Progress of ICAO's work on SAF

By ICAO Secretariat

Sustainable Aviation Fuels (SAF) are renewable or waste-derived aviation fuels that meet sustainability criteria, as referenced in the ICAO Standards and Recommended Practices – Annex 16 Volume IV[1]. They are one element of the ICAO basket of measures to reduce aviation emissions, which also includes technology and standards, operational improvements, and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

This article describes the progress of ICAO's work on SAF, included in four main workstreams: 1) development of globally-accepted **Standards** 2) Outreach of **Information,** 3) Establishment of **Policies and goals**, and 4) Supporting of **Capacity-building** in ICAO Member States.

Development of globally-accepted Standards

CORSIA allows aeroplane operators to reduce their offsetting requirements through the use of CORSIA Eligible Fuels, including Sustainable Aviation Fuels and Lower Carbon Aviation Fuels. To allow that, CORSIA includes Standards for sustainability and life cycle assessment of SAF, which represent the first global approaches to sustainability and life cycle assessment for an industry sector.

These Standards are developed by the Fuels Task Group of the ICAO Committee on Aviation Environmental Protection (CAEP). They are reflected into five ICAO documents that are referred to in Annex 16 Vol IV. Intensive work has been taken on these Standards on the last three years, in order to provide certainty to the nascent SAF and LCAF industries. This is reflected in the various amendments to these ICAO documents that have been approved by the ICAO Council in the last three years. More details on these developments are provided in Chapter 8.

Outreach of information

The ICAO GFAAF (Global Framework for Aviation Alternative Fuels), established in 2009 after a recommendation of the ICAO CAAF/1, is a pioneering database for sharing information related to aviation alternative fuels. To

FIGURE 1: Techno-economic assessments for SAF conversion pathways

1 https://www.icao.int/environmental-protection/CORSIA/Pages/SARPs-Annex-16-Volume-IV.aspx

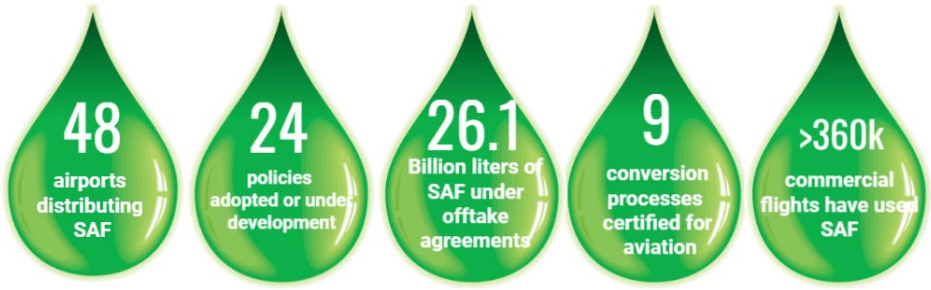

FIGURE 2: SAF tracking tools

supplement the GFAAF information, ICAO has launched a dedicated website with specific information on Sustainable Aviation Fuels[2], which builds upon the GFAAF information to provide includes a variety of information in support to a better understanding of SAF benefits and challenges.

SAF rules of thumb

As part of work on SAF projections, ICAO CAEP experts[3] have developed a set of heuristics, or 'Rules of Thumb[4]' for SAF that could be utilised to make broad order of magnitude estimations related to SAF costs, investment needs and production potential. This would then inform policy makers and project developers. Techno-economic assessments have been made on the Gasification Fischer-Tropsch (GFT), Hydroprocessed Esters and Fatty Acid (HEFA) and Alcohol to Jet (ATJ) SAF conversion pathways, with details on feedstock, yield, scale, and total capital investments required.

SAF Tracking tools

The ICAO's SAF webpage[5] provides comprehensive documentation tracking SAF development. Its SAF tracking tools includes updates on latest news articles concerning SAF, ranging from airline offtake agreements, pilots, investments on SAF infrastructure and production, etc, as shown in Figure 2. As an example, the trackers includes details on the 26 billion litres of SAF in offtake agreements which have been documented under publicly available news sources.

A growing number of airports are also offering SAF, either continuously or in batches, as shown in the SAF airports tracker. A SAF facilities map has also been developed, providing information on facilities (existing and announced) around the world that could produce SAF (see Figure 3). The SAF tracking tools also include information on all the States that adopted or are developing SAF-related policies.

