BRIEFING - APRIL 2025

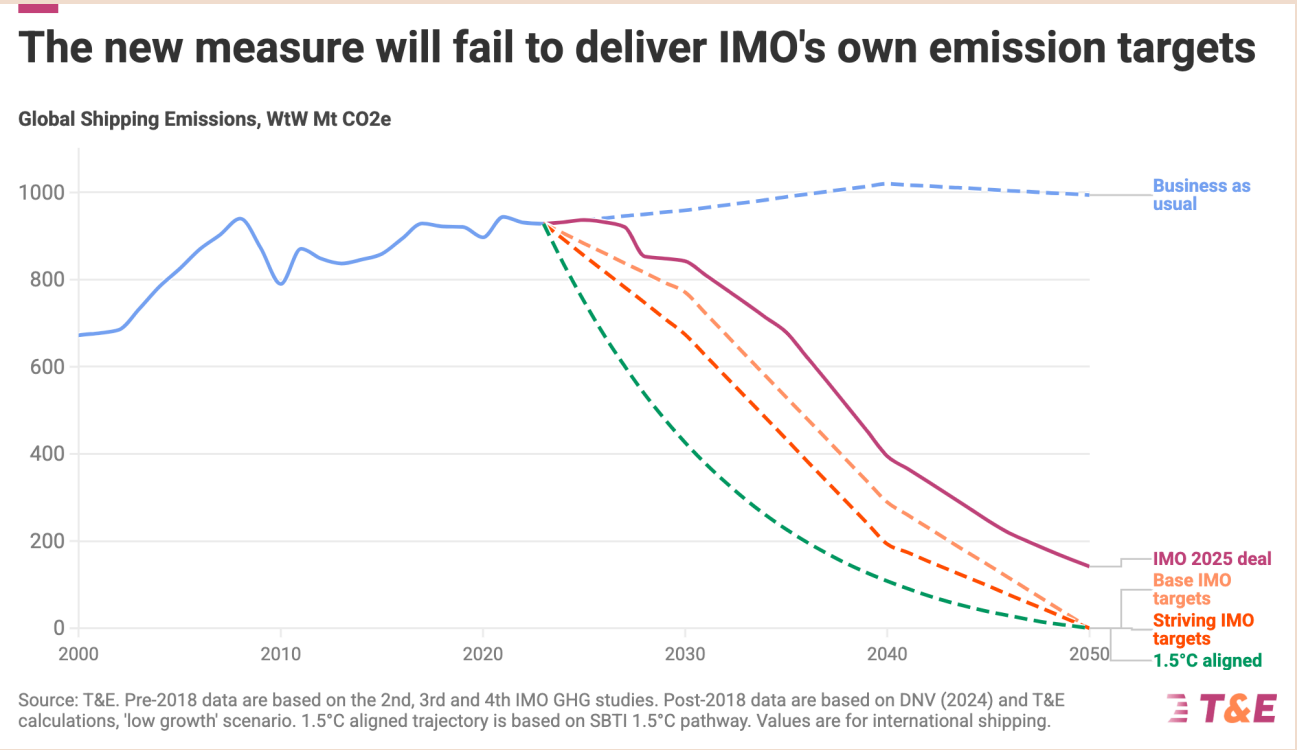
IMO Net-Zero Framework

Assessing the impact of the IMO's draft Net-Zero Framework

Summary

The IMO Marine Environment Protection Committee (MEPC83) approved a Net-Zero Framework in the hope of reaching the climate objectives set in the IMO 2023 GHG Strategy to decarbonise international shipping. The Strategy included intermediate objectives of 20-30% GHG emission reduction by 2030 and 70-80% reduction by 2040, eventually reaching net-zero by or around 2050.

Unfortunately, the draft deal – known as a IMO Net-Zero Framework – will fall short of delivering these targets, let alone being compatible with the 1.5°C temperature goal of the Paris Agreement.



While the framework should be in a position to **generate approx. revenues of $10 billion per year until 2035**, our analysis concludes that the projected revenues will not be sufficient to support the uptake of zero- and near-zero GHG fuels, nor enable a just and equitable transition. Even if funds are prioritised for ZNZ fuel rewards, in the absence of additional incentives, the estimated revenues needed to support the uptake of scalable ZNZs will run out by 2032.

In addition, given that the framework does not exclude nor cap the use of any fuel type, the targets are likely to incentivise ships to rely on the most affordable **crop-based first-generation biofuels on the market, such as those produced from vegetable oils, including palm oil, soybeans or rapeseed**. Given their impact on deforestation, reliance on

