Sustainable Aviation Fuels

By ICAO Secretariat

As described in the opening article of Chapter 4, sustainable aviation fuels (SAF) 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 provides a background on ICAO's activities in SAF, including those conducted through the ICAO Committee on Aviation Environmental Protection (CAEP), the establishment of policies and measures, the organization of events, the facilitation of information sharing and best practices, and the assistance on the development of SAF feasibility studies. It also provides an overview of ICAO's plans to foster the future of SAF deployment.

BACKGROUND

The first ICAO Assembly Resolution reference to SAF was registered during its 36th Session (2007). At the time, initial studies on the technical feasibility of these fuels were being conducted, and the Assembly *recognized the importance of research and development in fuel efficiency and alternative fuels for aviation that will enable international air transport operations with a lower environmental impact*. The Assembly also encouraged the Council to promote improved understanding of the potential use, and the related emissions impacts, of alternative fuels.

In 2009, the First ICAO Conference on Aviation and Alternative Fuels (CAAF/1)[1], held in Rio de Janeiro, Brazil in November 2009, endorsed the use of sustainable aviation fuels as an important means of reducing aviation emissions and recommended the development of life cycle methodologies and sustainability criteria for these fuels. CAAF/1 also recommended the creation of the ICAO Global Framework for Aviation Alternative Fuels (GFAAF)[2], a global platform where information on worldwide initiatives and actions on SAF are shared. More details on GFAAF are provided later on this article.

Following up on these conclusions, the 38th ICAO Assembly (2013) acknowledged the need for SAF to be developed and deployed in an economically feasible, socially and environmentally acceptable manner and requested States to recognize existing approaches to assess the sustainability of all alternative fuels in general, including those for use in aviation which should: achieve net GHG emissions reduction on a life cycle basis; respect the areas of high importance for biodiversity, conservation and benefits for people from ecosystems, in accordance with international and national regulations; and contribute to local social and economic development, and competition with food and water should be avoided.

The Assembly also requested States to adopt measures to ensure the sustainability of alternative fuels for aviation, building on existing approaches or combination of approaches, and monitor, at a national level, the sustainability of the production of alternative fuels for aviation.

Since 2009, significant progress has occurred, including six certified conversion processes for SAF production, more than 180,000 flights using a blend of SAF, six airports regularly distributing SAF, reductions in production costs, and evolution on the sustainability aspects of these fuels.

To follow up on these developments, the Second ICAO Conference on Aviation and Alternative Fuels[3] (CAAF/2) was held in October 2017 in Mexico City, Mexico. This

1 https://www.icao.int/Meetings/caaf2009/Documents/CAAF-09_SD003_en.pdf
2 https://www.icao.int/environmental-protection/GFAAF/Pages/default.aspx
3 https://www.icao.int/Meetings/CAAF2/Pages/default.aspx

second Conference endorsed the 2050 ICAO Vision for Sustainable Aviation Fuels[4], which calls on States, industry and other stakeholders for a significant proportion of sustainable aviation fuel (SAF) use by 2050.

ICAO WORK ON SAF

The Assembly requests related to SAF are being pursued by the ICAO Secretariat and the ICAO Committee on Aviation Environmental Protection (CAEP). In 2013, CAEP established the Alternative Fuels Task Force (AFTF) to provide technical support to ICAO work on aviation fuels and the environment. Due to the valuable input that AFTF has provided to ICAO's work, in 2019 CAEP agreed to evolve AFTF into a permanent CAEP group, called the Fuels Task Group (FTG). CAEP has been focusing on the development of processes and methodologies for consideration of aviation fuels under CORSIA, including globally-accepted sustainability criteria and life cycle methodologies. These developments are detailed in the Chapter 6 article on CORSIA Eligible Fuels, which provides specific details on how SAF is considered under CORSIA.

ICAO STOCKTAKING SEMINAR 2019

The CAAF/2 noted that progress on SAF development and deployment should be periodically reviewed through a stocktaking process, including the organization of regular workshops and seminars. Such a stocktaking process will lead to the convening of CAAF/3 no later than 2025, with a view to updating the 2050 ICAO Vision to include a quantified proportion of SAF use by 2050, as well as the associated carbon reductions.

In response to this decision, the first ICAO Stocktaking Seminar toward the 2050 Vision for Sustainable Aviation Fuels[5] (SAFS2019) was held in Montreal from 30 April to 1 May 2019. A questionnaire was shared with ICAO member States and international organizations, aiming to identify the current status and future trends on SAF deployment. As a result, 25 questionnaires with information on SAF deployment were received prior to the event and 26