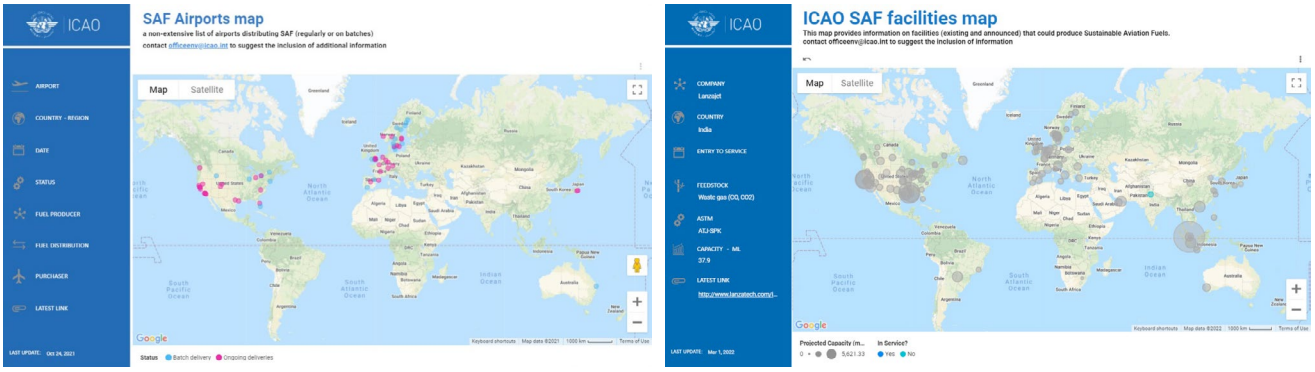

FIGURE 3: SAF airports and facilities map

2 https://www.icao.int/environmental-protection/pages/SAF.aspx
3 From Washington State University, supported by experts from Hasselt University.
4 https://www.icao.int/environmental-protection/Pages/SAF_RULESOFTHUMB.aspx
5 https://www.icao.int/environmental-protection/pages/SAF.aspx

ICAO Stocktaking Process

Since 2019, the ICAO Stocktaking process is "taking stock" of global progress on the development and deployment of SAF. Building upon the success of the first ICAO Stocktaking Seminar toward the 2050 Vision for SAF held in 2019, the scope was expanded subsequently in 2020 and 2021 to encompass other possibilities for in-sector aviation CO_2 reductions in addition to SAF, to incorporate technology and operational innovations that could accelerate the realisation of sustainable aviation. The 2021 Stocktaking process also included ICAO Pre-Stocktaking webinars on synthetic fuels, hydrogen propulsion, and battery technologies, with the objective to provide a deeper understanding on these topics.

These seminars served as platforms for industry leaders, researchers and States to illustrate their concrete and ambitious plans for decarbonising international aviation. Many also took the opportunity to announce plans to support and accelerate the energy transition specific to SAF. All these Stocktaking Seminars are available to be streamed at the ICAO.TV platform.

Establishment of Policies and goals

ICAO is working to define quantified goals for SAF use. In that regard, the 2050 ICAO Vision for Sustainable Aviation Fuels calls for a significant proportion of SAF use by 2050, and a level-playing field with other sectors. The Vision also defines that a quantified long-term goal for SAF will be defined in the third ICAO Conference on Aviation and Alternative Fuels (CAAF/3), to be held by 2025.

In addition, ICAO's work on a long term global aspirational goal for international aviation (LTAG) also has an important fuel-related component, since the LTAG report shows that the largest CO_2 reductions for aviation by 2050 is expected to come from fuels. More details on these results are provided in the LTAG Supplement.

The contribution of SAF to the ICAO environmental goals is also reflected in ICAO's Global Environmental Trends, which develops tools to regularly assesses the present and future impact of aircraft noise and engine emissions. This is integral to providing a robust reference to facilitate discussion and decision making in ICAO. The ICAO Environmental Trends are further elaborated in Chapter 1.

Supporting of Capacity-building in ICAO Member States.

Partnerships have also been established to promote the energy transition towards SAFs. Under the ICAO-UNDP-GEF assistance project 'Transforming the Global Aviation Sector: Emissions Reductions from International Aviation', a SAF Guide[6] was developed to inform ICAO Member States on how SAF can be deployed to reduce CO_2 emissions from international aviation activities. Targeted feasibility studies on the use of SAF have also been developed as part of the ICAO-EU assistance project 'Capacity Building for CO_2 mitigation from international aviation'.

ICAO regularly invites States and Organisations to indicate their interest in supporting or benefiting from potential future feasibility studies on SAF. In that regard, ICAO has recently launched the ACT-SAF Programme (Assistance, Capacity Building and Training for Sustainable Aviation Fuels), an ICAO initiative to facilitate the development and deployment of SAF. ACT-SAF will provide tailored support for States and facilitate cooperation under ICAO coordination. It will also develop a platform a Platform to facilitate knowledge sharing and progress monitoring. More information on this new Programme is provided in Chapter 11.

Conclusion

SAF is expected to contribute significantly to global efforts in reducing international aviation emissions. This article describes the various activities undertaken by ICAO to support the development and deployment of SAF, contributing to the 2050 Vision on SAF, and ICAO's goal to limit or reduce the impact of aviation greenhouse gas emissions on the global climate.

6 https://www.icao.int/environmental-protection/Documents/Sustainable%20Aviation%20Fuels%20Guide_100519.pdf