

Hydrogen as the cornerstone of zero-emission aviation: towards the decarbonization of air transport

Recommendations

Hydrogen Europe recommends the following points regarding the recent proposal of the ReFuelEU Aviation Regulation:

1. Increase the level of ambition with a dedicated, realistic target for the adoption of RFNBO's in the aviation sector by 2025 and, overall, higher targets and a more even growth trajectory after 2030.
2. Reconsider the practical implementation of additionality principle criteria.
3. Modify the definition of the blending mandate to account for the development of zero-emission, non-drop-in fuels.
4. Facilitate the development of RFNBOs industry through dedicated funding programmes and coherent policy actions.
5. Make sure enabling technologies necessary for e-fuels production (e.g. Direct Air Capture) are included in the EU taxonomy on sustainable finance.
6. Include a mention that supports the progressive development and deployment of zero-carbon emissions hydrogen-electric technologies in the next decade, capable of powering most of current flights.

Context

Hydrogen Europe welcomes the proposal of the ReFuelEU Aviation¹. The “Fit for 55” Package has shown a clear recognition of the role of hydrogen in all sectors of the European economy as an energy vector, energy carrier and fuel in pure and derived forms for all mobility applications. Air traffic is expected to grow by 43% by 2030 and 88% by 2050 (compared to 2015 levels and following the recovery from Covid-19 pandemic)², that is why aviation needs to be decarbonized rapidly.

Therefore, the proposed regulation is both timely and needed. The approach proposed by the Commission to mandate the uptake of renewable fuels of non-biological origins alongside other sustainable aviation fuels (SAFs³) is appropriate and balanced.

¹ https://ec.europa.eu/info/sites/default/files/refueleu_aviation_-_sustainable_aviation_fuels.pdf

² Ibid.

³ SAF are defined as: “drop-in aviation fuels that are either synthetic aviation fuels, advanced biofuels as defined in Article 2, second paragraph, point 34 of Directive (EU) 2018/2001, or biofuels produced from the feedstock listed in Part B of Annex IX to that Directive, which comply with the sustainability and greenhouse gas emissions criteria laid down in Article 29(2) to (7) of that Directive and are certified in accordance with Article 30 of this Directive”. Drop-in fuels are a synthetic and completely interchangeable substitute for conventional petroleum-derived hydrocarbons. In the aviation sector, those fuels are blended with conventional kerosene and power existing aircraft engines without any technological change. A maximum blending ratio of 50% is currently imposed by certification.

We acknowledge that pure hydrogen and electricity are not included as fuels within the scope of the Regulation due to the low Technology Readiness Level (TRL) of applications using these fuels for commercial aviation. Nevertheless, we are confident that technological developments in the next years will overcome existing barriers and drive down costs sufficiently **to allow hydrogen to be a key pillar of zero emission aviation.**

Sustainable Aviation Fuels (SAF) are the most viable option in the short term. Hydrogen Europe supports the blending of SAF in conventional fuels as this is the most promising short-term solution for commercial flights and cargo aircrafts.

The SAF blending mandate is clearly the strongest of the measures put forward in the proposal and can have a meaningful impact, provided that targets are ambitious enough. However, the mandate should not be defined in the way proposed by the European Commission, but rather **as a requirement to introduce a certain amount of sustainable fuels in a total volume of fuel supplied or consumed on a fleet level.** Otherwise, the measure will exclude non-drop-in fuel options (such as pure hydrogen), fail to be technology neutral and potentially hinder crucial research in the field of hydrogen-powered airplanes.

If the blending target continues to be expressed as a supply target, the obligation imposed on airlines to uplift at least 90% of yearly aviation fuel required at a given EU airport to prevent fuel tankering is a balanced measure, ensuring a coherent approach between the production (supply side) and consumption (demand side) measures. The exclusion of crop-based biofuels is also an appropriate decision.

Even though the Commission's proposal is welcomed, we believe there is room for increased ambition to **maximise the role of renewable fuels of non-biological origin (RFNBOs)** towards the decarbonisation of the aviation sector before hydrogen-powered aircrafts become widely used. As set out in **Hydrogen Europe's Hydrogen Act⁴ position paper, we support renewable and low-carbon technologies that offer high performance and can abate at least 90% of greenhouse gas emissions.**

2025 targets for synthetic aviation fuels

The proposed sub-mandate for synthetic aviation fuel starts at 0.7% in 2030, increases to 8% in 2040 and 28% in 2050. We prefer that the sub-mandate for synthetic aviation fuel starts in 2025 and then ramps up towards the 5% target set by 2035, with a higher target in 2030. Therefore, **Hydrogen Europe believes that a mandatory, albeit realistic, sub-target for synthetic aviation fuels should also be set for 2025** to enable the creation of a market for production of such fuels in the short term, and to facilitate the uptake of such technology in the aviation sector in the longer term.