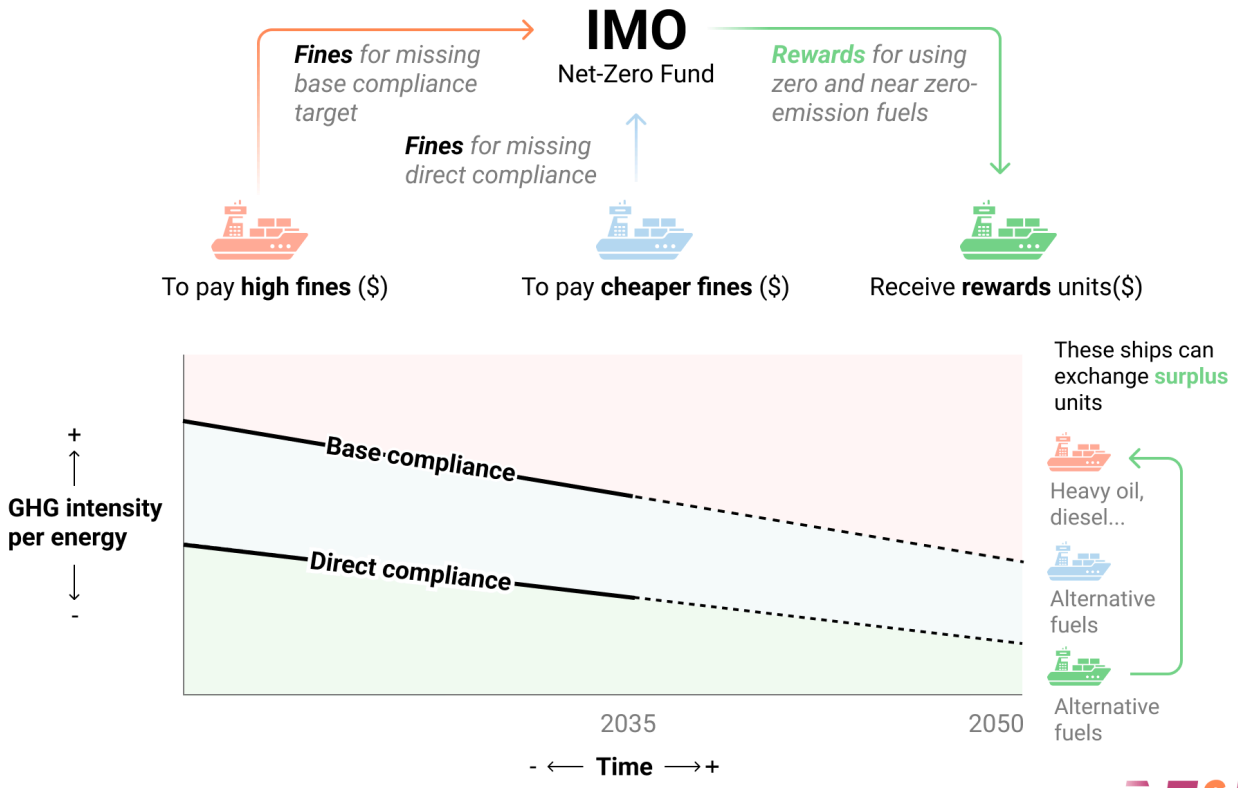
these fuels would likely limit emissions savings and may even increase total shipping emissions.

The framework holds similarities with the EU's own version called FuelEU Maritime. A table showing the differences and similarities between those two frameworks is available in the annex.

1. What did the IMO agree upon?

The IMO's net-zero framework brings the economic and technical instruments of the IMO's GHG Strategy under a single regulatory framework.

Functioning of the IMO Net-Zero Framework



Source: T&E

The framework functions based on the following parameters:

- The *Base GFI* targets act as the trajectory that ships must meet to reduce their emissions by switching to alternative fuels. These targets will act as the minimum *compulsory* decarbonisation trajectory. Ships failing to meet those base targets would pay penalties, a.k.a. Tier 2 remedial units (RUs).

- Tier 2 RUs (orange band) are intended to motivate ships to switch to alternative fuels and meet the base targets. These RUs are meant to act as a deterrent and not be used as part of a "pay to pollute" strategy. **The Tier 2 RU price is set at $380 per tonne of CO2e until 2030.** Post-2030 values will be decided in the future.

- The *Direct Compliance* (DC) GFI targets set a secondary compulsory goal for ships to achieve via fuel switch; but if they fail, they would normally have to pay Tier 1 RUs.

- Tier 1 RUs are priced *cheaper* than Tier 2 RUs, as well as the least costly compliant alternative fuels, making them the most attractive compliance option in the blue band. After achieving the necessary emissions reductions to meet the *base GFI*, ships would normally purchase Tier 1 RUs instead of switching to alternative fuels. **The TTier 1 RU price is $100 per tonne of CO2e until 2030.** Post-2030 values will be decided in the future.

- Surplus Units(SUs) would be provided to ships *exceeding* the DC GFI targets. These SUs could either be banked for up to two years to be used in the future or sold to undercompliant ships failing to meet *Base GFI* targets or cancelled voluntarily. SUs generated and sold by vessels running on expensive e-fuels can help to reduce the price gap between these fuels and low-carbon alternatives.

2. What are the expected emissions reductions, and are they enough to meet the IMO's 2023 objectives?

The base GHG emissions reduction objectives will fall short of the objectives set in the IMO's 2023 GHG strategy by at least 8% by 2030, while the striving objectives will be missed by at least 20%. Furthermore, **compared to reductions required in alignment with a 1.5°C trajectory, the current framework is off by a wooping 50%.**

The IMO Net-Zero Framework sets total GHG emissions from shipping to decrease to only 842.4 Mt CO2e by 2030 and to 530 Mt CO2e by 2035, a far cry from the 426 Mt CO2e total emissions required to remain on track for a 1.5°C aligned trajectory. Furthermore, had all vessels been included in this framework, i.e. those below 5,000 GT, the expected emissions reduction would be significantly lower.

