IEA-Advanced Motor Fuels
ANNUAL REPORT 2022

Task 63

Technology Collaboration Programme
by iea

Task 63: Sustainable Aviation Fuels

Project Duration	18 months / November 2021 – April 2023
Participants **Task sharing** **Cost sharing**	Austria, Brazil, China, Denmark, Germany, Switzerland, USA
Total Budget	EUR 200,000 (USD 218,252)
Task Manager	Doris Matschegg BEST – Bioenergy and Sustainable Technologies GmbH Email: doris.matschegg@best-research.eu
Website	https://iea-amf.org/content/projects/map_projects/63

Purpose, Objectives, and Key Question

Sustainable aviation fuels have the potential to reduce greenhouse gas emissions from the aviation sector. However, this potential remains largely untapped as such fuels currently represent only 0.05% of total jet fuel consumption. The aim of the Task is to lay the foundation for collaborative research, development, and demonstration (RD&D) work on sustainable aviation fuels within AMF TCP. Thus, the Task will focus on identifying stakeholders and experts, assessing participants' national situation, and facilitating information exchange on the main challenges in taking up sustainable aviation fuels. The Task will address both biofuels and e-fuels.

Activities

Task 63 activities include a comprehensive description of the international status quo on sustainable aviation fuels, an analysis of the concrete situation in some task member countries, highlighting best-practice examples, and identifying international stakeholders.

Status quo

- Approved technology pathways and those in the ASTM certification process: description of certified technologies and those applying for certification, feedstocks and products, TRL, production costs, and GHG emissions over the life cycle.
- Production facilities: overview of facilities in operation, under construction, or planned; production capacities currently and projected; and technology providers.
- Application of sustainable aviation fuels: supplying airports, using airlines, announced supply agreements, announcements of supply agreements, and announcements by aircraft manufacturers.
- Legislation: national and EU commitments, international announcements, and agreements.
- Sustainable aviation fuels in the energy system: global demand, relation to other transport sectors and other energy intensive sectors, and projected development.

National assessments

- Identification of current and potential national actors from research, industry, and administration along the value chain (feedstock supply, conversion technologies, aviation fuel suppliers, aviation fuel consumers, aviation OEMs, energy providers, bioenergy research centers, academia, etc.),
- Qualitative assessment of the national feedstock potential (considering competing use and trade) for the production of sustainable aviation fuels from biomass, wastes, residues and electrolysis hydrogen, and comparison of production potential with demand,
- Analysis of national strengths based on raw material availability, technological expertise, and willingness to implement on the part of the actors involved.
- Analysis of the current legal framework and announced new regulations with regard to their impact on national climate targets.
- Identification of challenges and opportunities along the value chain with regard to the market introduction of sustainable aviation fuels.

Best-practice examples

- Bringing jointly selected examples of successful production and application of sustainable aviation fuels before the curtain so that other stakeholders in the field (airports, airlines, kerosene providers, etc.) can learn from them.
- Presenting best-practice examples through a series of three online seminars with different thematic focus (Feedstocks and Conversion, Supply and Operation, and Markets and Policy) where successful actors will describe how they have implemented the production or application of sustainable aviation fuels (SAF), the challenges they have faced, and how they have overcome them.
- Making recordings of seminars and presentations available online to disseminate their findings.
- Deriving lessons and recommendations for action from the examples presented and summarizing them in a report. Additionally, best-practice factsheets will be prepared and shared online.

Key Findings

Since Task 63 lays the foundation for collaborative research, the findings were rather broad and less specific. Key findings of Task 63 include:

- Main barriers for implementing SAF were confirmed within the Task, namely sustainable feedstock availability, comparably high production costs, and a lack of clear (international) regulations.
- Biogenic SAF is essential for decarbonizing the aviation sector, especially in the short term. HEFA is currently the main pathway, but until 2030 also Gasification-FT and ATJ will produce significant amounts. PtL will take longer to be fully commercial. However, all SAF technology pathways are needed to achieve sector targets.
- Scaling-up SAF capacities requires huge investments and risk sharing among stakeholders. Offtake agreements are one possibility for airlines to support SAF producers while securing their SAF supply. The number of offtake agreements has increased sharply in recent years, and this trend is expected to continue.
- SAF availability is very limited at the moment but, for example, the EU and USA have very ambitious plans for capacity increase (ReFuelEU Aviation, US Aviation Climate Goal). Worldwide, six production facilities are in operation, with Neste as market leader. In the United States the production forecast for 2027 is about 60 times higher compared to 2022.
- Even though EU nations share a common (proposed) framework, strategies among Member States vary (e.g., strong focus on e-fuels in Germany and Denmark).
- SAF blending is not a technological issue (even in the case of multi-blending) but an administrative one. There are three modes of SAF delivery: segregated delivery, mass balance, and book and claim. Whereas book and claim is in high demand, only a segregated system allows for reducing regional non-CO_2 effects.

Main Conclusions

The implementation of SAF is, first and foremost, an economic problem, not a technical one. If we want to achieve the aviation sector´s ambitious targets, we need to start investing now. The SAF price can be lowered only with a learning curve, and technologies can only be improved and optimized once they are in operation. Compliance with sustainability must be ensured along the entire value chain.

Publications

- Presentations of national workshop (German): https://www.iea-amf.org/content/events/web_seminars/workshop_task63?_ga=2.9562294.2023133732.1675851855-1344608938.1617287363
- Recordings and presentations of online seminars: https://www.iea-amf.org/content/events/web_seminars/webinars_task63?_ga=2.13838516.2023133732.1675851855-1344608938.1617287363
- Presentations of international workshop: https://iea-amf.org/content/events/web_seminars/workshop_task63_cebc?_ga=2.237554691.2023133732.1675851855-1344608938.1617287363