In the absence of an earlier sub-target for specific production pathways, different feedstocks and technology combinations will compete purely on costs. Introducing sub-targets is an effective way to promote pathways in which production costs are higher but where the long-term decarbonization potential is greater.

More demand for renewable energy leads to more supply of renewable energy

Hydrogen Europe has developed its position on the Renewable Energy Directive's upcoming Delegated Act on additionality at length in a dedicated position paper⁵. To summarize, the production of synthetic fuels will require large volumes of renewable energy over the coming decades. Therefore, we welcome the increase in the EU renewable energy target from 32% to 40%. We fully

⁴ https://www.hydrogeneurope.eu/wp-content/uploads/2021/04/2021.04_HE_Hydrogen-Act_Final.pdf

⁵ https://www.hydrogeneurope.eu/wp-content/uploads/2021/06/2021.06-Hydrogen-Europe_Additionality-Position-Paper.pdf

recognise the importance and support the principle of additionality, namely the idea that additional renewable electricity consumption should be met with additional renewable energy generation capacity. Hydrogen Europe has expressed concerns regarding the practical implementation of the additionality principle criteria, not the principle itself.

Nevertheless, to RFNBOs producers, there are significant challenges posed by the additionality requirement. A revised Renewable Energy Directive should support the uptake of renewable energy in all sectors of the EU economy and ensure that the responsibility to add to the existing renewable energy capacity is shared by all energy consumers and not only by producers of RFNBOs. In the absence of this, the availability of synthetic aviation fuels, and thus the ability to meet the targets proposed by ReFuelEU Aviation, is put at risk.

Recognition of hydrogen as an aviation fuel

The exclusion of pure hydrogen from the scope of the Regulation ignores the fact that zero-carbon aircraft will enter the market as early as 2024 and have a lower lifecycle impact than conventional SAFs. From entering the market on relatively small aircraft in 2024, these technologies are expected to scale to larger aircraft and, given the Regulation sets targets up until 2050, will certainly have impacted commercial aviation by more than two decades. A lack of vision on how to accelerate the uptake of hydrogen in the short-term would hinder further European research in the field of hydrogen-powered aeroplanes, and place the European Union at a competitive disadvantage.

Therefore, in case ReFuelEU Aviation continues to define the blending mandate as a requirement to introduce a certain amount of sustainable fuels at each EU airport, then it should include a mechanism to count non-drop-in RFNBOs (such as pure hydrogen) used in aviation as contributing towards the targets of the Regulation.

Align the existing legislation with ReFuelEU Aviation

Hydrogen Europe is concerned that policy signals coming from all relevant pieces of legislation lack sufficient coordination, and their contribution to facilitate the production and uptake of SAFs and RFNBOs is limited by this fact.

While we fully support the EU Commission's recognition of e-fuels produced from carbon captured directly from air as a sustainable net zero solution, we would like to point out that, to facilitate large scale production of the said e-fuels, **investments in necessary enabling technologies - like Direct Air Capture or CO₂ transportation (not only for permanent storage) - should also be recognised as contributing to climate change mitigation in the EU taxonomy regulation.**

ReFuelEU Aviation should also be fully aligned with the Delegated Acts of the Renewable Energy Directive for what concerns the sustainability criteria of biofuels, as well as the upcoming Delegated Acts on additionality and GHG reduction requirements for RFNBOs.

Ensure adequate funding opportunities

We are convinced that a combination of a more coherent set of policies and robust funding investments is needed to unlock the "chicken and egg" dilemma, as mentioned in the Impact Assessment: the absence of effective demand for SAFs is explained by the high SAFs market prices relative to low fossil jet fuel prices. In turn, this absence of effective demand means that biofuel and e-fuel producers on the supply side of the market do not produce these fuels.

Hydrogen Europe supports the earmarking of the revenues from penalties towards the EU ETS Innovation Fund, and calls for additional measures to be taken. For instance, a basic measure would be to allocate allowances auctioned from the EU ETS Aviation proposal to fuel producers to support the rollout of a new generation of aviation fuels. Similarly, airports are well situated to form hydrogen production hubs in the future and supporting them in the transition is crucial.