CONSENSUS STATEMENT ON GUIDING PRINCIPLES FOR SUPPORTING THE DEPLOYMENT OF SUSTAINABLE AVIATION FUELS IN THE EU

BRUSSELS, JANUARY 2021

This statement represents the views of the Fuelling Flight Project. The Fuelling Flight Project is a stakeholder group convened by the European Climate Foundation and the ClimateWorks Foundation including industry and civil society representatives, with technical support from the International Council on Clean Transportation.

The aviation sector, like all sectors, must find ways to reduce greenhouse gas (GHG) emissions. Sustainable aviation fuels (SAFs) will be one of those strategies. This statement addresses key principles that must guide the growth of a European sustainable aviation fuel (SAF) industry as well as the market uptake for SAF in aviation in general to provide real and durable reductions in the environmental impacts of aviation.

Investment Certainty for the Production of Sustainable Aviation Fuels in Europe is Dependent on Long-Term EU Policy

Despite two phases of EU policy support through the Renewable Energy Directive (RED) and Fuel Quality Directive (FQD), European investment in advanced biofuels production has so far been subdued. Biofuel use in the EU has instead been dominated by biofuels with high sustainability risks, including very questionable carbon savings compared to fossil fuels, whose inclusion has been facilitated by inadequate sustainability guarantees in the directives concerned. A concrete example is the ongoing controversy over competition with other uses of land, such as production of food and feed for livestock or carbon sequestration by allowing reforestation. Putting this controversy to rest is crucial and can only be achieved by a regulatory framework which is transparent, future proof, and has a set of robust criteria for the sustainability and climate impacts of feedstocks and pathways. Future policy support should only go to fuels with high carbon reductions compared to fossil fuels, meaning amongst other things that they do not use dedicated cropland. Such a framework, unlike the revised RED, would provide a solid foundation for securing future investment in the development of sustainable aviation fuels and would also contribute to the achievement of the broader UN Sustainable Development Goals.

The Scale-Up of SAF Must be Informed by an Impact Assessment of EU Resources

Sustainability impacts may vary considerably depending on the location, scale and intensity of SAF deployment. High SAF mandates in the near term may drive unsustainable behavior, such as the high-intensity extraction of residues with existing uses, or the diversion of land to meet SAF demand. Therefore, competing uses for feedstocks from other sectors are an important factor when determining the sustainability and risk for some SAF conversion pathways. For example, the diversion of palm fatty acid distillates (PFADs) for biofuel likely induces substitution by high-impact palm oil for their existing uses. Therefore, the scale of a potential SAF policy must be informed by bottom-up assessment of feedstock availability in conjunction with a review of existing demands across different transport modes. Any potential SAF deployment targets must balance the availability of sustainable feedstocks with the necessary ambition and complementary policy support to drive investment in more challenging advanced fuel pathways.

Exclude Biofuels Produced from Dedicated Cropland

Biofuels produced from dedicated land —whether it was previously used for growing crops or if it has been newly converted— have been shown to compete with production of food or feed for livestock or carbon sequestration from reforestation. Several rounds of indirect land-use change (ILUC) modeling conducted by various jurisdictions suggest for example that many common food-based biofuels have ILUC emissions that undermine their carbon savings. This creates risks around sustainability and public perception, and support for such fuels should be excluded from any future EU policy to promote SAF production.

Prioritize Fuels Made from Wastes & Residues

The data is clear that SAFs from wastes and residues can provide GHG reductions compared to their fossil fuel alternative. Over the next several years, waste oils may deliver small volumes of sustainable, low-carbon SAF— but in the longer-term, the EU must invest in fuels made from more abundant resources such as agricultural residues, separately-collected municipal bio-waste, and electrofuels.

Residues are not always truly wasted, as they have a market and ecological value. Cereal straw, for example, is often used for livestock bedding or horticulture, and allowing it to decompose in situ can return valuable minerals to the soil and prevent erosion. But such residues can be converted to a sustainable fuel with high GHG savings, providing they are certified as extracted within the boundaries of sustainability. The waste hierarchy is an important consideration for identifying which wastes and residues are sustainably available for SAF production. The precise guidelines for sustainable availability will by necessity vary by location and on a feedstock-by-feedstock basis; for example, the guidelines for agricultural residues will be different than those for forestry wastes and municipal solid waste.

Case by Case Assessments

Sustainability risks aren't restricted to food-based biofuels or other dedicated crops. Even wastes and residues have impacts that are highly location-specific. For example, the risk that extracting residues will lead to erosion is higher on steeper slopes or poorer soils and biodiversity risks are bound to local ecosystems. Competing uses for feedstocks from other sectors is another factor that can be location-specific. Such risks can often be managed, but this may require a case-by-case assessment, including broader lifecycle impacts, and on-site verification. This could be integrated within the policy framework at EU-level, so that simple, robust and transparent criteria are applied appropriately and in a way that takes advantage of local assessment and knowledge. Such a case by case approach, which could for example involve the use of qualifying certification schemes, should be done on the basis of UN Sustainable Development Goals principles to ensure the broadest positive sustainability impacts possible.

Fuels of Non-Biological Origin

The theoretical availability of fuels of non-biological origin greatly exceeds the potential of fuels made from wastes and residues. Liquid fuels of non-biological origin, for example those generated from industrial waste gases, can contribute to our climate goals, although it will be important to ensure that they do not provide a continued business case for fossil fuel use and to undertake full Life Cycle Assessment to ensure that the fuel generates real GHG reductions relative to the fossil baseline. Including indirect effects within the analysis is necessary to ensure that waste gas diversion or the additional electricity needed for electrofuels doesn't generate additional fossil fuel demand.

