



Getting shipping on the green transition track – assertively

by Przemysław Myszka

The world of news can disturb what we take for reality. On the one hand, not a week goes by without stories about this-and-that investment that will move the transport industry's green transition needle – and indeed, the Baltic Sea region is rife with such examples. On the other hand, Transport & Environment (T&E) reminds us in one of its latest briefs that shipping, as a whole, still runs almost entirely on fossil fuels. That is the reason behind releasing the *Why an e-fuel mandate for ships?* analysis, in which the organisation explains why governing bodies, the EU in this particular case, should require the shipping business to use a certain minimum of renewable fuels.

In October 2022, the European Parliament (EP) proposed for the FuelEU Maritime regulation to mandate shipping to use at least 2% renewable fuels of non-biological origin (RFNBOs) by the end of the current decade.

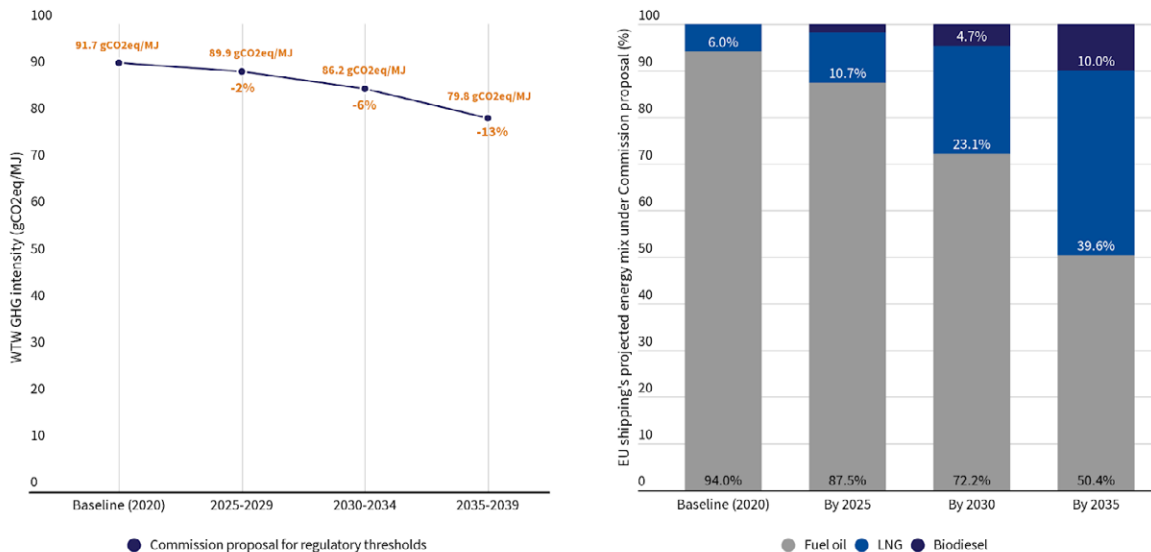
At the beginning of its brief, T&E highlights how this move differs from another EU initiative set forth by the European Commission (COM) of establishing a target on greenhouse gas (GHG) intensity

reduction (of 6% by 2030, whereas 13% was T&E's proposal). The NGO states that although technologically neutral on paper, the latter effectively gives the upper hand to marine fossil fuels over RFNBOs. The reason is twofold. First, "[...] given the decade-long EU subsidies towards LNG [liquefied natural gas] and biofuels, these fuels have lower production costs than RFNBOs. As a result, the proposed system makes investments in short-term solutions such

as fossil LNG and biofuels more attractive than in truly sustainable and scalable solutions." Second, RFNBOs get a sustainability criterion they must meet: at least 70% greenhouse gas emission well-to-wake reduction. By contrast, there is no such requirement for LNG.

