Policy and Planning, and Regulatory Framework Foundations for Aviation Cleaner Energies

SAF Policy Guidance and the CORSIA Eligibility Framework

By ICAO Secretariat

Introduction

Sustainable aviation fuel (SAF) is being pursued globally as a cornerstone measure in the broader framework of climate change mitigation for international aviation. SAF is defined as renewable or waste-derived aviation fuels that meets the ICAO sustainability criteria established under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) . The drop-in nature of SAF means its full compatibility with existing aircraft engines and airport fueling infrastructure. It offers significant life-cycle reductions in greenhouse gas (GHG) emissions compared to conventional jet fuel, and its deployment also contributes to reducing non-CO_2 drivers, which can improve local air quality.

The ICAO Committee on Aviation Environmental Protection (CAEP) has recognized that despite SAF's technical viability, multiple systemic barriers continue to hinder its widespread adoption, including high production costs, feedstock availability, infrastructure constraints, and financing challenges. In response, CAEP developed a policy guidance framework for supporting States to stimulate SAF development and deployment through a combination of fiscal instruments, regulatory actions, and enabling market conditions. Furthermore, CAEP supports the development of a comprehensive and harmonized ICAO regulatory framework for the sustainability criteria and certification mechanisms under the CORSIA, ensuring that SAF and other cleaner aviation fuels contribute meaningfully to the achievement of ICAO's Long-Term Global Aspirational Goal (LTAG)

As part of the ICAO Global Framework for SAF, Lower Carbon Aviation Fuels (LCAF) and other Aviation Cleaner Energies, adopted by CAAF/3 in November 2023, ICAO and its Member States strive to achieve a collective global aspirational Vision to reduce CO_2 emissions in international aviation by 5 per cent by 2030 through the use of SAF, LCAF and other aviation cleaner energies (compared to zero cleaner energy use). In support to achieving this Vision, **policy support is a key component of Global Framework's Building Block 1 (Policy and Planning)**, as illustrated in Figure 1, together with all other Building Blocks already mentioned in the previous ICAO Secretariat Article. It promotes national action through planning, target-setting, and the development of State policies and roadmaps.

As another key pillar, the CORSIA sustainability criteria and the broader CORSIA framework serve as fundamental elements of Building Block 2 (Regulatory Framework), anchoring environmental integrity, eligibility assurance, and emissions accounting mechanisms essential for the deployment of cleaner aviation energies.

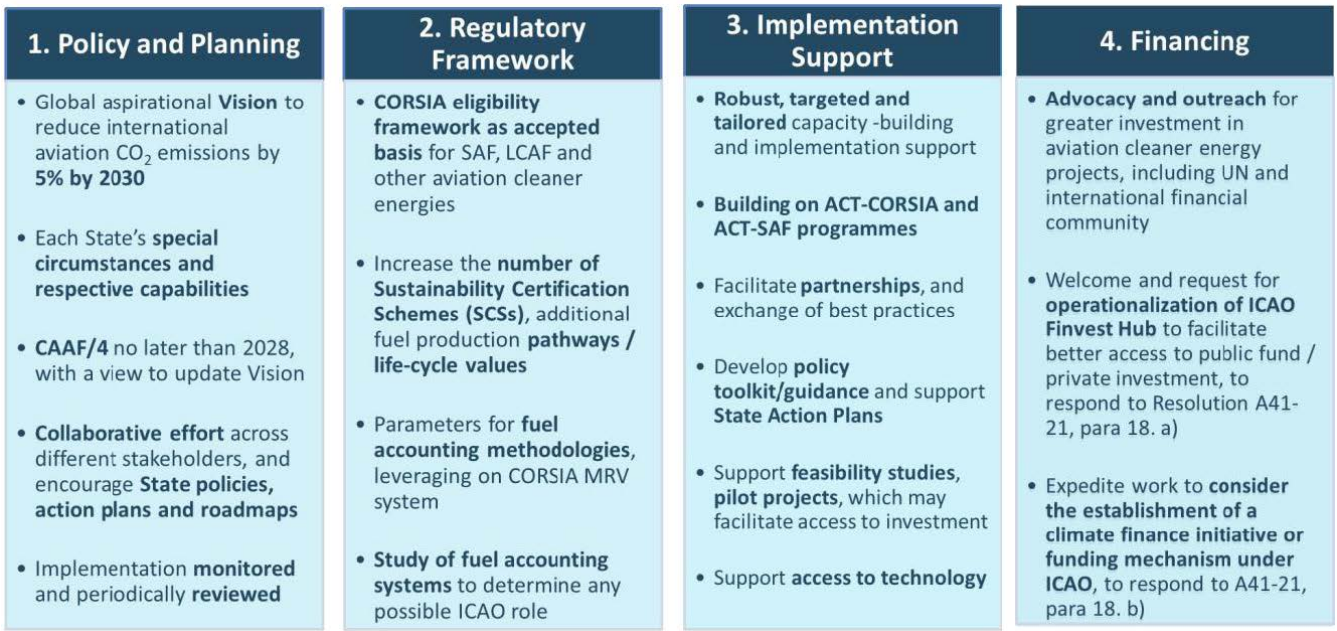


FIGURE 1: ICAO Global Framework Building Blocks.

