake • Definition of ZNZ rewards and methodology for rewards	MEPC 85
GFI Registry	• Development, management, and operation of IMO GFI Registry • Determination of the annual IMO GFI Registration administration fee • Functioning and access to the IMO GFI Registry	• MEPC 85 • MEPC 86 (Q2 2027) • MEPC 85
Further development of the GHG Lifecycle Analysis (LCA) Framework and emissions measurement	• Requirements and procedures for recognition of certification schemes and reporting of certification activities of the Organization • Testbed and onboard measurements of methane (CH_4) and/or nitrous oxide (N_2O) emissions from marine diesel engines • Certification and circulation of information in the fuel life cycle label. • Amendments to the LCA Guidelines	• MEPC 84 (May 2026) • MEPC 84 • MEPC 85 • MEPC 86
Amendments to existing guidelines and procedures	• 2024 Ship Energy Efficiency Management Plan (SEEMP) Guidelines • Guidelines for the verification and company audits by Administration of Part III of the SEEMP • Harmonized System of Survey and Certification (HSSC)	MEPC 85
Onboard Carbon Capture and Storage (OCCS)	• Testing, survey, and certification of OCCS	MEPC 85

Ref: Fonden Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping based on draft work plan set out in document MEPC/ES.2/3 (Secretariat)

Overview of the key IMO NZF workstreams



Ref: Fonden Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping

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Implications for the Mediterranean Region

Implications for the Mediterranean Region

1. **Costs of compliance for ships**
2. **Fuel production and supply**
3. **State not a Party to MARPOL Annex VI**
4. **Development of National Actions Plans**

Costs of compliance for ships

1. **Increased cost of fuels to comply with annual GFI targets – impacts?**
2. **Cost of remedial units (variable depending on whether ship is in Tier 1 (US$100) or Tier 2 (US$380) deficit)**
3. **Cost of "purchasing" surplus units (only where ship is in Tier 2 deficit) (US$380?)**
4. **Investment in new ships, technologies and energy sources - ROI?**
5. **Administrative costs – sourcing fuels (routing restrictions?), managing compliance**
6. **Potential impact on charter rates**
7. **Legal costs for additional legal work e.g., charter parties, disputes**

Costs of compliance for ships

Example of cost in US$ (millions) to purchase Remedial Units for a ship using 10,000 tonnes of fuel oil

Year	VLSFO (<0.5%S) (95.48 gCO_2eq/MJ)	MDO/MGO (<0.1%S) (93.93 gCO_2eq/MJ)
2028	1.39	1.15
2029	1.68	1.44
2030	1.97	1.73
2035	5.1	4.86

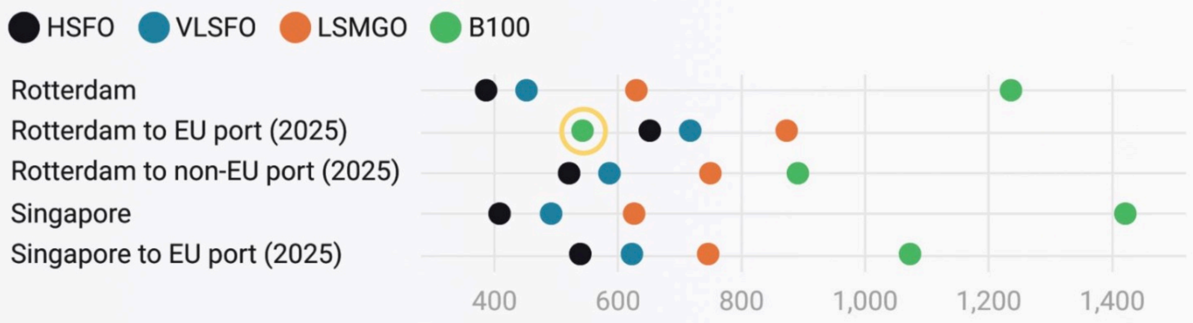
Source: Green Marine Associates Ltd.