FIGURE 1: Evolution of Commercial Production of SAF

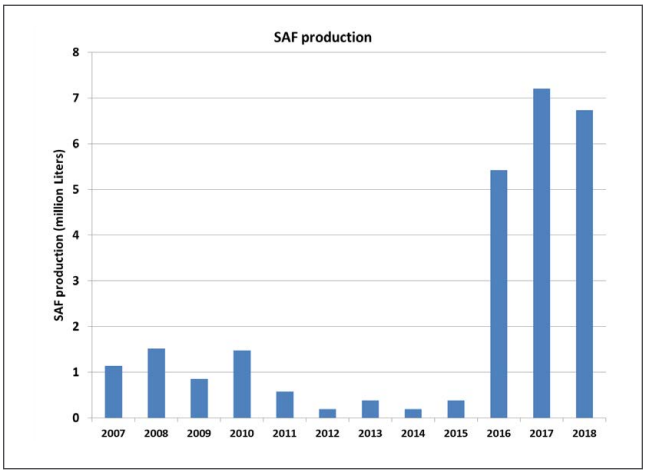
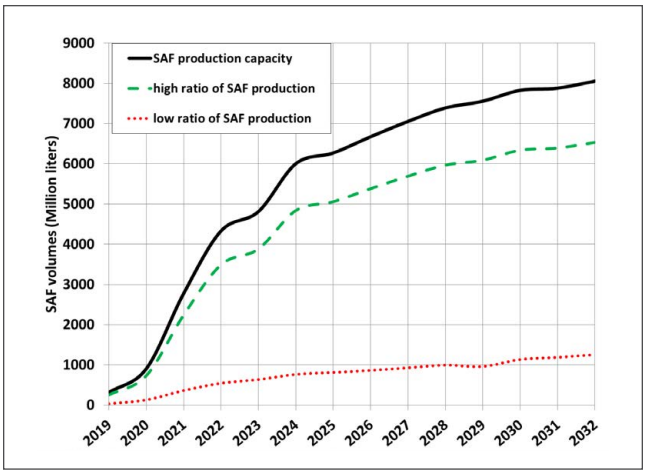


FIGURE 2: SAF Production Capacity Trends Based on the 2019 SAF Stocktaking Exercise

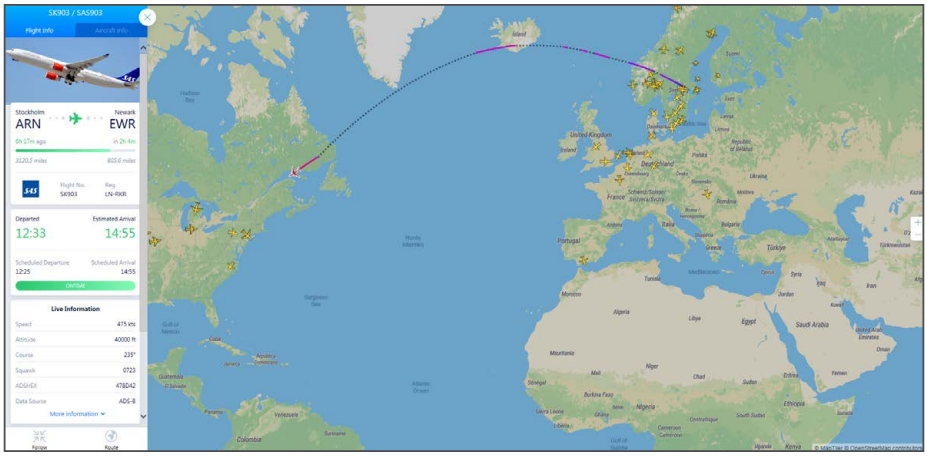


presentations (many with quantified information) were provided through the Seminar. All of the data was aggregated in order to provide a view on SAF deployment progress. The data showed that commercial production of SAF increased from an average of 0.29 million litres per year (2013-2015) to 6.45 million litres per year (2016-2018), as shown in Figure 1.

Looking to the future, the Stocktaking results showed that up to 6.5 Mt (8 billion litres) per year of SAF production capacity may be available by 2032. However, there is significant uncertainty on the share of this capacity that will be directed to SAF compared to other fuels. In this

4 https://www.icao.int/environmental-protection/GFAAF/Pages/ICAO-Vision.aspx
5 https://www.icao.int/Meetings/SAFStocktaking/Pages/default.aspx

FIGURE 3: Live Feed of Sustainable Aviation Fuel Flights



regard, the CAAF/2 encouraged States to promote policies that strive to establish a level playing field between aviation and other transportation sectors on the use of sustainable fuels. Figure 2 provides this future trend on SAF production capacity, together with scenarios of 10% and 80% SAF production ratios.

The second ICAO SAF Stocktaking Seminar will be held from 28 to 29 April 2020. This event will provide States with an opportunity for additional stakeholders to provide input to the SAF Stocktaking process and for stakeholders that have already submitted information to provide updates on their progress.

SHARING OF INFORMATION AND BEST PRACTICES

The ICAO GFAAF, established after a recommendation of the ICAO CAAF/1, is recognized as the online database for sharing information related to sustainable aviation fuels. It contains links to over 600 news articles dating back to 2005, details of past and ongoing initiatives, facts and figures, answers to frequently asked questions, and links to additional resources. It also includes a live feed of flights using sustainable aviation fuels, as illustrated in Figure 3.

As part of the ICAO-UNDP-GEF assistance project "Transforming the Global Aviation Sector: Emissions Reductions from International Aviation", a "Sustainable Aviation Fuels Guide"[6] was developed to inform ICAO Member States on how sustainable aviation fuels can be deployed to reduce CO_2 emissions from international aviation activities. The guide describes fuel production pathways, usage constraints, environmental and other benefits, and policy perspectives on the use and development of SAF.

Four successful feasibility studies on the use of SAF were also developed as part of the ICAO-EU assistance project "Capacity building for CO_2 mitigation from international aviation". These studies are detailed later in this chapter. As a result, other ICAO States expressed their willingness to undertake similar SAF feasibility studies. ICAO is encouraging States to express such interest in their State Action Plans to reduce CO_2 emissions (see Chapter 9 for more information), and to support the development of such feasibility studies.

CONCLUSIONS

Sustainable Aviation Fuels can play a major role in reducing international aviation emissions. This article described the various activities being pursued by ICAO to foster the deployment of SAF. This work will continue steadily in the next triennium, in support of the ICAO goal of limiting or reducing the impact of aviation greenhouse gas emissions on the global climate.

6 https://www.icao.int/environmental-protection/knowledge-sharing/Docs/Sustainable Aviation Fuels Guide_vf.pdf