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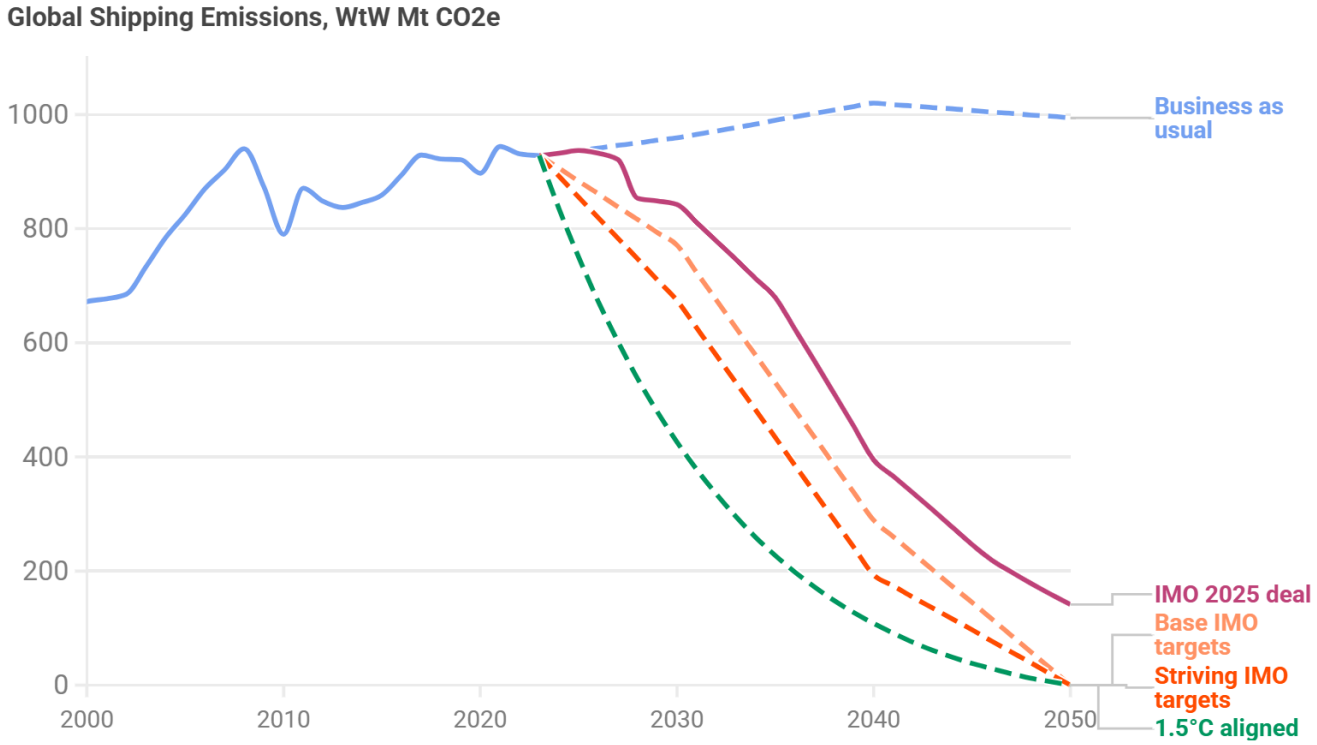
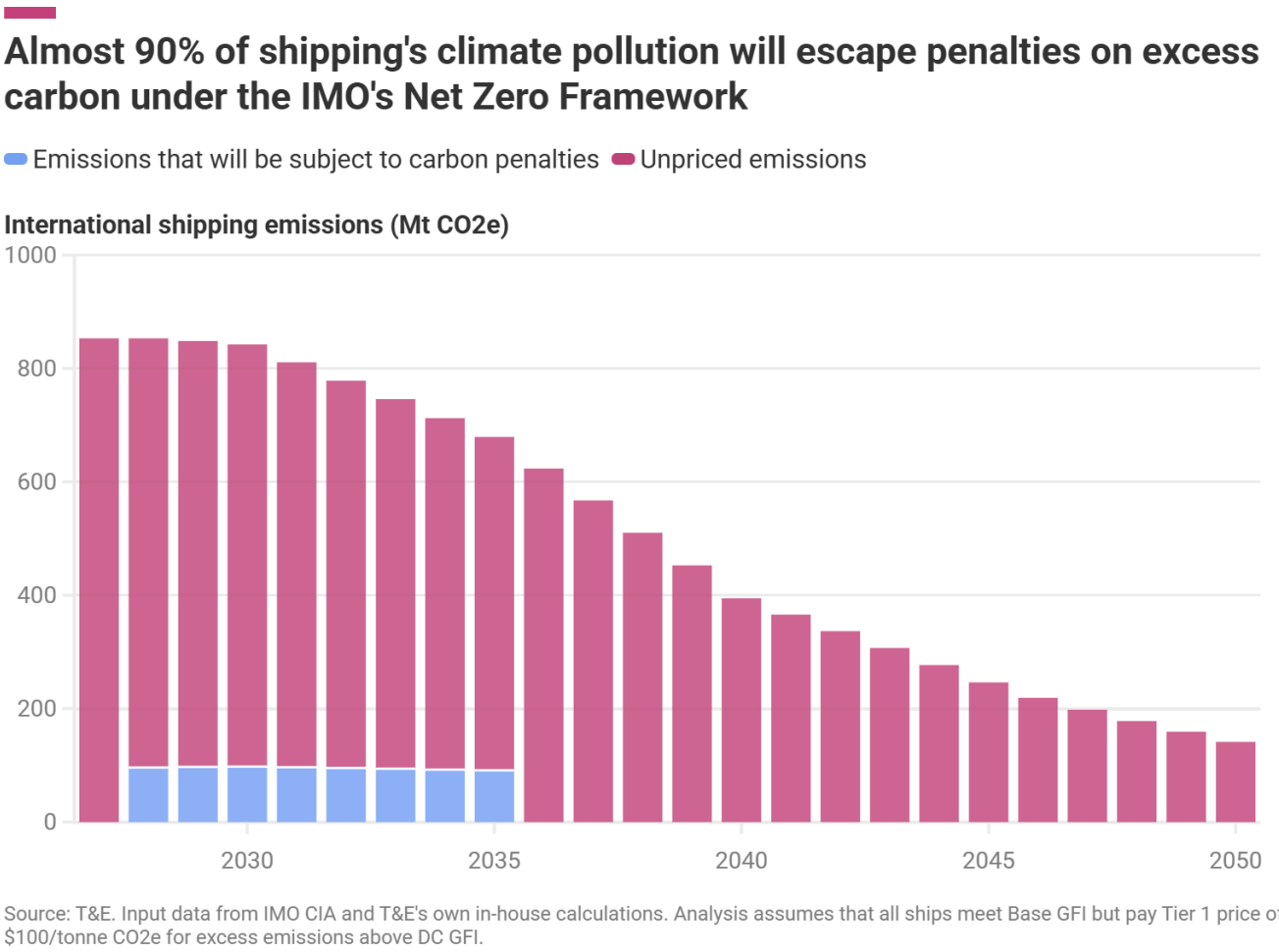
The new measure will fail to deliver IMO's own emission targets