Costs of compliance for ships – cost of fuels

Alternative Fuels 08 September 2025

Fuel Switch Snapshot

Fuel Price + EU ETS + FuelEU Costs ($/mt)



- *The dots represent VLSFO-equivalent prices adjusted for calorific contents.*
- *They either have estimated EU ETS, FuelEU Maritime and pooling costs excluded ("Rotterdam", "Singapore") or included ("Rotterdam to non-EU port", "Rotterdam to EU port", "Singapore to EU port").*

Source: ENGINE, Prima Markets, NYMEX | Created with Datawrapper

B100 discounts in Rotterdam have widened:

- $175/mt vs. VLSFO (up $8/mt)
- $331/mt vs. LSMGO (up $38/mt)
- $108–216/mt vs. LNG (up $41/mt, depending on engine type)

💧 LNG spreads shift

- LNG's premium over VLSFO for Otto MS engines climbed to $40/mt
- For dual-fuel diesel slow-speed engines, LNG is now $68/mt cheaper than VLSFO in Rotterdam

🛢️ VLSFO moves

- VLSFO fell $13/mt in Rotterdam and $12/mt in Singapore, tracking a $15/mt drop in front-month ICE Brent futures
- Lead times: 5–7 days in Rotterdam, 8–11 days in Singapore (slightly longer than last week)

🌱 B100 benchmark

- Rotterdam's B100 benchmark dropped $22/mt
- Heavier pressure from a $31/mt rise in Dutch HBE rebate

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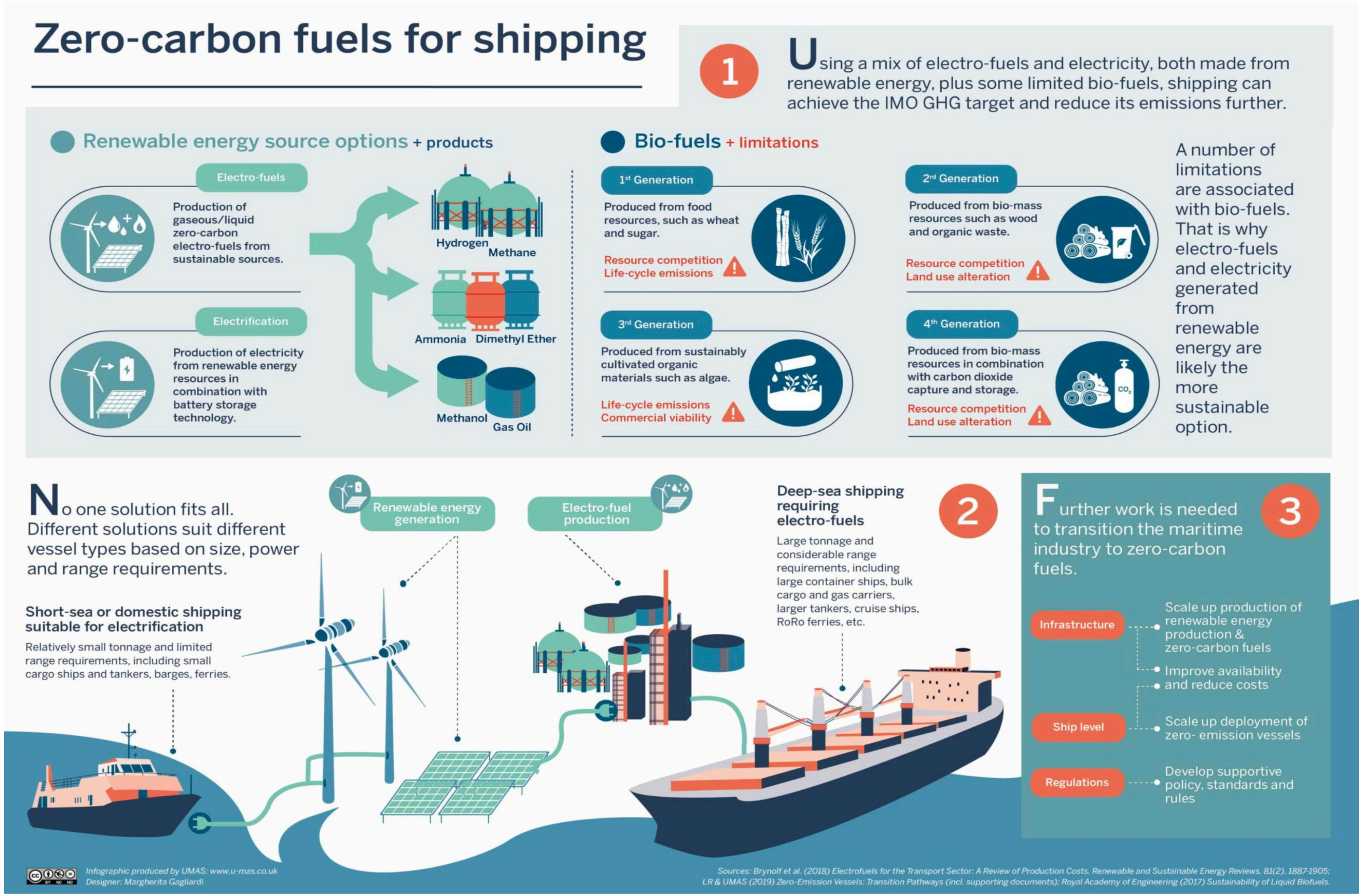

