

FuelEU Maritime

T&E recommendations for driving the uptake of sustainable and scalable marine fuels

February 2022

Context

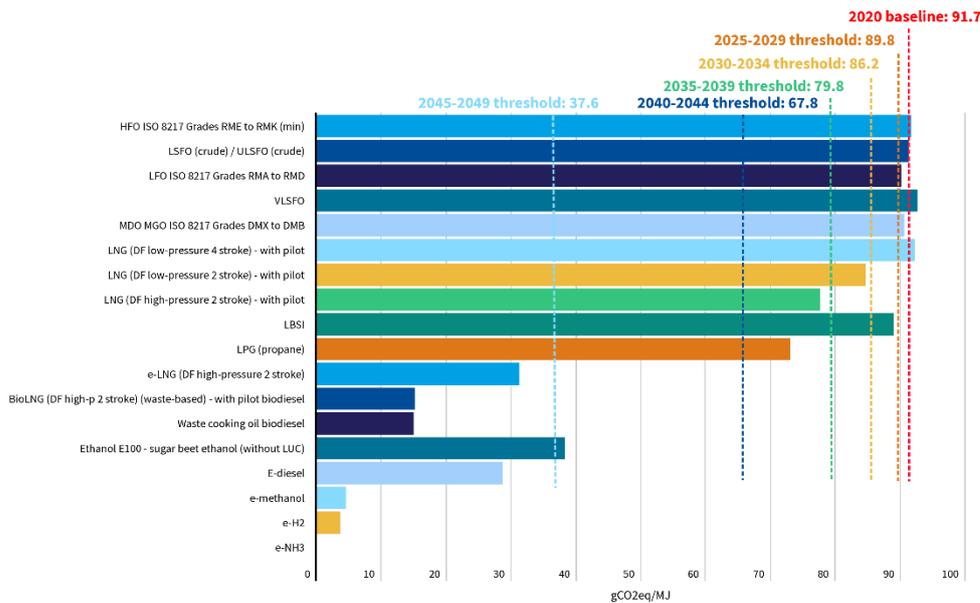
Today, the maritime sector relies almost entirely on fossil fuels and shipping emissions are growing rapidly. The scale of the effort is huge: if energy efficiency can deliver up to one third emissions cuts, full decarbonisation by 2050 will require kick-starting the uptake of sustainable fuels already in this decade. Green hydrogen-based fuels (also known as “e-fuels” or “RFNBOs”)¹ offer a sustainable and scalable pathway for the sector to decarbonise. But as nascent technologies, they’re expensive and require investments in new vessel technology, fuel production and port infrastructure. Hence, e-fuels require dedicated and predictable policy support, which the FuelEU Maritime initiative could provide.

What has the European Commission proposed?

In July 2021, the European Commission proposed the first-ever legislative initiative requiring ships to progressively switch to alternative marine fuels. It has a unique design: a goal-based GHG intensity target that increases in stringency over time, requiring ship operators to reduce the carbon footprint of the energy used onboard ships, expressed in Well-to-Wake (WTW) CO₂-equivalent terms to account for all the life-cycle GHG emissions (CO₂, CH₄ and N₂O) of the different fuels and engine technologies. The graph below (Fig.1) shows how GHG intensive fuels progressively cease to comply with the proposed GHG targets (expressed as thresholds of gCO₂e/MJ of energy used).

¹ RFNBOs = Renewable Fuels of Biological Origin, as defined by the forthcoming EU delegated act to the revised Renewable Energy Directive (EU) 2018/2001. E-hydrogen and e-ammonia are especially promising respectively for short-sea and deep-sea shipping; although other e-fuels could be used, such as e-methanol, e-diesel, and e-LNG.

Well-to-Wake carbon intensity of marine fuels (FuelEU Maritime proposal)




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Figure 1: Comparison of WTW GHG intensity of different fuels and FuelEU GHG targets (as proposed, with GWP100 for methane)

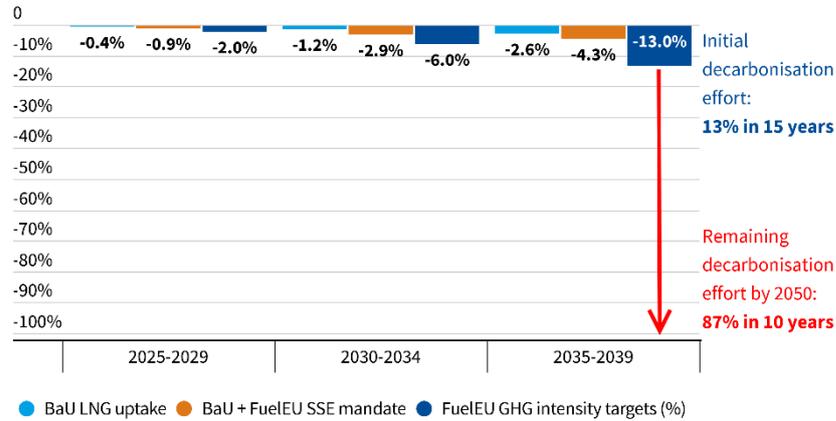
What's good? What's not?