Source: T&E. Pre-2018 data are based on the 2nd, 3rd and 4th IMO GHG studies. Post-2018 data are based on DNV (2024) and T&E calculations, 'low growth' scenario. 1.5°C aligned trajectory is based on SBTI 1.5°C pathway. Values are for international shipping.

2. Potential revenue generation and whether it will support shipping's energy transition and enable a just and equitable transition?

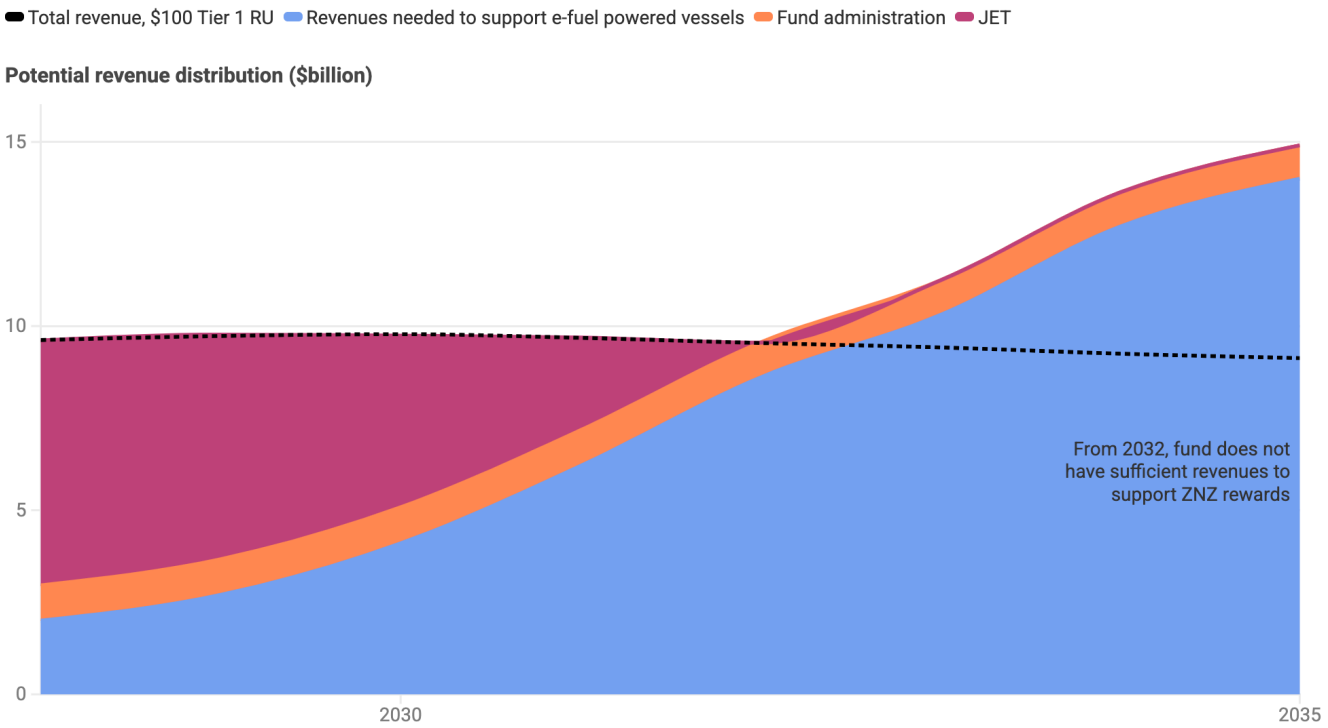
The main source of revenue is expected to originate from tier 1 RUs. This is due to the fact that a share from tier 2 remedial units is expected to be paid through the purchase of SUs. This would effectively reduce the amount of the revenue paid directly to the IMO Net-Zero Fund through tier 2 RUs. Our analysis estimates that **approx. $10 billion per year between 2028 could be made available**. While the framework specifies that revenues generated by the measure should support the uptake of ZNZ fuels and technologies and contribute to various objectives linked to a just and equitable transition, how, and when those revenues will be distributed remains to be decided.



