



Sustainable Aviation Fuels: Common Ground for a Take-off

Issue 2017/05 • November 2017

by Harri Kalimo, Filip Sedefov, Ólöf Söebeck and Eleanor Mateo

The renewable energy policy debate – emerging solutions

Mobility is an important aspect of the sustainable consumption and production agenda. The global growth economy seems to entail increasing movements of people and goods, yet measures to tackle climate change, resource scarcity and other environmental impacts are urgently required. There is thus an intensive policy discussion ongoing on what kinds of sustainable energy solutions could best address these intertwined challenges. The current revision of the EU's Renewable Energy Directive (RED II) epitomises many of these debates. This IES Policy Brief argues that, amidst all the confrontation, areas of convergence can also be observed. Sustainable aviation biofuels present such an area, where considerable common ground for short to medium term actions appears to exist. Our assessment is based on a broad analysis of stakeholder positions on sustainable (aviation) biofuels, as refined in a specific Policy Workshop amongst a group of experts representing a wide range of actors across the aviation biofuels value chain. Using a moderation technique developed by the IES, significant convergence in the parties' views forward could be established. Our conclusion leads to a fundamental question to the European policy makers: do the current proposals represent the optimal policy pathway to a sustainable aviation transport sector in the long term? Are we so focused on the takeoff, that we forget to first taxi to the runway?

Aviation sector

To current knowledge, there are no short to medium-term technological alternatives (such as electricity or hydrogen) to liquid hydro carbon aviation fuels, unlike for the road and

Aviation biofuels remain a controversial topic. An analysis of stakeholder views reveals, however, that there is considerable common ground on the two central issues in short to medium term: sustainability and commercialisation. Stakeholders generally agree that sustainability must be based on objective, transparent and clearly defined criteria that demonstrate the environmental advantages of sustainable aviation fuels (SAF) over fossil fuels. The measurement of impacts should use verified life-cycle analyses (LCA) throughout the supply chain. Sustainability standards should be strict, yet they should not be so rigid as to prevent the commercialisation of SAF, and they need to be tightened as the market evolves. For the commercialisation of SAF, the stakeholders reckon that the infrastructure and marketing models already exist: the remaining hurdle is the price gap between conventional fossil fuels and SAF. Active policies that include commercial and regulatory incentives are required to make sustainable aviation fuels competitive, and for the market to take off.

maritime transport sectors. As a result, within that timeframe and under the current market conditions, genuinely sustainable aviation fuels (SAF) that can be a drop-in in existing aircraft

and infrastructure, provide the most promising option to reduce carbon emissions in the sector. On the other hand, the development of sustainable aviation fuels (SAF) should not preclude any new and more sustainable options from emerging in the future.

The sustainability and the cost of SAF in comparison to fossil fuels are the two main issues under discussions with respect to the market uptake of SAF. The aviation industry is global and many of its players compete at the international level. While regulatory schemes on aviation fuels at the national or regional levels may lead to competitive distortions on a market that is global, there is also an opportunity to address the sector as a whole through global instruments.

Sustainability

It is widely accepted that all SAF production and use must fulfil objective and transparent sustainability criteria to ensure that these fuels offer environmental benefits when compared to fossil kerosene. To guarantee such benefits, the criteria must be enforced through appropriate monitoring, reporting and verification.

It is preferable to use verified actual assessments of sustainability throughout the supply chain, based for instance on indicators such as carbon intensity, rather than limiting the evaluation merely to the types of feedstocks. Assessments based on closed lists of feedstock should thus be avoided. The sustainability impacts should be estimated using a reasonable and clearly defined life-cycle analysis (LCA) that includes Greenhouse Gas emissions as well as other widely recognised environment-related elements such as the protection of biodiversity, as well as the protection against pesticides, fertilisers, deforestation and, more generally, direct land-use change. In addition, sustainability requirements should include socio-economic considerations such as those in the UN's sustainable development goals.

Generally speaking, all sustainable aviation fuels must be processed using sustainable supply chains, minimising the impact on food and feed when using agricultural raw materials and promoting the use of advanced technologies. The specific issues of direct and indirect land-use change (ILUC) need to be taken into account when defining sustainability, whether

for aviation or other use, but a broader, horizontal approach to address the direct and indirect effects of land use should also be developed to ensure neutrality across sectors. Appropriately managed waste and residue streams, which have the potential of contributing important quantities of raw material to the sustainable aviation fuels market, can alleviate the effects of land-use change by offering a means to diversify the feedstock. Further scientific research is useful in effectively modelling and addressing the effects of ILUC.

