Advancing CORSIA-Eligible Fuels (CEFs)

Methodological Enhancements for the CORSIA framework on fuels

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Delivering meaningful climate progress in international aviation requires more than ambition: it requires the tools to measure, validate, and certify the decarbonization efforts. Since its adoption, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) has continued to evolve, particularly around CORSIA-Eligible Fuels (CEF), which are central to decarbonizing the sector as seen in the results of the ICAO LTAG Report in 2022[2].

The latest developments under the Committee on Aviation Environmental Protection (CAEP) during CAEP/13 cycle (2023-2025) include a comprehensive package of amendments to strengthen the methodological backbone that enables fuels to qualify under CORSIA, reflecting both scientific advancements and practical implementation experience. CAEP also have developed new sample calculations to improve transparency and facilitate the verification of the life cycle values associated with CORSIA eligible fuels. Below, we unpack the key areas of enhancement recommended by CAEP, which will be incorporated into the CORSIA framework pending Council approval.

Clarifying the Role of Sustainability Certification Schemes (SCSs)

One of the cornerstones of CORSIA's sustainability assurance is its reliance on independent Sustainability Certification Schemes (SCSs). To enhance consistency and clarity, CAEP has proposed amendments to the document *CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes*[3].

A key clarification made was on the role of SCSs in verifying whether a material qualifies as a waste, residue, or by-product. The revised approach removes the burden from SCSs to interpret definitions; instead, SCSs must ensure the feedstock used by an economic operator aligns with ICAO's positive list and associated specifications. These definitions—"unintentional" and "unavoidable" production—help prevent deliberate misclassification and preserve environmental integrity. ICAO remains responsible for evaluating new feedstock classification proposals, thereby maintaining a centralized, consistent and inclusive review process.

Enhancing Life Cycle Assessment (LCA) Methodologies for Actual LCA Values

The document *CORSIA Methodology for Calculating Actual Life Cycle Emissions Values*[4] has undergone substantial updates. Several new components are now included to ensure more accurate greenhouse gas (GHG) assessments:

- **Electricity Sourcing Criteria for High-Electricity Input CEFs (HEI-CEFs):** For fuels like Power-to-Liquids, where electricity is a major input, new sourcing, deliverability,

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

temporal matching, and additionality criteria have been recommended by CAEP, providing a robust methodology to assess the benefits of low carbon electricity used in CEF production. For more details on this, please refer to the additional article "The Increasing Importance and Potential of Electricity for CORSIA Eligible Fuel Production" in this Chapter.

- **Soil Carbon Accumulation (SCA):** The new methodologies developed by CAEP will allow the consideration of emission savings associated with sustainable agricultural practices (e.g., reduced tillage, compost use, biochar use) can lead to meaningful soil carbon storage.
- **Carbon Capture and Sequestration (CCS):** Fuels produced with captured CO_2 will now be allowed to integrate GHG reductions from geological CCS into their lifecycle values. Requirements cover monitoring and permanence of the carbon storage, including a reserve inventory mechanism to offset any possible leakage events.
- **Feedstocks from Waste and Residue Gases:** New methodologies have been developed to calculate the GHG benefits of fuels produced from waste and residue gas streams, considering both baseline emissions and avoided releases. Additionally, specifications have been developed to clarify the conditions for a gas stream to qualify as a waste or residue gas stream.

Together, these updates enable a more complete accounting of environmental benefits across a broad range of SAF pathways.

Updating Default Values and ILUC Calculations

The document *Default Life Cycle Emissions Values for CORSIA Eligible Fuels*[3] was also revised, with significant changes that reflect newer datasets and improved modeling:

- **Core LCA Values:** Most core LCA values have been updated using the latest life cycle databases, improving precision across multiple fuel pathways.
- **ILUC (Induced Land Use Change) Values:** All ILUC values have been revised to reflect most up to date information (e.g., inclusion of IPCC 2019 guidelines on the ILUC Models), with special attention to removing soil carbon benefits to avoid double-counting when SCA credits are separately claimed.
- **Co-Processing Methodologies:** New equations now account for the GHG intensity of both fossil and renewable portions of SAF produced in LCAF-certified refinery units, enabling SAF/LCAF co-processing compatibility.
- **Weighted Average Approach for Multicropping:** A "weighted average approach" has been developed to obtain ILUC values for cases of significant multicropping, using region-specific crop data.

Providing Transparency through Sample Calculations

To promote transparency and consistency in the application and verification of the methodologies, CAEP has recommended two sample calculation cases:

- **Core LCA Calculation Example:** Using the corn grain alcohol-to-jet pathway, the sample walks through each step of LCA computation—highlighting differences between default and actual values, and clarifying data source requirements.
- **Direct Land Use Change (DLUC):** Historic case studies of land conversion (e.g., sparsely forested land to crop plantations) are used to illustrate the application of the CORSIA DLUC methodology, facilitating the verification of the use of this methodology.

Moving Forward

These methodological refinements mark a milestone in ICAO's ongoing commitment to credible, science-based aviation climate action. With the continuous update of the methodologies underpinning CORSIA-Eligible Fuels, ICAO ensures the environmental integrity of its flagship decarbonization scheme while addressing regional realities and new technologies in a timely manner.

The work ahead will continue under the CAEP/14 cycle, particularly on refining the ILUC modeling, expanding CCS methodologies and related guidance and continue refining the methodologies for electricity sourcing and sustainability certification. Together with States and stakeholders, ICAO remains committed to driving forward aviation's clean energy transition with the best available scientific information.