Source: T&E. Input data from IMO CIA and T&E's own in-house calculations. Analysis assumes that all ships meet Base GFI but pay Tier 1 price of $100/tonne CO2e for excess emissions above DC GFI.

If the financial support for ZNZ fuels such as e-ammonia and e-methanol was prioritized over JET objectives, **revenues available for a just and equitable transition would also dry up rapidly** dropping from an estimated $6.65 billion available by 2028,, to a mere $2.52 billion by 203,1, with no available funds thereafter. If all remaining GHG emissions had been affected by the framework, the total revenues would have been significantly higher, generating $71.1 billion in 2028 and $64.6 by 2035. Such amounts would have provided far greater certainty for the deployment of ZNZ e-fuels and technologies, while ensuring greater funds for a just and equitable transition.

IMO agreement will not raise sufficient funds to support a just and equitable transition



Source: T&E. Input data from IMO CIA (DNV, 2024) and Stratas Advisors. Base and Direct Compliance (DC) GFI values are calculated from IMO MTMs agreement. We assume generation of SUs below DC by e-ammonia and e-methanol-powered vessels, which contribute to 3%-26% of total energy demand by 2030 and 2040 respectively. SUs are assumed to be sold up to DC and transferred to vessels using VLSFO. Remaining vessels comply at 'base' trajectory using biofuel blends. Tier 1 RU price set to $100/t CO2e across period. Analysis assumes that SUs trade at a price of $380/tonne CO2e abated. The distribution assumes constant 10% allocation for fund administration.

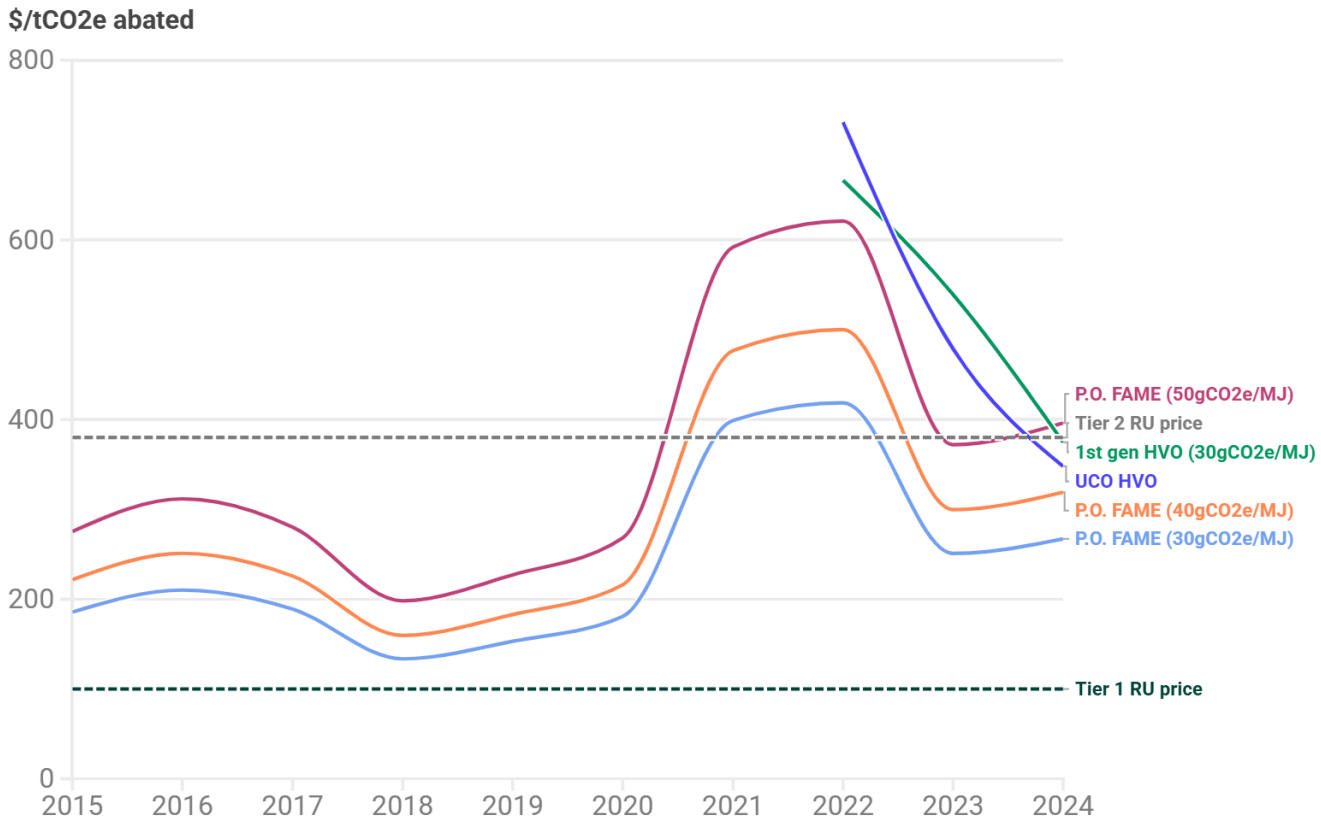
3. Which fuels are likely to be incentivised?