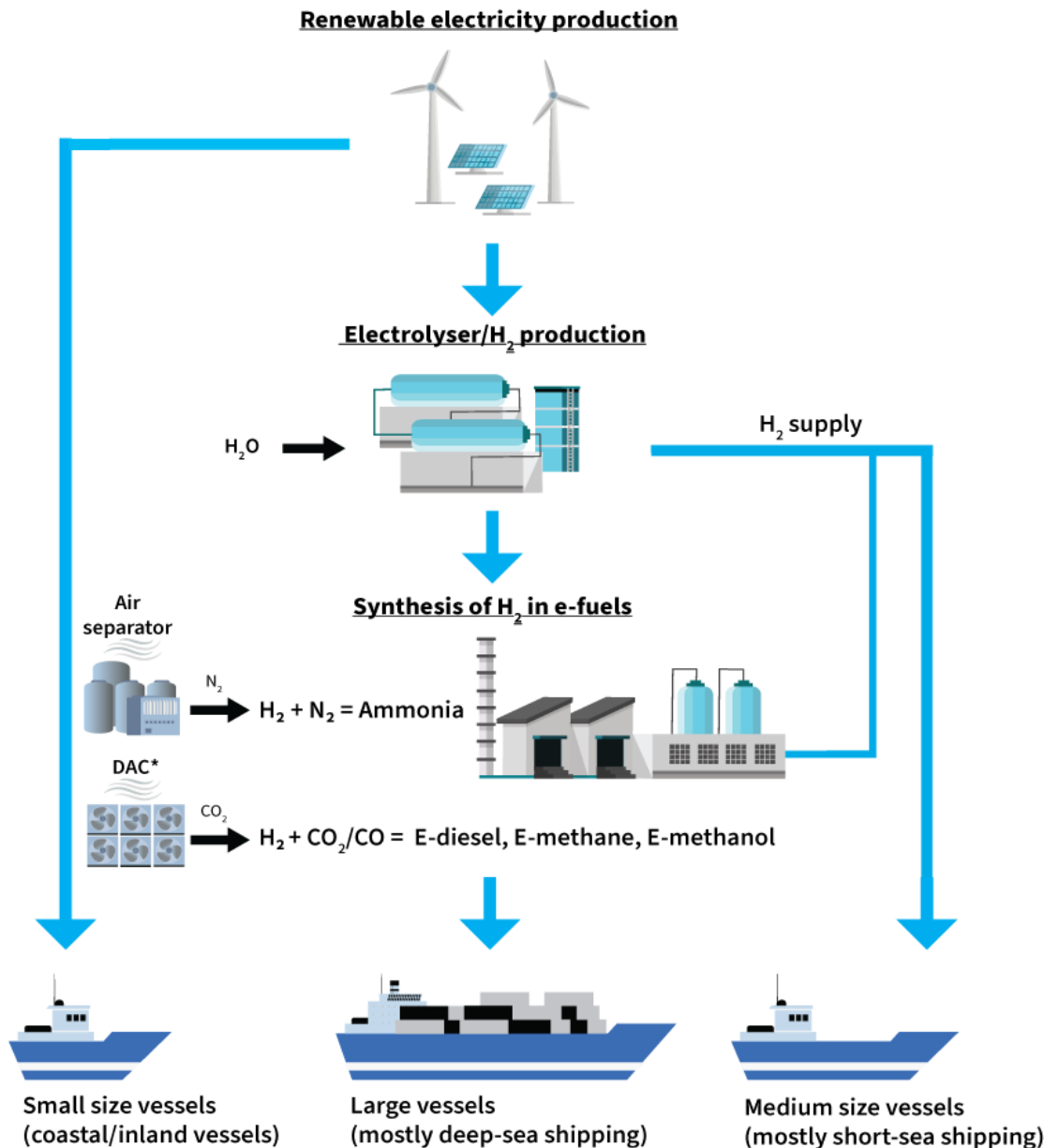
"It thus appears that adopting an RFNBO sub-quota in 2030 is the only way to guarantee a minimum switch to sustainable and scalable marine fuels in

Fig. 1. Projection of EU shipping fuel mix based on European Commission-proposed GHG intensity reduction targets and fuel costs



Source for all figs.: T&E's *Why an e-fuel mandate for ships?* (2023)

Fig. 2. Production pathways of renewable electricity and RFNBO suitable for different ship types



*Direct Air Capture. DAC is the only sustainable technology to capture CO₂.

this decade,” T&E answers its publication’s title question. The authors also underline that, if any, RFNBOs are tech-neutral: both when it comes to the fuels themselves (hydrogen and its derivatives) and propulsion types (internal combustion engines, fuel cells, gas turbines).