Source:
UMAS, June 2020

e-Fuel production and supply - issues

1 FUEL PRODUCTION
- Fuel production cost
- Fuel production maturity
- Current global grey molecule production
- 2050 e-fuel production (non liquified)
- Liquefaction bottleneck
- CO_2 availability

2 STORAGE
- Storage temperature at atmospheric pressure
- Fuel volumetric density
- Tank relative volume
- Ability to store in current infrastructure
- Storage tank TRL
- Capital cost of storage tank

3 DISTRIBUTION
- Transportability with existing infrastructure
- Fuel supply system TRL

4 BUNKERING
- Volumetric energy density
- Gravimetric energy density
- Ability to use existing fuel bunkering systems
- Bunkering system's TRL

5 ENGINE
- Thermal efficiency
- Ability to use existing engine.
- Ability to progressively share of e-fuel
- Engine TRL
- Current number of vessels in 2021

6 SAFETY
- Flashpoint
- Leakage risk
- Toxicity
- Safety measures

7 REGULATION
- E-fuel production regulation maturity
- Permit as ship fuel
- Public support
- Regulation maturity

Source:
E-fuels for Maritime Applications, New Energies Coalition, November 2021 (TRL = Technology Readiness Level)

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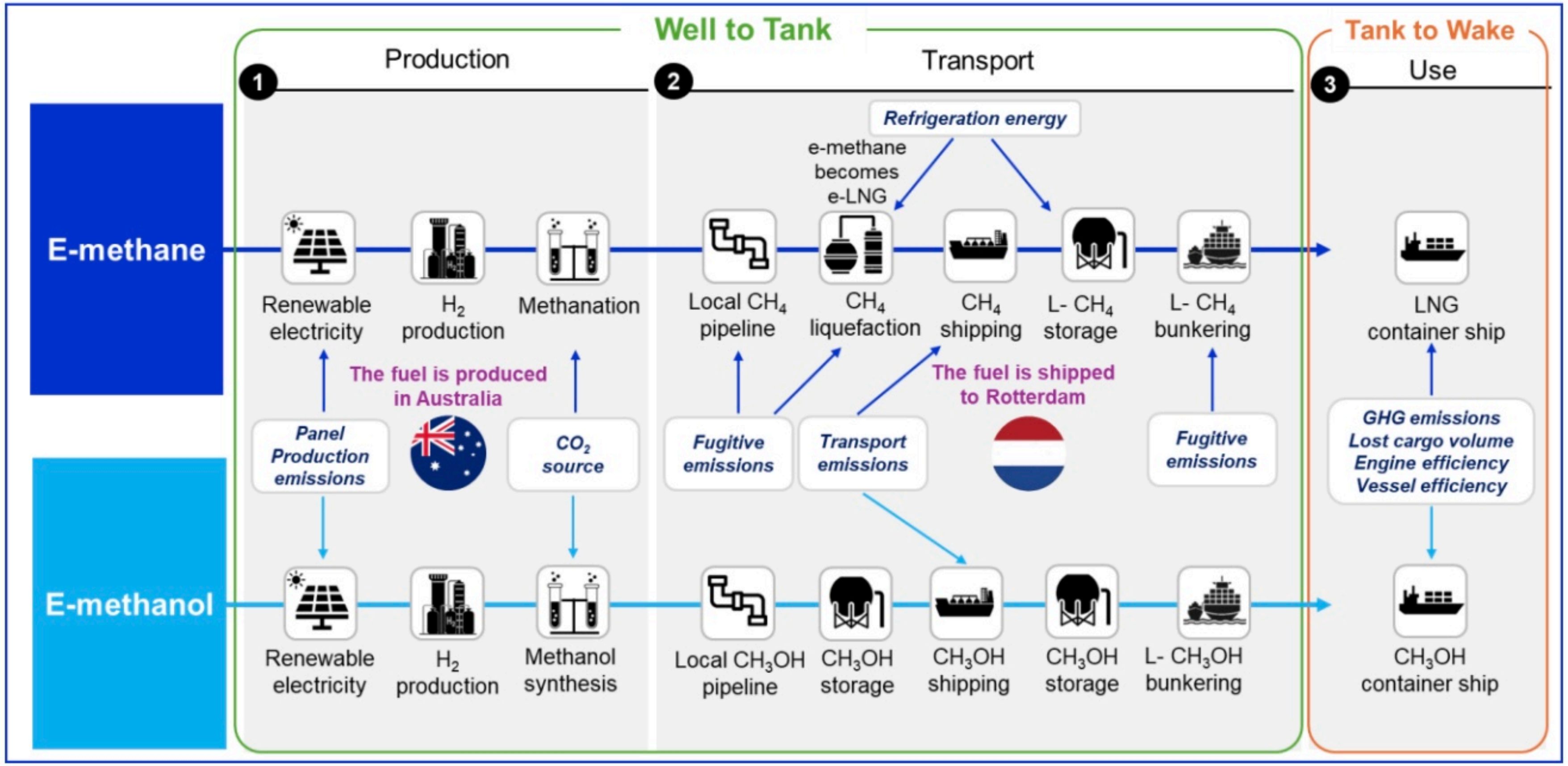
e-Fuel production and supply - example



Source:
Life cycle assessment of marine electro-fuels compared with fossil fuels, Ricardo & New Energies Coalition, December 2024

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Fuel production and supply - summary

1. Production
   - New opportunities for producers of ZNZ fuels – potential for States to become net-exporters of energy?
   - Synthetic fuels generated from sustainable energy e.g. solar – part of national energy policy

2. Supply (Transport, Storage and Bunkering)

   - hydrocarbons (HFO, MGO, LNG), biofuels, methanol, ammonia, hydrogen (IMO IGF Code covers use by ships)