While an initial tier 2 RU price of $380 per tonne of CO2e will encourage ships to move away from high-emission fuels such as VLSFO and diesel, it falls short of incentivizing a shift toward significantly cleaner alternatives such as green hydrogen-derived fuels. Under the current framework and penalty price, vessels are more likely to adopt relatively affordable biofuels, as these can help meet the base GFI targets. Had a higher penalty price been agreed, such as around $600 per tonne of CO2e, it would have provided a stronger financial incentive for ships to transition toward green hydrogen-based fuels such as e-ammonia and e-methanol which are more expensive.[1] In addition, considering that the price of biofuels has varied significantly over the years, ships may, at some point, prefer to pay the penalty instead of reducing their emissions to meet the base targets, further diminishing the sector's overall emissions

[1] For context, estimated fuel prices by DNV Impact Assessment for the IMO estimated that by 2030, biodiesel would be $30.9/GJ, which is significantly lower than the predicted price of e-ammonia at $46.5/GL or e-methanol at $61.2/GJ.

reductions. It remains to be decided what methodology will be adopted to determine the RU prices after 2030.

Historical biofuel prices show that penalties may not be high enough to ensure consistent compliance

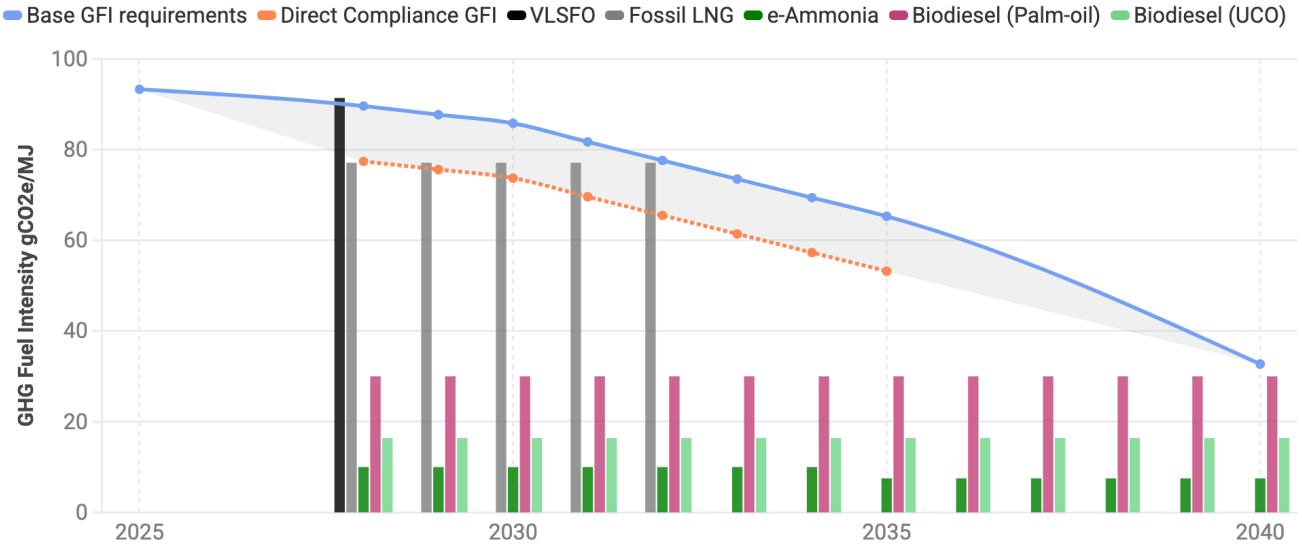


T&E (2025) analysis based on the historical prices of different biofuels. Analysis uses 17.25 gCO2e/MJ intensity for UCO HVO and 91.39 for VLSFO. VLSFO prices represent historical values in Rotterdam.