Demand & supply

The EP’s 2% proposal would demand about 21.5 petajoules (PJ) of RFNBOs by 2030, which translates to around 205-237kt of green hydrogen (up to 800kt if T&E’s sub-quota of 6% would be agreed on). Some 2.2GW of electrolyser capacity would be needed to feed that amount of

hydrogen at the cost of €0.8-1.4b. The 2% target would replace 514kt/year of fossil fuels the shipping sector consumes. “This will create a guaranteed market and business certainty for H₂ investments, acting as a regulatory-driven business guarantee of announcements already made by some shipping companies. Moreover, it would directly contribute to reducing Europe’s dependence on imported oil and gas, as shipping currently relies 99% on fossil fuels [...],” rounds up T&E in *Why an e-fuel mandate for ships?*

The organisation suggests that compliance should occur on the company’s fleet-level rather than for individual ships.

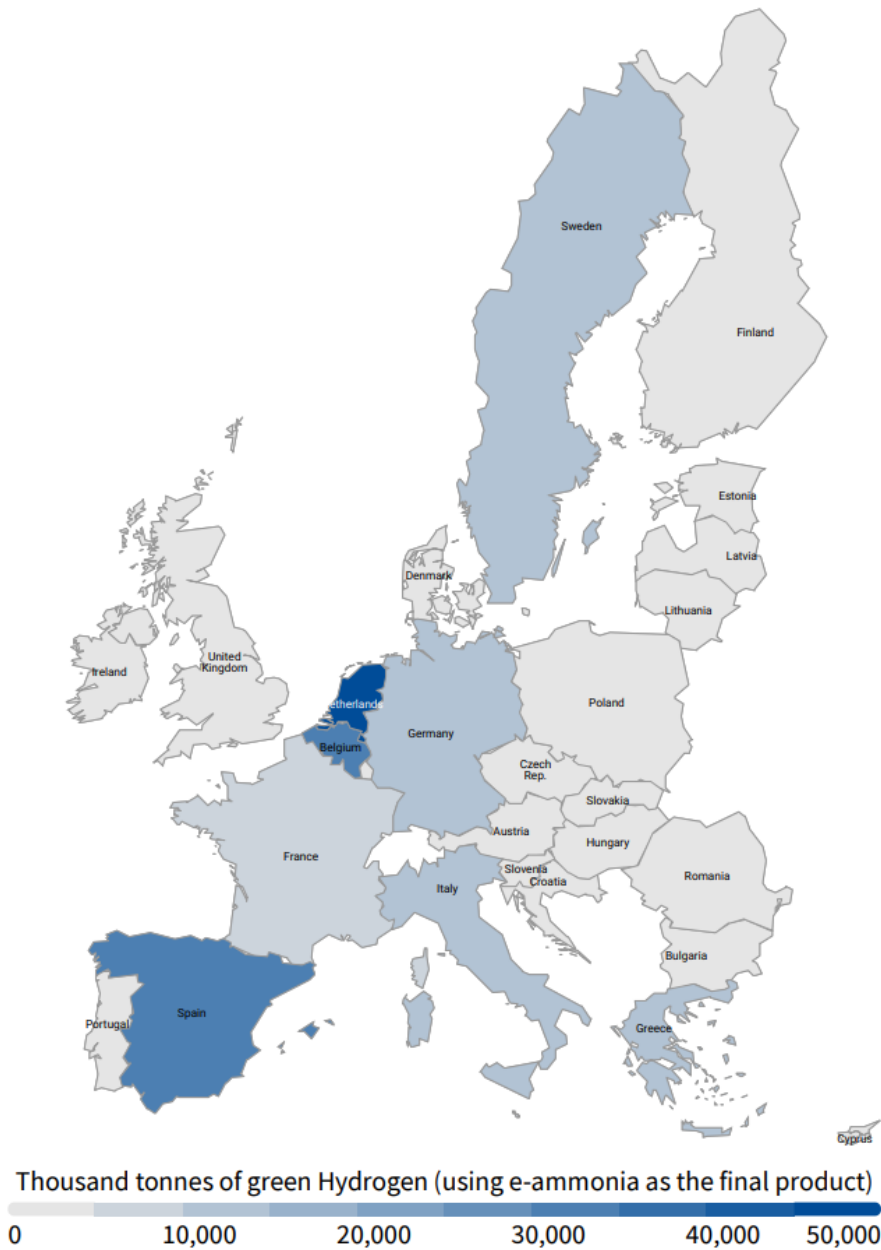
In this regard, T&E criticises the exemption (for 2030-2035) proposed by EP: that the sub-quota should apply to companies disposing of more than three vessels. If inked, this move would exclude half of the shipping companies, which account for 15% of European shipping’s energy use. Instead, lines should pool together and “[...] share surplus between themselves, so that both small and large companies can optimise their investments.” Compliance surpluses should be exchanged, and T&E gives thumbs up to the COM: “This flexibility option [...] designed by the European Commission precisely to avoid situations where every ship complies with the GHG intensity targets by blending minimum amounts of alternative fuels and incentivise instead compliance with new, fully renewable ships.”

The 2% sub-quota will create demand from the (regulatory) top to the (shipping) bottom. The supply will, it appears, go the other direction (at least partially). The COM’s RePowerEU plan sets the target supply of 40mt of renewable hydrogen by 2030, of which half will be produced in Europe. By whom? By shipping lines, it seems. Which may turn out to be better than it initially sounds; according to T&E, “Today, shipping companies investing in e-fuel capable ships often have to invest themselves in e-fuel production capacity to secure enough supply. A sub-quota would have the advantage to guarantee a minimum uptake of green hydrogen-based fuels in the maritime sector, providing legal certainty for investments undertaken by fuel



SUSTAINABILITY

Fig. 3. Potential renewable hydrogen supply needs, EU-EEA distribution of 2% RFNBOs by 2030 based on current bunker fuel sales



suppliers, shipowners and ports. In the long term, it should also help to achieve much needed economies of scale across the green e-fuel supply chain.”

The NGO brings forth a few green fuel production investments by the shipping sector. Maersk alone aims to produce 2.0mt of e-methanol in its Spain facilities (around 40PJ, so way above the 2%’s 21.5PJ). The Danish company has 19 e-methanol container ships in its order book, scheduled to hit the ground in 2025 (and already at that point in time, half of them are to sail on made-by-Maersk e-methanol). But one mustn’t be as big as Maersk to become a fuel supplier. **In the**

previous issue, we hosted an article on how the Finnish Meriaura, by all means orchestrating a smaller fleet than that of the Copenhagen-based carrier, has been for many years producing its own green marine fuels, a capacity that will only become bigger soon.

The Baltic Sea region will house marine/transport e-fuel production sites too. The latest announcement came in late January 2023, when the Swedish Liquid Wind shared that it chose the country’s up-north Umeå as the potential location for its third production plant. All documents required for an investment decision are to be ready in 2024,

with an expected production of 100kt/year starting in 2026.

Interestingly, the demand will come from different directions, not only from spanking-new & sky-scraping container carriers. In late February 2023, ScandiNAOS, Chalmers University of Technology, and the Swedish Maritime Administration (SMA) launched a project to develop dual-fuel kits for converting new and existing diesel engines (up to 1,000kW) to methanol operation. The two-year-long project will see ScandiNAOS develop and implement such a solution for a pilot boat owned and operated by SMA (the institution, which intends to remove fossil fuels from its fleet by 2045, already operates a methanol-powered pilot boat equipped with a single-fuel compression ignited methanol engine which completed successful trials in December 2021).