   - new ship tonnage required to transport as cargo/bunker new fuels?

   - storage of multiple fuels - investment in port infrastructure to supply and store new fuels but as they have a lower energy density likely to means more storage required

   - safety & training implications – risks need to be identified and managed

   - regulatory framework lag – safety, insurance, liability (unknown unknowns!?)

3. Energy supply network e.g. onshore power supply (EU requirements)

4. Finance – estimated to require USD 30 to 90 billion per year to 2050[1]

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[1] Mapping Global Financial Support Opportunities for Zero-Emission and Energy-Efficient Ships, Danish Maritime Authority, February 2025

State not a Party to MARPOL Annex VI

1. **108 IMO Member States are Contracting Parties to MARPOL Annex VI**

2. **Five Contracting Parties to the Barcelona Convention are not a Party to MARPOL Annex VI**

3. **States that are not a Party, including several in the Mediterranean Region, will be potentially at a disadvantage when seeking uniform and effective implementation of IMO Net-Zero Framework**

   - **Does not have the right to issue to a registered ship a Statement of Compliance related to the annual GHG fuel intensity (regulation 37 of MARPOL Annex VI)**

   - **Ships will still need to comply if trading internationally and so will need another Administration to issue a Statement of Compliance to demonstrate to port State control authorities that the ship is compliant – payment of remedial units, receipt of rewards for use of ZNZs**

   - **Access to IMO Net-Zero Fund?**
     Regulation 40.4 of MARPOL Annex VI [IMO Net-Zero Fund] reads as follows:

     “The governing provisions, referred to in paragraph 3 of this regulation, shall include provisions specifying which entities may be eligible to receive funds from the IMO Net-Zero Fund.”