Finally, considering that the framework does not exclude, nor cap, the use of any specific fuel type , thie GFI targets are likely to encourage ships to rely on the most affordable crop-based biofuels on the market. This could come at a significant cost for the global climate as it is unclear how indirect land-use change (ILUC) emissions will be accounted for under the IMO life cycle analysis guidelines. This is a key issue considering that ILUC emissions can increase by three times the carbon footprint of fuels such as biodiesel from palm oil. Blended mixes of fossil marine diesel and their biodiesel counterparts would be able to comply for much longer. When it comes to LNG, the direct compliance targets should ensure that LNG does not generate SUs, but this fuel option will be incentivised by the base targets.

Ships could also opt to bunker enough of such biofuels to generate a substantial amount of SUs, despite not offering a option for long-term decarbonisation. These surplus units could then be sold to offset the emissions of those ships that would otherwise be penalised.

First generation crop-based biodiesel will be compliant for nearly two decades

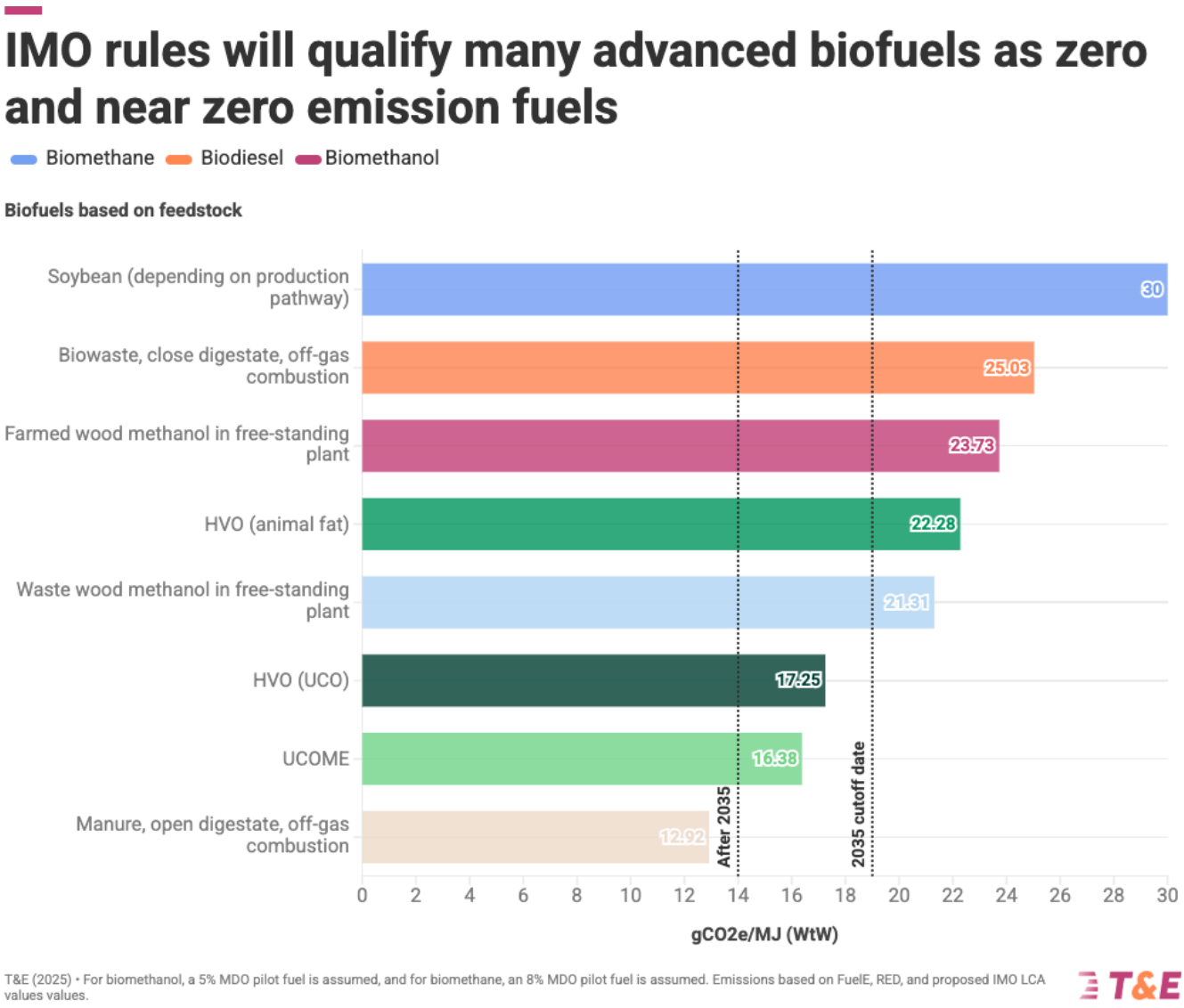


Source: T&E (2025). Calculated fuel intensities based on FuelEU Maritime values, IMO & IEA data and in-house T&E calculations.

4. Which fuels could be considered ZNZ fuels?

The framework provides some parameters for zero and near-zero emission fuels, technologies and energy sources. Until 2035, these will be able to meet a maximum threshold of 19 g CO2e/MJ, and afterwards a threshold of 14 g CO2e/MJ. This definition is crucial as it provides **a reference point to determine which fuels, technologies and energy sources could receive financial rewards from the IMO Net-Zero Fund**. While the threshold has been agreed upon, the official well-to-wake values of marine fuels remains to be deteremined by the GESAMP group through the Life Cycle Analysis (LCA) guidelines, which are meant to be finalised before the measures enter into force.[2] But existing values from the EU Renewable Energy Directive allows us to make a preliminary comparison, which can be seen below.