Fuels made from captured carbon in conjunction with renewable electricity or concentrated sunlight will be an important source of SAF in the long term. Policymakers must ensure that both the renewable electricity used to produce electrofuels and carbon capture for fuel production are not incentivized by power sector policies or otherwise double-counted towards those policies. Therefore, it is critical to ensure that these fuels are produced from additional renewable electricity and their CO_2 use, if not captured from the atmosphere, does not provide a continued business case for fossil fuel use.

The primary constraint on electrofuel production are economics and the availability of renewable electricity. Therefore, in order to ensure capitalization of this potential, governments must invest in the technological developments necessary to mature the conversion processes, reduce prices of green electricity and electrolyzers, and to develop a commercially-viable process for CO_2 air capture.

Cover Cropping

Cover crops, if grown before or after main crops, may also provide additional feedstock for SAF production. However, there are several environmental and climate uncertainties in relation to these crops, especially on their indirect impacts. To reduce the risk of indirect effects, it must be demonstrated that cover crops eligible for SAF policy support do not interfere with the growth of main crops on existing cropland. The feedstocks supported should consist only of those non-food, non-feed crops that can be demonstrated to not contribute to additional cropland demand through an additionality assessment. The quantities of new and additional cover crops that can be grown without displacing existing land uses and that could thus be used for SAF production with low risk of indirect impacts, though a robust system for crediting additionality, is currently lacking. Indeed the potential contribution of this type of feedstock is uncertain and requires further analysis, including on impacts - including on soil carbon – on land availability and yields. This type of analysis may require additional time, but is necessary to ensure that any contribution from cover cropping is sustainable.

Availability of SAF Feedstocks

The quantity of sustainably available feedstocks for SAF production —particularly for wastes & residues— is constrained by exogenous factors beyond aviation fuel demand. Policy support and deployment targets should be based on detailed impact assessments on the sustainable availability of feedstocks and existing demand by other transportation and industrial sectors. Initial targets and policy tools should be conservative until sustainable supply is assessed and guaranteed, in time becoming more progressive and stringent. Working within our understanding of the sustainability of various SAF feedstocks, we envision a three-phased approach to deploying SAFs into the sector based on technology readiness and feedstock availability.

In the first phase of SAF deployment through 2025, waste oils are the likeliest source of low-carbon fuel due to their low carbon intensity and ease of conversion. While these fuels could be deployed in the next several years, the overall supply of waste oils suitable for the production of SAF through existing, commercialized conversion processes is largely inflexible to increased demand. The increased collection of used cooking oil (UCO) and animals fats is likely to only provide a marginal increase in total supply, whereas additional incentives for its use in aviation would likely do more to divert these materials' use in the road sector than to drive substantial additional collection. If the majority of waste oil—largely already utilized for diesel--were to be diverted to aviation fuel, we expect that it could displace around 2% of 2030 EU jet fuel demand, after taking into account increased collection. However, policymakers might choose not to incentivize the diversion of waste oil away from the road sector towards the aviation sector. Even with diversion from the road sector, the penetration of waste oils in aviation will be limited, but would constitute a meaningful first step.

Scaling up SAF deployment even further requires utilizing more technically challenging feedstocks through the commercialization of emerging technologies from 2025-2035. After reaching the limits in terms of the supply of waste oils that can be converted into SAF using existing technologies, the next most more abundant source of sustainable feedstock consists of lignocellulosic residues and wastes such as the biogenic fraction of municipal solid waste (MSW), agricultural residues & forestry residues (largely consistent with Annex IX List A in the RED II).

While some of these materials have existing uses outside of the energy sector, there is still a sustainably available portion available for fuel conversion with low risks of indirect impacts. This assumes that around half of forest residues and two-thirds of agricultural residues should be left for existing uses; to protect against erosion; and to provide environmental services. Compared to HEFA fuels from waste oils, these feedstocks are more technically challenging to convert and conversion processes are not yet deployed at commercial scales; furthermore, these conversion technologies have attracted less investment interest and are perceived to be riskier than HEFA projects. Therefore, there is a substantial time lag associated with bringing these fuels to the market at large volumes even if policy support begins within the next five years. The delay associated with designing, constructing and deploying bio-refineries would slow the deployment of these pathways down considerably, meaning that even a 1% blending rate would require considerable support and investment over the next decade.

Meeting long-term decarbonization targets and deeper deployment rates will require the use of fuels with greater availability than bio-based wastes and residues. Electrofuels offer substantial long-term potential for supplying SAF, as there are fewer constraints to their production volumes. However, the high cost of supplying additional renewable electricity makes this one of the most expensive options for reducing aviation emissions. Despite initial high costs, policy support for electrofuels over the next decade can help to bring down the capital costs for electrolyzers and introduce the policy framework that would link transportation energy demand to new, additional renewable electricity from the power sector

Conclusion

It is vital to start the ramp up of SAF in Europe in the right manner with consistent, future-proof sustainability requirements, to minimize the risk of massive capital investments in things that increase emissions compared to fossil fuels and/or that become stranded assets. Therefore, we recommend that the European Commission propose higher sustainability standards than the ones currently laid out in the Renewable Energy Directive, including clear exclusions of unsustainable feedstocks and pathways, such as biofuels from dedicated cropland and PFAD. This should be done before policy makers decide how to prioritize and ramp up production and use of SAF from domestic [i.e., EU-sourced] feedstocks, electrofuels and other renewable fuels of non-biological origin. We would also advocate that this renewed framework only incentivize levels of SAF and/or feed stock use that could be met from domestic EU supplies. Competition for limited resources, particularly in relation to international transport, will not solve the global climate challenge.

The organisations participating in this initiative acknowledge that this is not an easy task, but we are convinced it can be done in the right way. We're dedicated to making European SAF the most sustainable fuels available in the world and this is an opportunity for the EU to demonstrate to the world that it can be done.

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