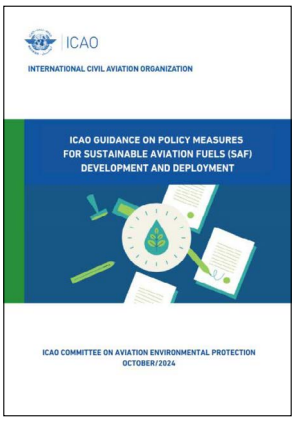
This article focuses in greater detail on these two key pillars of ICAO's work as they relate to the topics addressed in this Chapter. Meanwhile, **Building Block 3 – Implementation Support** is explored in **Chapter 8 – Capacity Building and Implementation Support**, and **Building Block 4 – Financing** is addressed in the dedicated **Chapter 9 – Climate Financing**.

ICAO Policy Guidance on SAF Development and Deployment[1]

The policy guidance developed by CAEP is based on detailed analytical work carried out since 2016, including techno-economic assessments and policy reviews. The objective is to offer ICAO Member States a practical toolbox of policy options that can be tailored to their national circumstances, economic profiles, and development goals.

The guidance identifies three main policy functions: stimulating the growth of SAF supply, creating demand, and enabling SAF markets. One approach to stimulate supply is through public funding of research, development, demonstration, and deployment (RDD&D). For example, governments may allocate funds to support SAF-specific R&D, particularly for new feedstock conversion technologies or to improve yields in existing pathways. Demonstration projects are also critical to derisk investment; they may involve funding pilot plants or test flights using SAF blends. In the European Union, the Horizon Europe programme financed 119 SAF-related projects between 2014 and 2023 with a total investment of €493 million, showcasing the type of long-term commitment that can foster innovation and learning-by-doing.

Another category focuses on targeted incentives to expand SAF production capacity and infrastructure. Tax relief and financial instruments such as loan guarantees, grants, and production subsidies can make SAF production economically viable in its early stages. For example, tax credits could reduce the operational costs of SAF producers, while capital expenditure grants might lower the upfront costs of building new biorefineries.



Mandates play a key role in creating demand for SAF. These can be structured as blending quotas that

1 https://www.icao.int/environmental-protection/Pages/saf_guidance_potential_policies.aspx

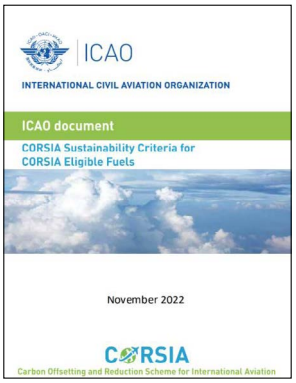
require fuel suppliers to include a minimum percentage of SAF in their jet fuel mix. The establishment of binding targets, such as the European Union's ReFuelEU Aviation initiative, compels market actors to integrate SAF into their operations, thus driving demand. In countries where mandates may not yet be feasible, updating existing renewable energy legislation or emissions trading schemes to include aviation SAF can indirectly encourage uptake.

Government leadership can further amplify market confidence. When States incorporate SAF into their own public procurement or military aviation operations, they send a strong demand signal to the private sector. These actions also demonstrate a commitment to broader decarbonization objectives and may facilitate public-private partnerships that reduce investment risks for new entrants.

Finally, enabling SAF markets requires action on institutional and infrastructural fronts. Developing standards for SAF quality, certification systems for emissions performance, and traceability protocols ensures interoperability and environmental integrity. Public authorities may also support the formation of industrial alliances and value-chain consortia, which are essential for coordinating stakeholders from feedstock suppliers to airport fuel handlers.

An effective SAF policy, according to CAEP guidance, should be: predictable, stable, and of long enough duration to support long-term investment; feasible and practical in implementation, with minimal administrative burden; technology-neutral, allowing diverse feedstock and conversion pathways; and stackable with other incentives, including those in other sectors. It should also reflect national or regional contexts, leveraging local advantages while mitigating barriers. To assist with decision-making, the guidance includes a qualitative metrics framework that allows policymakers to evaluate potential measures based on factors such as flexibility, certainty, cost-effectiveness, unintended consequences, and contribution to GHG reduction and SAF deployment.