T&E's in-depth analysis of the proposal² concludes that the proposed draft law presents high risks of fossil fuel lock-in and will not decarbonise the sector by 2050 as called for by the EU Climate Law and EU and Member State declarations at COP26 and IMO. The analysis of the proposal raised the following serious concerns. In particular, green e-fuels would struggle to find their way to the shipping sector in the absence of dedicated requirements and incentives to support their uptake. This is because compliance with the GHG target can be achieved with much cheaper fossil fuels despite their limited GHG savings or with biofuels that are immediately available off-the-shelf but are not scalable for the entire industry:

- The FuelEU Maritime proposal has limited ambition in the first 15 years of its application, and half the fuel GHG intensity improvements will take place under normal market conditions and/or as a result of shore-side electrification. Further, a 13% fuel GHG improvements by 2039 leaves the remaining 87% of the effort to the ensuing 10 years if shipping is to decarbonise by 2050.

² See forthcoming publication - Transport & Environment. (2022). FuelEU Maritime: T&E analysis and recommendations. How to drive the uptake of sustainable fuels in shipping

FuelEU Maritime will achieve negligible GHG reduction until 2040

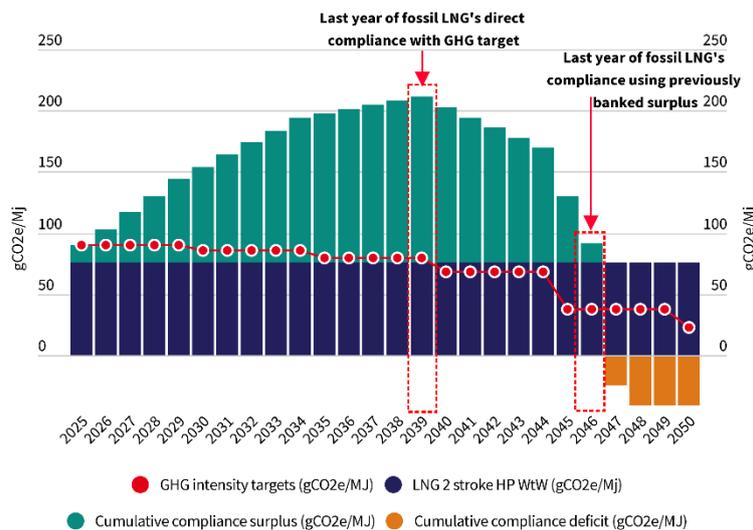


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Figure 2: Evolution of the GHG intensity of the fleet under a BaU scenario with SSE mandate, compared to GHG reductions targeted under FuelEU proposal

- The Commission proposal will give a strong push to fossil LNG shipping at the expense of more sustainable alternative fuels. Fossil LNG-powered vessels with 2 stroke high pressure dual-fuel engines comply with the GHG intensity target until 2039 (Fig.1). They could even extend their compliance at no cost until as far as 2046, due to the possibility to indefinitely bank the compliance surpluses in the early years of implementation (Fig. 3). As a result, fossil LNG could reach 23% of the total energy used in EU-related shipping already by 2030.

FuelEU Maritime greenlights fossil LNG until 2046



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Figure 3: Cumulated compliance balance of fossil LNG use in 2 stroke HP engine, with unlimited use of banked compliance surplus over time

- The proposed SSE mandate is limited to passenger and container ships only. This leaves out 57% of EU emissions at berth, i.e. 5 Mt of CO₂ and 3 kt of sulphur oxide (SO_x) per year, equivalent to the SO_x emissions of the entire EU passenger car fleet (250 million cars).
- Current 50/50 geographical scope on voyages from and to third countries represents a drop in emissions coverage by almost one-third (28% or 42Mt CO₂) of the total 146 MtCO₂ emitted by EU-related shipping in 2019. Furthermore, the size limit exempts 19.7 Mt of emissions from vessels below the 5000GT threshold.
- FuelEU excludes the use of food and feed-based crop biofuels. This is positive and should be defended, but it leaves unaddressed other problematic feedstocks, especially other crops biofuels.
- Under Article 20 (3) of the FuelEU proposal, companies can be exempted from compliance with the GHG intensity targets against simple payment of a penalty, which might be cheaper for shipowners than making actual investments in zero-emission vessels.

How should it be improved?

Many aspects of the proposal need considerable revision by the EU co-legislators to avoid shipping following a climate and environmental disaster scenario in the coming decades. As a priority, we recommend policy-makers introduce dedicated quotas and incentives to boost demand for sustainable e-fuels. In parallel, advancing the GHG targets by 5 years compared to the Commission proposal is important to engage a fuel switch right from the start.

- **Mandating a goal-based e-fuels/RFNBOs sub-target**

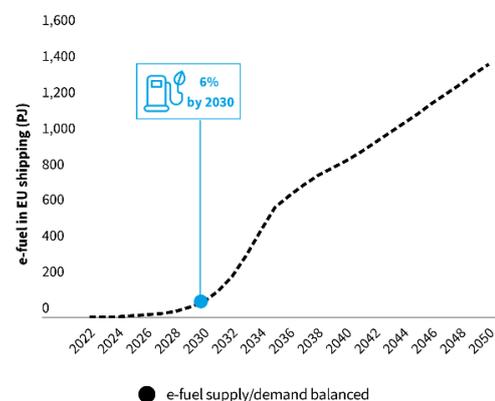
Mandating a minimum share of e-fuels use is the most straightforward way to ensure demand for sustainable fuels in shipping and can provide business predictability to the fuel suppliers. We recommend a goal-based e-fuels sub-target of 6% of the energy demand used by ships by 2030.³ This means that ships would be able to comply with the sub-targets by using a suite of sustainable e-fuels/RFNBOs, including e-H₂, or green hydrogen-based fuels such as e-ammonia (e-NH₃), e-methane (e-CH₄), e-methanol (e-MeOH), as well as e-diesel. In practice, this mandate would apply in parallel with the GHG intensity targets and be met by ships thanks to the use of the pooling system at the fleet level.

Such an e-fuels mandate on ships should be complemented with a mandate on fuel suppliers / refineries to supply those fuels in European ports, to ensure sufficient quantities are distributed to the shipping sector.

This can be achieved either via a dedicated shipping e-fuel/RFNBO sub-target under the Renewable Energy Directive (RED) or introducing a parallel supply mandate under the proposed FuelEU Maritime Regulation.

³ Under the proposed geographical scope of the FuelEU Maritime (a.k.a. a semi-full scope MRV), 6% of shipping's 2030 energy demand would be equivalent to about 85PJ of e-fuels. This compares to the amount of green ammonia that could be deployed in shipping by 2030, based on T&E estimations. Transport&Environment. 2021. *Decarbonising European Shipping*. https://www.transportenvironment.org/wp-content/uploads/2021/07/202104_Shipping_Technological_Roadmap_to_Decarbonization.pdf

E-Fuel uptake pathway for EU shipping



Note: T&E analysis which uses e-ammonia as a "placeholder" for calculations. This does not prejudice other e-fuels uptake by ships. Analysis assumes no regulatory-driven energy efficiency gains by the sector until 2050 and full shore-side electricity use by all vessels at berth. Energy density of e-ammonia: 18.6Mj/kg. **Source:** Decarbonising European Shipping Technological, operational, and legislative roadmap, T&E, 2021.

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Figure 4: E-fuel uptake pathway for EU shipping (PJ)

In addition, additional incentives could be implemented to boost the cost-competitiveness of e-fuels. Carbon pricing alone cannot bridge the price gap between sustainable e-fuels and conventional fuels: the EU would need >€500/tonne CO₂ price to make, e.g. green ammonia competitive with VLSFO⁴. And green ammonia is considered the cheapest among e-fuels. In this context, T&E recommends to introduce the following regulatory instruments to render e-fuels cost-competitive:

- A multiplier of 5 for e-fuels/RFNBOs
- Pooling of compliance surplus should be restricted to e-fuels ships only

Together, they can bridge the cost-competitiveness gap of e-fuels with other alternative fuels - provided that GHG targets get stricter.

- **Measures to limit regulatory-driven uptake of fossil LNG**

In order to limit the potential acceleration of fossil LNG uptake shipping, we recommend to:

- Advance the GHG targets by 5 years compared to the proposed trajectory by the Commission
- Adopt a 20-year global-warming potential accounting of methane emissions.
- Exclude fossil LNG from the banking and pooling of compliance system

This will limit the eligibility of fully fossil LNG ships to 2034, and ensure only low-methane-slipping LNG engines can be used from the entry into force of the Regulation.

- **Overall ambition level of the Regulation**

For shipping to fully decarbonise by 2050, many aspects of the proposal need to see the ambition level revised upwards:

- Advancing the GHG targets by 5 years would have the advantage of starting the necessary fuel switch from the entry into force of the first target, while setting a progressive and realistic trajectory for European shipping to achieve zero-emission by 2050. Overall, this would increase emission savings by 478 MtCO₂ over the period 2025-2050, compared to the Commission proposal.
- Accelerate the deployment of shore-side electricity, starting from 2025 for passenger ships, 2030 for containerships, tankers and refrigerated bulk carriers, and all remaining ship types by 2035;
- Extend the geographical scope to cover 100% of EU-related shipping; and apply the Regulation to all ships above 400 GT;

- **Enforcement**

In addition to strict rules of the origin of eligible fuels, the FuelEU Maritime's enforcement framework must be improved to ensure the environmental effectiveness of the proposal.

- Exclude all crop-based biofuels from the Regulation (i.e. not only food and feed-based, but also intermediate crops and energy crops), and advanced biofuels' by-products with existing uses (i.e.
- Apply RED II's GHG saving criteria to all eligible fuels
- Prevent risks of non-compliance by removing the pay to comply mechanism (or time-limiting it), by raising the penalty level to 3000 EUR/tonne of VLSFO-equivalent, and by giving more enforcement powers to Member States in setting penalties.

Further information

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⁴ Carbon pricing estimated by T&E based on UMAS-LL costs (2020)