Standards developed in the context of international or universal frameworks are preferred over those on other levels of governance. The visions of e.g. IATA or ICAO regarding sustainable aviation fuels represent a useful starting point that needs to be expanded upon further by the medium term at the latest and with involvement from a wide range of stakeholders. The work on sustainability certification standards carried out under ICAO's Alternative Fuels Task Force is one of the paths towards an international framework worth exploring. The development of international standards must, however, not prevent using adequate regional or national measures in the short term where such measures are required by local realities. Where regional/national sustainability standards are developed, they should strive to be coherent and achieve mutual recognition when possible. They should avoid creating situations, as did the EU's current Renewable Energy Directive, where the certification market is fragmented and causes unnecessary administrative burden. A risk-based approach to standards can streamline certification and reduce administrative burden on producers or distributors. Certifiers with expertise, such as those working under the Roundtable for Sustainable Biomaterials (RSB) and the International Sustainability and Carbon Certification (ISCC) frameworks, already exist and can be relied upon.

Commercialisation

The technological benefits of SAF have been proven and sustainable pathways for their production are available. The remaining challenge is currently economic, with a significant price-gap between fossil fuels and their sustainable drop-in alternatives. The matter boils down to the affordability of SAF: airlines as end-users need SAF at a competitive price in order to create a bankable demand for the producers who have invested in the innovative technologies. Business models for a SAF market currently

exist but are often specific to a particular kind of feedstock in a particular location and regulatory context. They constitute a good starting point but need to be constantly updated and replaced on a case-by-case basis in order to better match local needs and realities.

The creation of the market and the support for innovation requires a stable regulatory framework. The framework should be designed in a way that contains the negatives of the sector (e.g. guarantee true sustainability through full LCA) but also stimulates its positives (e.g. socio-economic benefits in terms of job creation through e.g. offtake agreements, feedstock diversification, etc.). In particular, the regulatory framework should aim to level the playing field regarding access to sustainable fuels between all modes of transport – aviation, maritime and road. A level-playing field would promote the large-scale uptake of SAF, which is necessary to reduce the price-gap and to demonstrate viability. As such, the SAF sector presents a high degree of technological readiness and there is potential for market uptake through already existing pathways. Further, once there is a viable market (with guaranteed demand and supply), the actual distribution of SAF is a relatively straightforward matter: the SAF is a drop-in alternative to fossil kerosene, and the required modifications to existing infrastructure are in fact very limited, in particular in comparison with road transport, as the number of airports to which the fuels need to be supplied is small.

Commercial incentives based on the sustainability performance of the SAF are needed to support the creation of technologies. Regulatory schemes need to foster innovation and encourage the development of new technologies and feedstocks. The policy framework must be robust and technology and feedstock neutral. Further, the framework should guarantee coherence and alignment

of principles with other policy areas, such as waste management and the circular economy. Local level pioneers offer in these respects important best practices for implementation.

For SAF to become a reality, the sustainability, commercial and technical requirements need to be reconciled. The sustainability standards should be sufficiently strict and properly enforced, but their implementation should also not prevent the commercialisation of SAF, keeping in mind that they will be tightened further within specific timeframes as the market evolves. In this sense, a common and evolving set of sustainability criteria is a key element in the commercialisation of SAF.

A move to sustainable aviation fuels will not be sufficient in itself to address emissions from aviation. Policy incentives to promote sustainable aviation fuels should be combined with instruments promoting more fuel efficient aircraft and improved air traffic management. Linking aviation to carbon markets (e.g. ETS) is currently not sufficient to drive investments in new SAF facilities in the EU, as carbon prices are too low to bridge the price gap at this moment. National sustainability strategies, action plans and targets should include aviation fuels. The development of sustainable fuels and offsets should be approached strategically as complementary measures to reduce emissions from the aviation sector.

As has been the case in the past, it is essential that governments and the private sector work together to identify, face, address and share the risks of moving to SAF. Further, projects, partnerships and initiatives between all stakeholders (aviation industry, producers, fuel distributors, airlines and NGOs) should be further encouraged.

This Policy Brief does not in any way represent the official views of the participants to the Policy Workshop. The participants covered the full sustainable aviation value chain and included an EU institutional stakeholder, an environmental NGO, an aircraft manufacturer, an airlines industry association, an aviation biofuels developer, an aviation biofuels marketer, an airport operator and an aviation biofuels producer.

About the authors



Professor **Harri Kalimo** is a Jean Monnet Chair and research professor at the IES. His work focuses on European, American and international economic and environmental law and policy, and their interactions, notably in the areas of circular economy (in particular Extended Producer Responsibility, WEEE and renewable energy), environment-and-trade issues and policy instruments.



Filip Sedefov is a project researcher at the Institute for European Studies (IES) and the Law Faculty of the Vrije Universiteit Brussel. His research focuses on European and international economic and environmental law in the context of renewable energy and, in particular, bioenergy and biofuels for aviation.



Ólöt Söbech is a project researcher at the Institute for European Studies. She works on European funded projects that revolve around environmental policy: aviation biofuels, sustainability, behaviour and participation, as well as on societal security.



Eleanor Mateo is a project researcher at the Institute of European Studies. Her research focuses on the interaction of environmental law and international and European economic law in the context of the Circular Economy.



Co-funded by the
Erasmus+ Programme
of the European Union