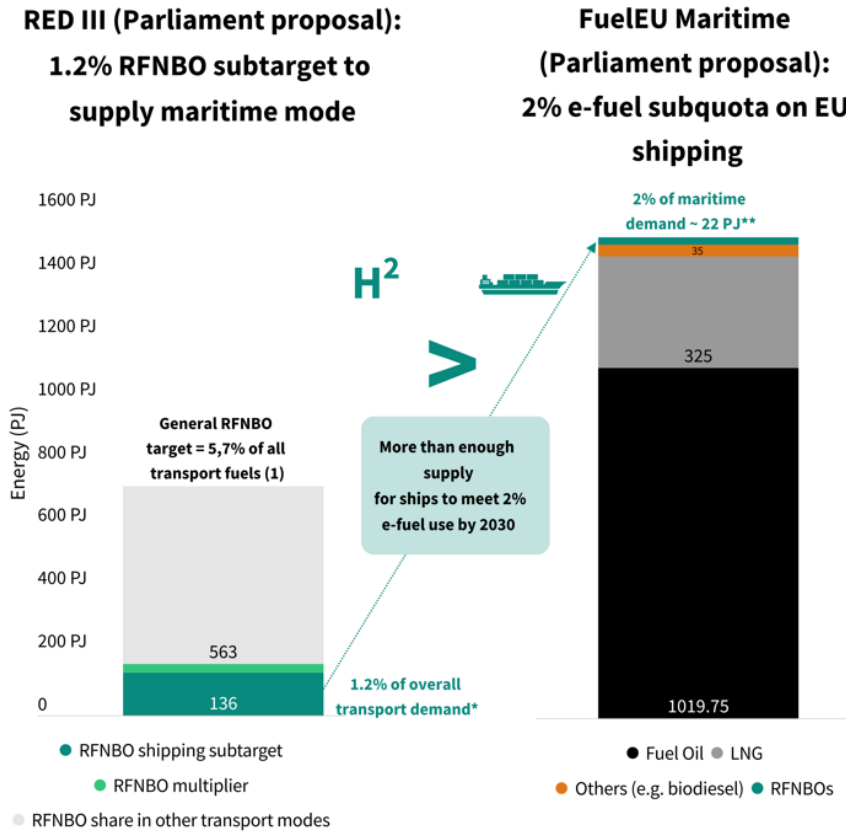
Why an e-fuel mandate for ships? lists existing and near-future RFNBO ships: 23 already sailing on methanol (of fossil origin) and 42 on order, plus 130 ammonia-ready on order (per October 2022 data). T&E also underscores the engine manufacturers’ readiness: two- and four-stroke ammonia engines will be available from 2024 and by 2025, respectively.

The organisation is also in favour of requiring fuel suppliers to deliver a certain minimum of RFNBOs to the shipping sector. The EP’s proposal assumes that at least 1.2% of all transport RFNBOs should be earmarked for the needs of the maritime industry. This figure would translate into covering 10% of shipping’s fuel demand in 2030, so plenty to satisfy the 2% sub-quota. T&E also invites the EU to set targets on its ports to provide adequate e-fuel bunkering infrastructure.

In practice

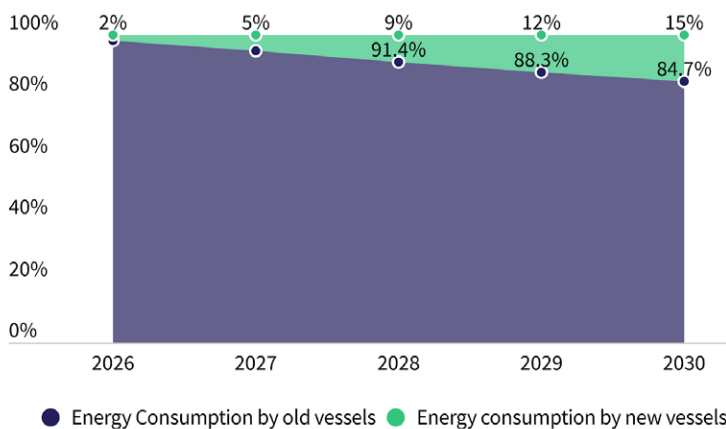
T&E details several scenarios of shipping lines complying with the 2% sub-quota. First, running an RFNBO vessel (fully or partially on green fuels) and banking on the created surplus. Second, blending RFNBOs with compatible marine fuels (like synthetic LNG/diesel with LNG/diesel). Third, investing in RFNBO auxiliary engines to check off the 2% for the vessel’s total energy consumption. Fourth, entering into a pool and ‘buying’ compliance. Fifth, paying fines and getting a FuelEU certificate this way (EP’s proposal speaks of penalties equivalent to about three times the price spread between the fuel used and the RFNBO compatible with the ship). “In practice, and especially if the pooling system is made easily accessible to companies [...], the 2% RFNBO sub-quota

