



**WORKING PAPER**

**CONFERENCE ON AVIATION AND ALTERNATIVE FUELS**

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- Agenda Item 1: Developments in research and certification of aviation alternative fuels**
- Agenda Item 2: Financing and assistance programmes for aviation alternative fuels**
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**EUROPEAN VIEWS AND SUPPORT FOR THE DEVELOPMENT AND USE OF  
SUSTAINABLE AVIATION FUELS**

(Presented by Estonia, on behalf of the European Union and its Member States  
and the other States Members of the European Civil Aviation Conference)

**SUMMARY**

Sustainable Aviation Fuels have an important role to play in reducing net carbon dioxide emissions from air transport. The environmental benefits and the overall sustainability of such fuels are of primary importance. Equally, rules must be applied in such a way as to ensure fair competition. In addition to scaling-up research and deployment initiatives, stable policy frameworks are essential, not least for the financing of investments.

Action by the conference is in paragraph 6.

**1. INTRODUCTION**

1.1 Sustainable Aviation Fuels (SAFs) have an important role to play in reducing net carbon dioxide emissions from air transport. Such aviation alternative fuels have been included in ICAO's "basket of measures" as part of the aviation sector's on-going response to the environmental impacts of aviation. Although time will be needed to deploy such fuels at scale, it is encouraging that the technologies already exist today: the challenge is one of accelerating the scale and speed of deployment and reducing their cost. It is a priority to expand the use of Sustainable Aviation Fuels as aviation has fewer technological alternatives to reduce carbon dioxide emissions than other transport modes, even if there are early-stage efforts to develop hybrid and electric aircraft.

1.2 The environmental benefits and overall sustainability of such fuels are of primary importance. Equally, rules governing the sustainability of aviation alternative fuels should be global in order to allow for fair competition and a level playing field amongst carriers as well as fuel suppliers.

1.3 SAFs have the advantage of impacting emissions from the existing fleet of aircraft. The suitability of some biofuels has already been well-proven for aviation, with specific pathways already certified for blending up to 50%. A faster transition could be achieved if the economies of scale would

lead to significant cost reductions of such biofuels, preferably based on waste and residues. In addition to biofuels, synthetic fuels made using renewable electricity generally have a less negative impact on the environment than biomass-derived fuels.

1.4 It needs to be ensured that support for SAFs is targeted at those fuels we can be confident deliver significant greenhouse gas savings and also contribute positively to sustainability as a whole. The environmental benefits, especially in terms of greenhouse gas savings and the sustainability, need to be based on a full Life-Cycle Analysis, taking into account both direct and indirect land use change effects, and robust sustainability criteria. The greenhouse gas savings vary significantly from one feedstock to another, and in some cases, especially where fuels are produced displacing directly or indirectly existing crops, there is risk that their use can result in higher greenhouse gas emissions than the use of kerosene. No aviation alternative fuel should be promoted or encouraged without a high level of confidence that it will perform significantly better than kerosene with respect to its environmental and climate impacts. For this reason, policy must be based on sound science and realistic assumptions about the availability of relevant feedstocks for the production of such fuels. In the case of remaining scientific gaps or uncertainties, a conservative approach needs to be taken to ensure that negative environmental, social and economic impacts are minimised.

1.5 Much has been achieved since the First Conference on Alternative Aviation Fuels held in Brazil in 2009. The Alternative Fuels Task Force of the ICAO Committee on Aviation Environmental Protection (CAEP) in particular, has brought valuable knowledge together, with the support of States, industry and environmental stakeholders. Continuation of such support for SAF development is a necessity, such as by the continued collection of data and performance of Life-Cycle Analysis to assess the emissions associated with SAFs.

## **2. DEVELOPMENTS IN RESEARCH RELATING TO SUSTAINABLE AVIATION FUELS**

2.1 Member Countries of the European Civil Aviation Conference, including the European Union (EU), are widely researching and developing the use of SAFs. This is being done through research projects funded by European-, State- or company-level participants.

2.2 The European Union's current research programme, "Horizon 2020", dedicates considerable funds to research related both to innovation and to enabling pre-commercial production of sustainable advanced aviation biofuels. EUR 464 Million is allocated for advanced biofuels and other renewable energy sources, of which EUR 25 Million is specifically earmarked for aviation biofuels.

2.3 In aviation, whilst development of new designs of aircraft and aviation propulsion technologies is the subject of on-going research, it will take many years for such efforts to reach fruition, with liquid fuels remaining the only option for the aviation sector in the meantime. Drop-in solutions will be pivotal in such a context. Specific innovation projects include technologies that synthesize renewable liquid hydrocarbons from abundant feedstocks, such as water, carbon dioxide and renewable energy. This enables Power-to-Liquid<sup>1</sup> and Sun-to-Liquid<sup>2</sup> fuels. Other studies being undertaken on drop-in fuels promise good results and should be encouraged, such as biofuels derived from microalgae.

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<sup>1</sup> See Working Paper by Germany on Power-to-Liquid (CAAF/2-WP/15)

<sup>2</sup> Horizon 2020 project SUN-to-LIQUID (EUR 4.5 Million contribution). Recently the first ever production of solar jet fuel has been experimentally demonstrated and efforts are continuing to complete an integrated fuel production chain that will be validated at pre-commercial scale.

2.4 The European Advanced Biofuels Flightpath, a partnership between the European Commission and major European stakeholders<sup>3</sup>, aims to accelerate the speed at which SAFs come to market in the EU, the next phase of which will probably review the remaining barriers to SAFs coming to market and assess potential actions to address these barriers.

### **3. FINANCING AND ASSISTANCE PROGRAMMES FOR SUSTAINABLE AVIATION FUELS**

3.1 In Europe, the financing of SAFs is most frequently undertaken by Grant funding under research and development programmes. In addition to the European Union's current research programme (to which some non-EU States also contribute), as already mentioned, funds have also been generated from the revenues from the auctioning of allowances under the EU Emissions Trading System for innovative renewable technologies, including advanced biofuels.

3.2 The European Investment Bank (EIB) supports the deployment of alternative fuels and cleaner technology in transport, more recently by the "Cleaner Transport Facility", a joint initiative by the European Commission and the EIB. The intent is that the Facility will assist investments in cleaner transport projects by both private and public stakeholders. The EIB is ready to engage with the aviation sector, including potential developers of SAFs, to work together to develop financial products and structures tailored to the industry's investment needs. Such project financing will still be dependent upon a favourable and stable regulatory framework.

### **4. POLICY INCENTIVES FOR SUSTAINABLE AVIATION FUELS**

4.1 Public authorities have a wide range of options available to further the development of SAFs. Incentives can, for example, be created through taxes and subsidies. Both may raise issues of equal conditions of competition, especially considering the international nature of the aviation business, as well as issues of affordability<sup>4</sup>. Other ways of incentivising SAFs are to make policy-frameworks through regulations that set objectives for private entities and/or public authorities. Policies promoting biofuels have existed in Europe for many years. Approaches vary from setting obligations on States, such as a target of 10% of renewable energy in transport by 2020, to imposing blending mandates on fuel suppliers.

4.2 Specifically in aviation, the EU Emissions Trading System (ETS) currently covers flights within the European Economic Area. On condition that biofuels fulfil the EU's stringent sustainability criteria and achieve substantial greenhouse gas savings taking into account their production and use, emissions attributable to the use of such biofuels in aviation are deemed to be zero under the EU ETS.

4.3 The expected demand for both conventional and Sustainable Aviation Fuels is such that very considerable quantities of biofuels will be needed by the aviation sector alone, in addition to the possible use of biofuels by other transport sectors. That is a major reason why the EU's research focus and legislative proposals also include sustainable synthetic fuels made from non-bio sources. That also explains the European Commission's support for the prioritisation of sustainable biofuel use by the transport sectors, such as aviation, with fewer technological alternatives and more stringent fuel certification standards.

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<sup>3</sup> These stakeholders include aircraft manufacturer (Airbus), leading European Airlines (Lufthansa Group, Air France/KLM, and British Airways), biofuel producers (Choren Industries, Neste Oil, Biomass Technology Group, Swedish Biofuels, Honeywell UOP, Amyris Total, BioChemtex Italia), biofuel distributor (SkyEnergy) and technology developer (Honeywell).

<sup>4</sup> Under EU law, any such measures may be subject to State aid rules and, in this case, must comply with those rules.

## 5. **DEFINING THE ICAO VISION ON SUSTAINABLE AVIATION FUELS AND FUTURE OBJECTIVES**

5.1 Many good research and development projects are being undertaken and are all needed if costs are to be reduced and SAF to be more cost-competitive with fossil kerosene. However, SAFs still represent a very small proportion of fuel used in aviation (considerably less than 1%). Continued research efforts are vital, and benefit can be gained by collaborative approaches, the sharing of knowledge and the development of partnerships.

5.2 Also, the future vision has to take account of the fact that there is at present a lack of availability of SAFs. The future promotion of SAFs must be based on solid knowledge of the market availability of relevant feedstocks. In the light of competing uses of alternative fuels amongst sectors, and of the lack of credible alternatives for aviation, the ICAO vision would prioritise the use of Sustainable Fuels in aviation.

5.3 Above all, the ICAO vision should clearly target the large-scale deployment of aviation alternative fuels which meet robust sustainability criteria applicable globally, and which effectively deliver significant greenhouse gas emissions reductions, on the basis of a full Life-Cycle Analysis, taking into account both direct and indirect land use change effects, without creating other negative social, environmental or economic impacts.

## 6. **ACTION BY THE CAAF2**

6.1 The CAAF2 is invited to:

- a) recognise that Sustainable Aviation Fuels have the potential to contribute significantly to ICAO's climate objectives;
- b) recommend that aviation alternative fuels be acknowledged to contribute to the ICAO's climate objectives only if they comply with robust sustainability criteria and deliver significant greenhouse gas savings relative to fossil fuel, as demonstrated through consensual scientific assessment based on a full Life-Cycle Analysis taking into account direct and, where appropriate, indirect land use change effects;
- c) invite States and industry to invest in research, development and trials to develop Sustainable Aviation Fuels;
- d) invite States to support the development of stable policy frameworks that facilitate the large-scale deployment of Sustainable Aviation Fuels, including via financing, assistance, policy incentives, and collaborative research, while avoiding unwarranted distortions of competition;
- e) invite States to further the sharing of knowledge and experience amongst States and stakeholders, including via the dedicated ICAO web-portal "*Global Framework for Aviation Alternative Fuels*";
- f) support the continuation of the Alternative Fuels Task Force of ICAO's Committee on Aviation Environmental Protection (CAEP) such as by the continued collection of data and performance of Life-Cycle Analysis to assess the emissions associated with the use of aviation fuels.