Development of National Action Plans

1. **IMO resolution MEPC.367(79) on *Encouragement of Member States to develop and submit voluntary national action plans to address GHG emissions from ships*** identifies the following actions:
   (a) improving domestic institutional and legislative arrangements for the effective implementation of existing IMO instruments;
   (b) developing activities to further enhance the energy efficiency of ships;
   (c) initiating research and advancing the uptake of alternative low-carbon and zero-carbon fuels;
   (d) encouraging the production and distribution of such fuels for shipping;
   (e) accelerating port emission reduction activities, consistent with resolution MEPC.366(79);
   (f) fostering capacity-building, awareness-raising and regional cooperation;
   (g) facilitating the development of infrastructure for green shipping; and
   (h) facilitating voluntary cooperation through the whole value chain, including ports, to create favourable conditions to reduce GHG emissions from ships through shipping routes and maritime hubs consistent with international law, including the multilateral trade regime

2. **NAP provides national policy framework to support implementation of regulation 42 of MARPOL Annex VI including for Member State accession to MARPOL Annex VI**

3. **Guidance Document on the preparation of National Action Plans to address GHG emissions from ships in the Mediterranean region, REMPEC, July 2025**

4. **IMO Circular Letter.5062 (2 September 2025) Call for Expressions of Interest: GreenVoyage2050 support for the development of National Action Plans to address GHG emissions from ships**

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Wrap-up and Next steps

Thank-you for your attention

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Poll 1

What is the tonnage threshold for ships trading internationally to comply with the IMO Net-Zero Framework?

A. 400 GT and above
B. 500 GT and above
C. 3,000 GT and above
D. 5,000 GT and above

Poll 2

What does the acronym GFI stand for?

A. Global Fuel Index
B. Global Fuel Intensity
C. GHG Fuel Intensity
D. GHG Fuel Index

Poll 3

What is the price of a Tier 1 remedial unit for meeting the Direct compliance target?

A. US$100
B. US$150
C. US$250
D. US$380

Poll 4

What is the price of a Tier 2 remedial unit for meeting the Base target?

A. US$100
B. US$150
C. US$250
D. US$380

Poll 5

By when does the ship have to report its annual GFI intensity to its Administration?

A. 31 January
B. 31 March
C. 30 April
D. 31 May

Poll 6

By when does the Administration have to issue to the ship a Statement of Compliance related to annual GFI intensity?

A. 31 July
B. 31 August
C. 30 September
D. 31 October

Poll 7

What is the GHG fuel intensity threshold in gCO_2eq/MJ at which fuels used by ships become eligible for rewards?

A. 93.3
B. 65
C. 19
D. 14

Poll 8

The IMO Net-Zero Fund would be able to disburse funds for what?

A. rewards for use of ZNZs
B. promote a just and equitable transition in States
C. administration and operational costs of the fund
D. all the above

Poll 9

Which of the following would the IMO Net-Zero Fund <u>not</u> disburse funds for?

A. RD&D of ZNZs
B. enabling a just transition for seafarers
C. adaptation and resilience building outside the boundaries of the energy transition in shipping
D. addressing disproportionately negative impacts resulting from the regulations

Poll 10

How many IMO Member States are currently a Contracting Party to MARPOL Annex VI?

A. 73
B. 108
C. 123
D. 176

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Poll 11

If the Member State is not a Party to MARPOL Annex VI what will an Administration not be able to do?

A. Issue a Statement of Compliance related to the annual GFI
B. Develop a National Action Plan
C. Apply the requirements to its ships
D. Be eligible to receive funds from the IMO Net-Zero Fund