



WORKING PAPER

**THIRD CONFERENCE ON AVIATION AND ALTERNATIVE FUELS
(CAAF/3)**

Dubai, United Arab Emirates, 20 to 24 November 2023

Agenda Item 2: Supporting policies to promote the development and deployment of cleaner energy for aviation (Building Block 1: Policy and planning)

SUPPORTING POLICIES TO PROMOTE THE DEVELOPMENT AND DEPLOYMENT OF SAF, LCAF AND OTHER AVIATION CLEANER ENERGIES

(Presented by the ICAO Secretariat)

SUMMARY

This paper presents various policy approaches by States to promote the development and deployment of Sustainable Aviation Fuel (SAF), Lower Carbon Aviation Fuel (LCAF) and other aviation cleaner energies, including information from the ICAO Guidance, examples of such national policy approaches, as well as the role of State Action Plans and roadmaps to reduce CO₂ emissions from international aviation. It also provides updates on technical certification aspects of aviation fuels.

Action by the Conference is in paragraph 5.

1. INTRODUCTION

1.1 The development and deployment of Sustainable Aviation Fuel (SAF), Lower Carbon Aviation Fuel (LCAF) and other aviation cleaner energies will be crucial in enabling the sector to attain its long-term global aspirational goal (LTAG) of net-zero emissions. Based on the most ambitious scenario in the ICAO LTAG Report, contributions from fuels are expected to form the largest contributions towards aviation decarbonization; technology scenarios also factor in the adoption of cleaner energy options – with unconventional propulsion concept aircraft incorporating non-drop-in fuels (hydrogen and battery electric), that may require major infrastructural changes. In addition, the role of policy enablers is also taken into account in developing the LTAG integrated scenarios.

1.2 Accordingly, the Assembly Resolution A41-21, paragraph 28 f) requested the convening of “CAAF/3 in 2023 for reviewing the 2050 ICAO Vision for SAF, including LCAF and other cleaner energy sources for aviation, in order to define a global framework in line with the *No Country Left Behind* (NCLB) initiative and taking into account national circumstances and capabilities”. Supporting policies for aviation cleaner energy form an important building block in enabling the definition of the global framework.

2. POLICY APPROACHES TO PROMOTE THE DEVELOPMENT AND DEPLOYMENT OF CLEANER ENERGY FOR AVIATION

2.1 In encouraging the successful adoption of policies in States, appropriate to their circumstances, and in line with Assembly Resolution A41-21, paragraph 20 a) to “continue to develop and keep up to date the guidance for Member States on the application of policies and measures aimed at reducing or limiting the environmental impact of emissions from international aviation”, the ICAO Council’s Committee on Aviation Environmental Protection (CAEP) developed a *Guidance on potential policies and coordinated approaches for the deployment of SAF*¹ based on various studies performed since 2016, and was updated in March 2023.

2.2 The ICAO Guidance also supports other provisions in A41-21, requesting States to:

- a) “set a coordinated approach in national administrations for policy actions and investment to accelerate the appropriate research, development, deployment and use of cleaner and renewable energy sources for aviation, including the use of SAF and LCAF, in accordance with their national circumstances” (A41-21 paragraph 27 a));
- b) “consider the use of incentives to encourage the deployment of cleaner and renewable energy sources for aviation, including SAF and LCAF” (A41-27 paragraph 27 b)); and
- c) “work with relevant stakeholders to accelerate the fuel research, certification and development as well as processing technology and feedstock production, and the certification of new aircraft and engines to allow the use of 100 per cent SAF, in order to decrease costs and support scale-up of sustainable fuel production pathways up to a commercial scale, especially through encouraging and promoting SAF and/or LCAF purchase agreements as well as supporting timely delivery of any necessary changes to airport and energy supply infrastructure, taking into account the sustainable development of States” (A41-21 paragraph 27 c)).

2.3 The ICAO Guidance is a support reference (or “policy toolkit”) for States, providing useful information on what defines an effective SAF policy, and qualitative metrics to assess the effectiveness of policies, as well as policy options and examples for creating a sustained market for SAF (while the guidance does not provide any endorsement of specific policies), which may be divided into the following categories:

- a) Stimulating SAF supply through the increase in SAF feedstock, fuel production capacity and supply through research and development (R&D), investment, production incentives, and tax treatment. Such policies can include government funding for SAF R&D, demonstration, deployment, targeted incentives and tax relief to expand SAF supply infrastructure or SAF facility operation, and recognition and valorization of SAF environmental benefits;
- b) Increasing SAF demand with policies such as the creation of SAF mandates, which can take various forms (expressed in energy volume, or reduction of fuel carbon intensity), adapting pre-existing policies to include SAF as qualified fuels, or incorporating SAF into sub-national, regional, or local policies. States may also create demand signals through commitments to SAF procurement; and
- c) Enabling SAF markets which include adopting clear and recognized sustainability standards and life cycle green-house gas (GHG) emissions methods for certification of

¹ ICAO Guidance is available at: https://www.icao.int/environmental-protection/Pages/saf_guidance_potential_policies.aspx

feedstock supply and fuel production, supporting the development/recognition of systems for environmental attribute ownership and transfer, and supporting SAF stakeholder initiatives.

2.4 The Guidance also contains additional comparative analysis tools, such as the “Rules of Thumb”, which provides order of magnitude estimations of SAF costs, investment needs and production potential; as well as discussions on SAF cost assessment concepts, on the basis of marginal abatement costs of CO₂, which can also apply to other forms of cleaner energy for aviation. Policy approach examples from several States (UK Jet Zero Consultation, United States SAF Grand Challenge) and regions (Fit-for-55: ReFuelEU Aviation) are also detailed in the Guidance.

