Biofuels and e-fuels in trucks will make it harder for aviation and shipping to go green

November 2023

The EU climate targets will slash demand for oil and gas. As a result, fuel suppliers are investing in e-fuels and biofuels to replace them. It is in their interest to maximise the number of sales markets for those fuels, despite hard-to-abate sectors such as aviation and shipping needing to prioritise fuels based on green hydrogen (and advanced biofuels in the case of aviation) for their own use.

However, as part of its market maximisation strategy, the fuels industry tries to convince aviation and shipping actors that they would benefit if road transport also used biofuels and e-fuels. They claim that "*using e-fuels in trucks and buses will help scale up production, reduce their costs, and make them more available for planes and ships*". They also claim that "*Road hauliers will bear most of the high cost, making e-kerosene almost free for airlines.*" This is incorrect, as this simple explainer will make clear.

Just like fossil crude, e-crude is refined into different hydrocarbons such as e-kerosene or e-diesel[1]. **While e-crude cannot be entirely refined into one single fuel, the co-product yield can be optimised to prioritise one type of fuel and thus use case**. A possible split benefitting aviation, shipping, and the chemical industry can be 50% e-kerosene, 25% e-diesel, and 25% e-naphtha[2]. A recent report by Concawe, the oil industry's research branch, considers further optimisation for aviation by modelling that 75% of the e-crude could be processed into e-kerosene[3]. However, they also promote scenarios where the majority of e-crude yield is instead prioritised for road transport, and little would be left for aviation, shipping, or the chemical industry[4].

Scaling up green hydrogen production, direct air capture, and renewable power all require time, land, and investments. **Total e-fuel volumes will therefore be limited by 2030**. Under EU law, sustainable aviation fuels (SAF) such as e-kerosene should make up 1.2% of aviation fuel demand in 2030 to comply

---

[1] Currently, one of the most mature processes to produce e-fuels is called Fischer-Tropsch, where synthetic e-crude is synthesised from hydrogen and carbon. If the hydrogen is green (meaning produced from renewable electricity that fulfils the additionality requirements under the Renewable Energy Directive (REDIII) and the CO_2 is directly captured from the air (DAC), then that e-crude can be considered sustainable.

[2] FVV. (2013). *Kraftstoffstudie - Zukünftige Kraftstoffe für Verbrennungsmotoren und Gasturbinen*.

[3] The co-products are 12.5% e-gasoline and 12.5% e-diesel. Concawe. (2023). *Aviation: technologies and fuels to support climate ambitions towards 2050*.

[4] The split is 32% e-kerosene, 37% e-gasoline, 28% e-diesel, and 3% e-LPG. Concawe. (2022). E-Fuels: A techno-economic assessment of European domestic production and imports towards 2050.

with the ReFuelEU targets. In the case of shipping, by 2031 at least 1% of its EU fuel demand needs to be covered by renewable fuels of non-biological origin (RFNBOs), which can include e-diesel, otherwise a sunrise clause kicks in, mandating at least 2% RFNBOs[5] from 2034 onwards. **Refining of e-crude should therefore be optimised for e-kerosene, and any co-products left should be used to decarbonise hard-to-abate sectors such as shipping or chemical industries.** For shipping, the key focus should be on green hydrogen and other fuels based on it, such as e-ammonia and e-methanol.

Currently, **e-fuel suppliers are incentivised to focus on aviation and shipping** in the Renewable Energy Directive (REDIII) thanks to multipliers as well as an indicative RFNBO supply target for shipping[6]. The 1% transport sub-target for RFNBOs can be met by providing the required minimum supply of e-fuels needed to meet sub-targets under ReFuelEU and FuelEU Maritime, without any need for additional e-fuels to be used in road transport. The aviation and shipping regulations provide the right regulatory incentive to prioritise e-fuels. Truly advanced and sustainable biomass feedstocks should be used for aviation instead of using them to produce liquid and gaseous biofuels for road transport.

However, **opening the door to fuels in road transport could incentivise the exact opposite**. If e-fuels and biofuels are credited in the CO_2 standards for heavy-duty vehicles (HDVs), fuel producers would have an incentive to only provide the minimum volumes to the aviation and shipping sector that are needed to fulfil regulatory sub-targets. They would tool their refineries to the detriment of kerosene output and try to maximise the fuel volume going into road transport. The same logic applies to advanced biofuel feedstocks, where competing uses are already limiting access to sustainable sources, which should therefore be prioritised in non-electrifiable transport modes. The adoption of this crediting system could jeopardise the aviation and shipping industries' access to sustainable, affordable, and scalable renewable fuels and their chance to cut emissions and move towards climate neutrality.

As to the argument that road transport would shoulder the cost burden, it makes little economic sense. Unlike the majority of planes and ships, road transport including trucks and buses can decarbonise by going fully zero-emission[7]. From a total cost of ownership (TCO) point of view, this is a third cheaper than running trucks on e-diesel[8], so it is unlikely hauliers would be willing to operate trucks on e-diesel and pay a significant premium given the small profit margins in the road haulage industry of one to two percent.

In short, including biofuels and e-fuels in road transport would reduce available volumes for hard-to-decarbonise sectors, while doing nothing to bring down e-fuel prices for aviation and shipping.

[5] Or fuels providing equivalent greenhouse gas savings as RFNBOs.
[6] T&E. (2023). *2023 Renewable Energy Directive fact sheet*.
[7] TNO (2022). *Techno-economic uptake potential of zero-emission trucks in Europe*.
[8] T&E. (2022). *E-fuels in trucks: expensive, scarce, and less green than batteries*.