Fig. 4. EU Parliament proposal of RFNBO mandates matching supply and demand in shipping under FuelEU Maritime and RED III



(*) Includes all mode of transport. Energy demand 13557 PJ from the REF scenario from the EC.
 (**) Intra-EEA voyages and 50% of inbound and outbound voyages. Energy demand 1254 PJ from T&E FuelEU modelling.

Fig. 5. By 2030, 15% of shipping energy will come from new vessels built after 2025



is likely to be met only with new ships, able to run on RFNBOs. Using existing literature on the average lifetime of vessels, we estimate that by 2030, about 15% of EU shipping energy demand will come from vessels built after 2025. This date coincides with announced orders of vessels able to run on e-methanol,” reads *Why an e-fuel mandate for ships?*

The second scenario is particularly interesting because of another EU initiative: the sub-quota for e-kerosene in the aviation sector (COM proposed a 0.7% target, while EP – 2% by 2030). E-diesel is a by-product of making e-kerosene; as such, COM’s target would produce 7.7PJ and EP’s 22PJ of e-diesel, corresponding to around 36% and matching the shipping

industry’s demand created by its 2% sub-quota, accordingly. “Rather than using e-diesel volumes in road transport, where consumers would pay the high price, a more appropriate use-case could indeed be the shipping sector, especially considering the need for diesel pilot-fuel in ammonia and methanol ships,” advises T&E.

‘Crude’ mathematics say that higher fuel prices must translate into more expensive transportation, hence increases on the tags. RFNBOs are, as things stand today, four times more costly than current marine fuels. Still, T&E attempted to calculate the impact they would have on the price of end products. According to the NGO, sailing 100% RFNBO from China to Belgium would add €0.08, €1.0, and €8.0 to buying a pair of shoes, TV, and fridge, respectively.

Choose to think ahead

Transport & Environment tops its analysis by examining the multiplier effect for RFNBOs, used to multiply the use of each tonne of such fuels towards reaching the GHG intensity reduction targets. The NGO proposed a multiplier of five, but EP and the European Council went for that of two. Undeterred, T&E nevertheless supports the move, “[...] if combined with a sub-quota, even a multiplier of 2 could deliver a powerful boost to investments in e-fuel ships. Before 2030, it would work as a pure incentive for early investments in e-fuels. When the sub-quota kicks-in, it would reward shipping companies going beyond minimum compliance, encouraging them to use more than the required 2% e-fuels in their fleet. What’s more, the compliance surplus obtained would be multiplied by 2 until 2030 and by 1.5 after 2030 in the Parliament’s proposal, generating revenues thanks to the pooling system. This means double benefits for companies choosing to think ahead rather than choosing unsustainable or unscalable fuels.”

There is much debate around the various initiatives of the EU to get shipping on the green transition track. The main practical ‘why’ in *Why an e-fuel mandate for ships?* seems to be getting all hands on deck from the very beginning to avoid the chicken-and-egg situation (as was experienced with the proliferation of LNG in the Baltic). Shipping lines, fuel suppliers, ports, and other relevant stakeholders are to be ready to play their part from the onset – the more assertively, the better. For the sake of the environment (and business), and with a minimal negative impact on customer pockets. □