2.5 In addition, as one of the ICAO Tracker Tools, the latest developments on a number of national and regional policies on SAF and other aviation cleaner energies and their summaries are being tracked in an interactive map and table².

2.6 As policies are customized to the specific circumstances of States, it should be noted that there is no one-size-fits-all approach, and a combination of policies may also be required. In addition, effective policy implementation can be defined by principles, including but not limited to: policy certainty and stability; being technology-neutral; avoiding market distortion; and the need to drive further innovation, among others listed in the Guidance.

2.7 It should be also noted that effective policy implementation will require collaborative effort between States and many stakeholders (fuel producers, sustainability certification schemes, aircraft and engine manufacturers, airports, aircraft operators) that play important respective roles in the aviation fuel value chain.

3. ICAO STATE ACTION PLANS INITIATIVE³

3.1 Assembly Resolution A41-21 “encourages all States to submit and update voluntary action plans to ICAO to reduce CO₂ emissions from international aviation, outlining respective policies, actions and roadmaps, including long-term projections” (paragraph 10 refers). The Resolution also “invites States that choose to prepare or update action plans to submit them to ICAO as soon as possible preferably by the end of June 2024 and once every three years thereafter, in order that ICAO can continue to compile the quantified information in relation to achieving the global aspirational goals, and the action plans should include information on the basket of measures considered by States, reflecting respective national capacities and circumstances, quantified information on the expected environmental benefits from the implementation of the measures chosen from the basket, and information on any specific assistance needs for the implementation of the measures” (paragraph 11 refers).

3.2 Such quantified information on SAF, LCAF and other aviation cleaner energies may be utilized as part of monitoring of progress on the implementation of measures towards the achievement of the LTAG (A41-21, paragraph 9 refers).

3.3 As of September 2023, 140 States representing more than 98% of global international aviation traffic in revenue tonne kilometres (RTK) have voluntarily submitted SAPs to ICAO, out of which 86 States have incorporated SAF as a measure to reduce aviation CO₂ emissions.

3.4 ICAO is currently progressing on the update of ICAO Doc 9988, *Guidance on the Development of States’ Action Plans on CO₂ Emissions Reduction Activities*, with an aim to provide

² ICAO Tracker on aviation fuel policies: <https://www.icao.int/environmental-protection/GFAAF/Pages/Policies.aspx>

³ ICAO State Action Plans initiative: https://www.icao.int/environmental-protection/pages/climatechange_actionplan.aspx

additional guidance for States to incorporate their long-term emissions reduction initiatives into SAPs and to report quantified data in a more harmonized manner to facilitate the monitoring of the LTAG progress. This updated Guidance is expected to be available in early 2024, to encourage the submission of new and updated SAPs by end of June 2024.

3.5 SAPs also enable ICAO to assess States' needs, and tailor appropriate capacity building and implementation support measures and facilitate access to financing (refer to CAAF/3-WP/7, *Assistance and capacity building for cleaner energy*, and CAAF/3-WP/8, *Financing cleaner energy*).

4. TECHNICAL CERTIFICATION OF AVIATION FUELS

4.1 An aviation fuel conversion process is defined as “a type of technology used to convert a feedstock into aviation fuel” (Annex 16, Volume IV refers). A variety of feedstocks can be used to produce SAF, and more than 40 types are recognized as of September 2023, and they are broadly categorized into primary and co-products, by-products, wastes and residues.

4.2 SAF conversion processes are evaluated and approved by organizations such as ASTM International, and 11 conversion processes for SAF production have been approved, including: Fischer-Tropsch, Hydroprocessed Esters and Fatty Acids, and Alcohol to Jet SAF conversion pathways, incorporating a variety of feedstocks from used cooking oils, biomass, etc., with additional conversion processes currently under evaluation.

4.3 Further information on SAF feedstocks and conversion processes are available under the ICAO Tracker Tools⁴, which also include information on airports distributing SAF, SAF offtake agreements, and latest news highlighting the significant developments in SAF.

4.4 While there is currently a 50% SAF blending limit, international aerospace manufacturers have committed to 100% SAF compatibility by 2030. In addition, work is ongoing to increase the maximum blending for co-processing (from 5% to 30%). In this regard, aircraft and engine manufactures should be encouraged to expedite such work towards 100% SAF use in new, in-production and existing aircraft, as soon as it is safe to do so, and also to maximize the opportunities offered by other cleaner energy sources in the longer term.

5. ACTION BY THE CAAF/3

5.1 The CAAF/3 is invited to:

- a) recognize the need for close collaboration across all stakeholders, in order to achieve effective policy implementation in the value chain for the development and deployment of SAF, LCAF and other aviation cleaner energies;
- b) encourage all States to submit and update voluntary action plans to ICAO, outlining respective policies, actions and roadmaps, including long-term projections, which may be utilized as part of monitoring of progress on the implementation of measures towards the achievement of the LTAG;

⁴ ICAO SAF Tracker Tools: <https://www.icao.int/environmental-protection/Pages/SAF.aspx>

- c) encourage relevant industry stakeholders to expedite work to ensure 100% SAF compatibility is feasible in new, in-production and existing aircraft, as soon as it is considered safe to do so, and to maximize the opportunities offered by other cleaner energy sources in the longer term; and
- d) use information in this paper, for consideration of CAAF/3 outcomes.

— END —