CORSIA Sustainability Criteria and Linkages to the Broader CORSIA Framework



The "CORSIA Sustainability Criteria for CORSIA Eligible Fuels[2]" is a foundational document referenced in Annex 16, Volume IV – *Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)*. It sets out the various sustainability requirements relating to carbon reduction, environmental, and socio-economic aspects that fuels must meet to qualify as CORSIA eligible fuels (SAF or LCAF).

The CORSIA sustainability criteria is organized into the following themes and associated principles:

- **Greenhouse Gases (GHG)**: CORSIA eligible fuel should generate lower carbon emissions on a life cycle basis. Criterion 1.1 states that CORSIA eligible fuel will achieve net greenhouse gas emissions reductions of at least 10% compared to the baseline life cycle emissions values for aviation fuel on a life cycle basis.
- **Carbon Stock**: CORSIA SAF should not be made from biomass (feedstock for CORSIA LCAF) obtained from land/aquatic systems with high biogenic carbon stock.
- **Greenhouse Gas Emissions Reduction Permanence**: Emissions reductions attributed to CORSIA eligible fuel should be permanent.
- **Water**: Production of CORSIA eligible fuel should maintain or enhance water quality and availability.
- **Soil**: Production of CORSIA eligible fuel should maintain or enhance soil health.
- **Air**: Production of CORSIA eligible fuel fuel should minimize negative effects on air quality.
- **Conservation**: Production of CORSIA eligible fuel should maintain biodiversity, conservation value, and ecosystem services.
- **Waste and Chemicals**: Production of CORSIA eligible fuel should promote responsible management of waste and use of chemicals.

2 https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Eligible-Fuels.aspx

- **Seismic and Vibrational Impacts**: (Applicable for CORSIA LCAF only) Production of CORSIA LCAF should minimize seismic, acoustic and vibrational impacts.
- **Human and Labour Rights**: Production of CORSIA eligible fuel should respect human and labour rights.
- **Land Use Rights and Land Use**: Production of CORSIA eligible fuel should respect land rights and land use rights including indigenous and/or customary rights.
- **Water Use Rights**: Production of CORSIA eligible fuel should respect prior formal or customary water use rights.
- **Local and Social Development**: Production of CORSIA eligible fuel should contribute to social and economic development in regions of poverty.
- **Food Security**: Production of CORSIA eligible fuel should promote food security in food insecure regions.

Along with the above document, additional ICAO documents (described below) are also essential to ensure robust monitoring, reporting, and verification of CORSIA eligible fuels, as well as accounting for its emissions reductions.

The suite of interlinked ICAO documents[3] under the CORSIA framework includes:

- **CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes:** Outlines criteria that SCSs must meet to certify CORSIA eligible fuels. They encompass documentation management, risk assessment, transparency in greenhouse gas reporting, and adherence to approved sustainability standards, ensuring that certified fuels contribute effectively to emission reduction goals;
- **CORSIA Approved Sustainability Certification Schemes:** Lists the SCSs approved by the ICAO Council.;
- **CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels**: Provides default life cycle assessment values for various SAF pathways to enable operators to claim emissions reductions under CORSIA without the need to establish actual life cycle assessment values, provided they adhere to specified documentation and compliance requirements;
- **CORSIA Methodology for Calculating Actual Life Cycle Emissions Values:** Provides detailed procedures for determining the life cycle greenhouse gas (GHG) emissions of CORSIA-eligible fuels. It outlines methodologies for calculating emissions across various stages of the fuel supply chain, including feedstock production, transportation, conversion, and combustion, ensuring compliance with CORSIA's sustainability criteria.

These documents collectively ensure the environmental integrity, credibility, and traceability of fuels used under CORSIA. For example, a fuel producer must be certified under an approved SCS to claim compliance with CORSIA sustainability criteria. If actual life cycle emissions values are used, the calculations must follow ICAO's approved methodology, and data must be verified by the SCS and transmitted through a recognized chain-of-custody.

This robust framework allows ICAO to monitor and validate climate benefits from CORSIA SAF and LCAF use, ensure comparability across operators and States, and support global climate transparency and accountability. This architecture supports global harmonization, environmental credibility, and the scaling up of cleaner energies for international aviation. The rest of this Chapter builds on this foundation to explore implementation pathways, regional strategies, innovation in production technologies, and investment mechanisms for scaling cleaner energy in aviation.

3 https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx