

Market & Policy

Introduction

This factsheet summarizes the findings of an online seminar, organized by AMF TCP Task 63 on Sustainable Aviation Fuels (SAF) in December 2022. Several challenges still hinder the market introduction of SAF and the market is only growing slowly. The aim of the seminar was to highlight best practice examples for the market uptake of SAF in terms of market and policy.

CORSIA, the first international approach to calculate and credit GHG emissions of SAF

The final online seminar started with opening words by the moderator Michael Wang (Argonne National Laboratory). Robert Malina (Uhasselt) held the first presentation on CORSIA, the first international adopted approach to calculate and credit lifecycle GHG emissions for aviation fuels. This approach by ICAO is important since emissions from international aviation are not included in nationally determined emission reduction contributions. The aviation sector voluntarily committed itself to CO₂-neutral growth from 2020 onwards and become net-zero CO₂ by 2050. The CORSIA mechanism compares a baseline with the actual CO₂ emissions of the sector. The gap defines the CO₂ offsetting requirement of the sector. The baseline is lowered over time to e.g. 85% of annual CO₂ emissions in 2019 (from 2024 to 2035). This means that the offsetting requirement is increasing. CORSIA eligible Fuels (Sustainable Aviation Fuel = SAF or Lower-Carbon Aviation Fuel = LCAF) are considered as alternative to the offsetting requirement and are therefore decreasing the requirement for the operator. The aviation fuels must comply with the CORSIA sustainability criteria. These currently cover GHG emissions and carbon stock, but will be extended by further criteria in 2024. Countries voluntarily committed to CORSIA. However, this approach will become mandatory for international aviation.

The expected role of SAF to decarbonize international civil aviation

The second presentation about the expected role of SAF in decarbonizing international civil aviation was given by Matteo Prussi (DenerG Politecnico Di Torino). Before the COVID pandemic, the aviation sector was continuously growing. Now the sector is still recovering. The combustion of fuel is expected to further grow in the future. SAF are an effective short to medium-term measure to decarbonize aviation (by over 90% as defined in CORSIA). ICAO published its long-term global aspirational goal (LTAG) feasibility study. The study is assessing the net-zero carbon emissions by 2050 goal using 3 main integrated scenarios. The relevance of SAF

can be clearly seen. For creating the scenarios, the marginal abatement cost (costs per ton of abated CO₂) has been established in LTAG. This is an important decision support for investors for choosing the most efficient technology. At European level a volumetric SAF share is being discussed. A share of 5% SAF would be around 3 Mtoe/a of SAF, which represents 17.5% of current EU27 biofuel consumption in the whole transport sector. To reach the targeted share, a huge amount of feedstock is required and it has to be ensured that the required feedstock is sourced sustainably. One strategy to ensure sustainable feedstock availability (also though competition with e.g. the maritime sector) is increasing the potential feedstock pool. However, an analysis confirmed that feedstock availability will not be the major barrier in the short term, but feedstock costs, price volatilities and the effective sustainable feedstock mobilization.

EU policies – SAF in the context of Fit-for-55

The seminar continues with Andrei Mungui (DG Move), presenting SAF in the context of the Fit-for-55 package (EU policies and proposals). Aviation and resulting emissions become more important for the society. There are five initiatives with direct effects on aviation within the Fit-for-55 package, namely ReFuelEU Aviation Initiative, Renewable Energy Directive, EU Emission Trading System, Energy Taxation Directive and Alternative Fuel Infrastructure Regulation. The ReFuelEU Aviation aims for a gradual ramp-up of SAF while maintaining a well-functional aviation market (level playing field in the aviation sector). SAF have to be made available for airlines at competitive prices. The aim is a gradual increase of the SAF share, with a sub-target on synthetic fuels. Eligible SAF are biofuels produced from waste oils and fats, advanced biofuels from waste and residues (listed in Annex IX of the Renewable Energy directive) and synthetic fuels (PtL). An enlargement of base is discussed to recycled-carbon fuels, nuclear-based e-fuels and renewable hydrogen. The targets have to be achieved by fuel suppliers. The operators have to buy the SAF provided. The regulation applies to all air operators flying from EU airports. Supporting/flanking measures include intensifying European efforts at ICAO, creation of the Renewable and Low-Carbon Fuels Value Chain Industrial Alliance (tinder for fuels) and regulatory support towards SAF update (CORSIA, EU-ETS, etc.).

U.S. policies and programs

The final presentation was held by Michael Wang (Argonne National Laboratory), speaking about US policies and programs for decarbonizing the aviation sector. The aviation sector accounts for 11% of US

Summary

transportation GHG emissions. The US Aviation Climate Goal of the transportation department is reaching net-zero GHG emissions by 2050, including international as well as domestic flights for US operators. Another activity is the US Governmental SAF Grand Challenge which foresees a minimum reduction of 50% in life-cycle GHG emissions, a near-term (3 billion gallons in 2030) and a long-term goal (35 billion gallons in 2050, representing 100% of US aviation fuels) as well as detailed roadmap document. To achieve these goals, about 400-500 refineries will be required. A sharp ramp-up of SAF production facilities is expected, but the goal is still ambitious. The 2022 Inflation Reduction Act (IRA) provides incentives (tax credit for fuel producers) for SAF sold or used from 2023. There are also incentives for clean transportation fuels and clean hydrogen. There are specific grand opportunities from the Federal Aviation Administration (\$297 million). Argonne generated LCA values of SAF path-ways using GREET, which includes details of both biofuel feedstock and conversion. SAF LCA results shows significant emission reduction potential, depending on pathways and feedstocks. Carbon capture can even lead to negative emissions.

Key findings

- Implementing SAF is not a technical nor a feedstock availability problem, it is an economic problem
- EU Target of 2% by 2025 would require about 1 million tons of SAF and is feasible according to European fuel suppliers and airlines (20% share would require about 35 to 40 new SAF production plants).
- Short-haul flights are responsible for about 4% of GHG emissions in the EU, but they are mainly responsible for particle emissions
- In 2035 there should be SAF at any airport in the EU.
- Offtake agreements are one solution for future buyers to secure SAF supply and support producers (current SAF availability low and trend is expected to continue)
- Recordings and slides of the seminar are available at: [AMF \(iea-amf.org\)](https://www.iea-amf.org)

Task 63: Sustainable Aviation Fuels