[2] But other regulatory frameworks already included WtW values for different fuels. The graph indicates which fuels might comply based on the EU emission factors from FuelEU and RED.



While the exact methodology on how the collected revenue will be distributed is unknown, the threshold of 19 gCO2e/MJ is likely to incentivize a wide range of fuels, including from feedstocks used cooking oil (UCO), which are already in use in other industries and available in limited quantities.[3] Annual demand for UCO and animal fat is predicted to grow up to 27.8 Mt by 2040, whereas the combined sourcing potential in the USA, EU, UK, China, Indonesia, and Malaysia is around 12.9 Mt/year.[4] For UCO to make a significant contribution, it would require privileged access, which is unlikely to happen. This limited availability, combined with a broad definition of ZNZ fuels is a clear incentive for locking in fuels that may be cheaper in the short term, but would fail to achieve lasting emission reduction.

In addition, it remains to be seen which technologies will be considered ZNZ. While this is likely to include clean energy sources like wind propulsion, solar energy, or direct electrification of

[3] T&E, 2024. The advanced and waste biofuels paradox. Availability and sustainability of advanced and waste biofuels. Available on: https://www.transportenvironment.org/uploads/files/202407_TE_advanced_biofuels_report-1.pdf

[4] Cerulogy, 2025. Full steam ahead? Environmental impacts of expanding the supply of maritime biofuels for the International Maritime Organisation targets. Available on https://www.cerulogy.com/full-steam-ahead/

ships, technologies such as onboard carbon capture (OCC) could potentially qualify. These technologies do filter some carbon from exhaust gases, but require up to 40% higher energy demand,[5] and incentives for even more fossil fuel use at a time when the world is trying to move away from fossil fuels and embrace clean alternatives.

[5] Norway, 2025. Information on a full-scale onboard CO2 capture project and a case study of a ship fitted with an onboard carbon capture system. IMO Document ISWG-GHG 16/4/1.

Appendix: Comparison between FuelEU and the IMO Net Zero Framework

	FuelEU Maritime	IMO GFS
Scope	>5000 GT	>5000 GT
Fossil fuel base line:	91.16 gCO_2/MJ	93.3 gCO_{2e}/MJ
GHG reduction targets (gCO_{2e}/MJ) * ** the lower the value, the higher the emissions savings*	2028: 89.34 2029: 89.34 **2030: 85.69** 2031: 85.69 2032: 85.69 2033: 85.69 2034: 85.69 **2035: 77.94** **2040: 62.90** **2045: 34.64** **2050: 18.23**	2028: 89.57 2029: 87.70 2030: 85.84 2031: 81.73 2032: 77.63 2033: 73.52 2034: 69.42 2035: 65.31 2040: 32.66 **2045: tbd** **2050: tbd**
Flexibility mechanism	Positive compliance balance can be : - Banked - Sold - Pooled with other vessels - Cancelled	Surplus Units can be: - Banked for two years - Traded with ships not meeting the Base GFI targets - Pooled with other vessels - Cancelled
Fuels	**Biofuels:** - Food and feed crop-based biofuels are non-eligible for emissions reduction **Sustainability requirements:** - Advanced biofuels must meet the 55-65% GHG reduction threshold of the EU REDII (i.e. max 32.9	**Biofuels:** - No limitations on the food and feed crop-based biofuels **Sustainability requirements:** - Sustainable marine fuels must generate lower GHG emissions than the weighted

	gCO_{2e}/MJ). - RFNBOs/e-fuels must meet the 70% GHG reduction threshold of the EU REDII (i.e. max 28.2 gCO_{2e}/MJ). **Special targets and incentives:** - Multiplier of 2 for RFNBOs until 2033 - 2% sub-target for RFNBOs by 2034 (if 1% uptake not reached by 2031) - Shore side electricity (SSE) incentivised through zero-rating - Container, cruise ships and ferries must connect to SSE from 2030 onwards - Ships using wind power can take advantage of small incentives	3-year average of liquid petroleum fuels, in gCO2eq/MJ (GWP100), which means **zilch**. - They cannot increase GHG intensity from the use of fossil energy. **Zero and near-zero (ZNZ) emission fuels, technologies and energy sources must meet** - A max of 19 gCO_{2e}/MJ threshold until 2034 - A max of 14 gCO_{2e}/MJ threshold from 2035 **Special targets and incentives:** - No sub-target, but ZNZs are eligible for financial reward from the IMO Net Zero Fund (subject to revenue availability) - No specific incentives for e-fuels/RFNBOs - No SSE incentives or connection requirements. *Note: emission factors including fuel feedstock and production pathway will be decided by the GESAMP group through the Life Cycle Analysis Guidelines*
Penalties	€647 per tonne of excess CO_{2e}	$380 per tonne of excess CO_{2e} until 2030. Post-2030 values are to be determined in the future.

Further information

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