Response to the Inception impact assessment: ReFuelEU Aviation - Sustainable Aviation Fuels

Reducing greenhouse gas emissions in a growing sector such as aviation is becoming increasingly important. While some advanced biofuels (renewable and waste derived) and electro-fuels can reduce emissions in the aviation sector, their use can also lead to an adverse effect.

Bellona supports the introduction of a mandate for specific sustainable advanced fuels in the aviation sector **only if** the fuels in question have proven to provide a substantial greenhouse gas reduction.

General principles of assessment

Overall, there are some general principles which should be considered before the introduction of a mandate for a given fuel in the aviation sector:

- **Policy coherence** - any support to alternative aviation fuels should be coordinated with other environmental and climate policies. If the measures are not analysed as parts of a wider system of policies, the effects could lead to a harmful outcome (e.g. plastic fuels countering circularity policies).

- **Full lifecycle assessment -** To avoid errors and inform decision making with robust scientific data, a Life Cycle Assessment (LCA) of these fuels should include full chain accounting. This includes the input used in the production process and the carbon embedded in it, CO_2 emitted on product use and any additional external effects such as renewable energy displacement or other indirect effects on the system. In other words, both direct and indirect impacts of the fuels should be accounted for (e.g. gCO_{2eq}/kWh for electricity used in e-fuel production, carbon source in waste based and e-fuels).

- **Deployment potential at scale -** The scale of deployment for some of the suggested fuels is limited by their large input requirements. In these cases, trade-offs between direct use of such resources and the production of these fuels on a large scale should be considered (e.g. direct use of renewable electricity in other sectors versus e-fuel production).

Bellona Europa aisbl
Rue d'Egmont 15
1000 Brussels, Belgium

Transparency register ID :
29934726424-76
www.bellona.org

Tel: +32(0)48 779 8419
Email: ana@bellona.org

Examples: sustainability criteria for waste based and e-fuels

E-fuels (Renewable Fuels of Non-Biological Origin in RED II)

The climate impact of an e-fuel depends on the origin of its two main components: 1. carbon (CO, CO_2 or other carbon source) and 2. hydrogen.

1. Carbon source

The source of the carbon directly influences the net effect on the CO_2 pool in the atmosphere. For instance, if CO_2 is taken from an industrial point source and emitted into the atmosphere after the combustion of the fuel, it still contributes to a net increase of fossil CO_2 pool in the atmosphere. The flow of fossil carbon is simply redirected and mitigation at the point source is disincentivised.

- In order to account for this effect, the difference between biogenic/atmospheric and fossil carbon should be recognised in the GHG accounting for the fuel.

2. Hydrogen and energy/electricity use

CO_2 is a waste-product from energy-intensive processes (e.g. combustion) and is an inert molecule, so conversion or activation of CO_2 typically goes along with high specific energy demand. Consequently, the production of synthetic kerosene will induce a large increase in baseload demand for electricity and the resulting indirect emissions will have high relevance for the overall footprint for the production process.

H_2 produced with current electricity grid mix in most member states of the EU will not be low carbon. On the contrary, if produced in an emission intensive electricity grid, it would have higher GHG impacts when compared to conventionally produced, fossil hydrogen. With further processing to synthetic kerosene, this issue could be exacerbated even further due to the overall efficiency loss in the process.

- In order to account for the indirect climate impact of hydrogen production for e-fuels and the further reduction in efficiency due to additional processing, the carbon intensity of electricity used to produce the hydrogen should be disclosed (in gCO_{2eq}/kWh) and included in the initial GHG calculations.

Potential adverse effects of e-fuels

If deployed too early and on a large-scale, the production of these fuels would make the entire energy system less flexible and secure, likely extending the use of fossil electricity from coal and imported gas within the EU.

Waste based fuels (Recycled Carbon Fuels in RED II)

To determine the GHG impact of waste based fuels, the origin of the waste must be taken into account. Just as biogenic CO_2 should be differentiated from fossil, so should the origins of the waste inputs be taken into account.

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Any gaseous, liquid or solid carbon source coming from a fossil source should be accounted for. For instance, if waste gases from industrial combustion or fossil plastics and materials are turned into fuels and combusted, they contribute to a net-increase of fossil CO_2 in the atmosphere.

- To account for such potential effects, the initiative should not promote the use of waste-based fuels which rely on fossil waste streams.

Potential adverse effects of waste based fuels

The use of fossil waste streams for conversion to fuel could prevent other policies from mitigating their climate impact (e.g. Circular Economy Strategy or industrial climate action measures).

References:

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