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THE ROLE OF SUSTAINABILITY CERTIFICATION SCHEMES IN ENABLING LOWER CARBON AVIATION FUELS AS A LOW HANGING FRUIT IN AVIATION DECARBONISATION

(Presented by Saudi Arabia, Egypt, Nigeria and United Arab Emirates)

EXECUTIVE SUMMARY

This working paper highlights its authors' views on the critical role of Lower Carbon Aviation Fuels (LCAF) in advancing the International Civil Aviation Organization (ICAO)'s climate Aspirational goals, including the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), the Long-Term Aspirational Goal (LTAG), and the ICAO Global Framework for Sustainable Aviation Fuels (SAF), Lower Carbon Aviation Fuels (LCAF), and other aviation cleaner energies.

Despite its near-term mitigation potential and alignment with ICAO's technology-agnostic and inclusive approach, LCAF remains underutilized—primarily due to the absence of ICAO-approved Sustainability Certification Schemes (SCSs) specific to LCAF. This gap has delayed its deployment and limited its contribution to ICAO's global decarbonization efforts.

Unlocking LCAF's potential will require timely progress in improving certification processes and expanding the scope and availability of approved SCSs.

Action: The Assembly is invited to request the Council to:

- urge** the ICAO-approved SCSs to submit, without delay, system requirements covering LCAF certification for ICAO Council approval;
- intensify outreach** and **inform** new candidate SCSs of the opportunity to apply for CORSIA approval, while **prioritizing** schemes seeking concurrent approval for both LCAF and SAF;
- direct** CAEP to apply more flexible processes including timeframe for SCS applications and revision in support of the provisions of the ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies and;
- urge** ICAO Member States to actively support and provide resources to CAEP/SCSEG, thereby facilitating related activities.

<i>Strategic Goals:</i>	This working paper relates to the Strategic Goal – <i>Aviation is Environmentally Sustainable</i> .
<i>Financial implications:</i>	No financial implications are anticipated.
<i>References:</i>	

1. INTRODUCTION

1.1 Aviation Fuels in the Context of Emissions Reduction for International Aviation

1.1.1 The 37th International Civil Aviation Organization (ICAO) Assembly, held in 2010, adopted a basket of measures to reduce CO₂ emissions from international aviation. For the first time, **alternative aviation fuels** were recognized as a reduction measure, alongside technology improvements, operational and infrastructural enhancements, and market-based measures.

1.1.2 In 2016, the 39th ICAO Assembly adopted the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) – the world’s first and only global market-based measure to address CO₂ emissions from international aviation. CORSIA was designed to support the ICAO mid-term aspirational goal of achieving carbon-neutral growth at the 2020 emissions level (CNG2020).

1.1.3 CORSIA framework recognizes emissions reductions achieved through the use of CORSIA Eligible Fuels (CEFs); the Lower Carbon Aviation Fuels (LCAF) (A42-WP/131) and Sustainable Aviation Fuels (SAF) as referenced in Annex 16, Volume IV, as means to reduce air operators’ offsetting obligations. This recognition is supported by a set of implementation elements and supporting documents that define sustainability criteria, lifecycle emissions values, and certification requirements. Together, these provisions serve as a market-based incentive to promote the development and deployment of cleaner fuels in international aviation.

1.1.4 The Long-Term Aspirational Goal (LTAG), adopted during the 41st Assembly in 2022, set a collective global goal of net-zero CO₂ emissions from international aviation by 2050. LTAG is grounded in principles of policy neutrality and technology agnosticism, allowing States to determine the most suitable pathways and technologies based on their own capabilities, circumstances, and national timeframes.

1.1.5 The LTAG considers LCAF to be a viable option for decarbonizing, which supports wider participation and regional inclusivity, alongside other emerging technologies and novel fuels, including SAF.

1.1.6 The Third ICAO Conference on Aviation and Alternative Fuels (CAAF/3), held in Dubai Nov. 2023, adopted the ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies, structured around four pillars: Policy and planning, Regulatory foundation, Implementation support, and Financing mechanisms.

1.1.7 The inclusion of LCAF reflects ICAO’s recognition of the need for flexible pathways to achieve emissions reductions as stated in its aspirational goals—considering regional diversity and the current technological advancement and economic landscape, particularly in regions facing limited SAF production capacity or high associated costs.

1.2 The Role of Sustainability Certification Schemes (SCSs)

1.2.1 CORSIA, LTAG, and the ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies emphasized the essential role of Sustainability Certification Schemes (SCSs) in ensuring that eligible fuels comply with ICAO’s sustainability criteria and in maintaining environmental integrity.

1.2.2 The ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies specifically called for accelerating ICAO’s SCS approval and evaluation processes. Strengthening the accessibility and responsiveness of these processes is essential to support the global scale-up of SAF and LCAF production and deployment.

1.2.3 The ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies also calls, *inter alia*, for:

1.2.3.1 ICAO-approved Sustainability Certification Schemes to accelerate the certification of qualifying SAF, LCAF, and other aviation cleaner energies in line with CORSIA requirements.

1.2.3.2 ICAO, States, and industry to enhance efforts to increase the number of ICAO-approved SCSs across all regions, without excluding any particular fuel source, pathway, feedstock, or technology. In this regard, ICAO, with technical and neutral contributions from the Committee on Aviation Environmental Protection (CAEP), is encouraged to accelerate the development and approval of new SCSs, as well as the analysis and approval of lifecycle values for new fuel sources and pathways.

1.2.3.3 Promoting the increase in the number of ICAO-approved Sustainability Certification Schemes to support the broader deployment of SAF, LCAF, and other aviation cleaner energies.

2. DISCUSSION

2.1 LCAF potential GHG reduction in support of Long-Term Aspirational Goal, The ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies, and CORSIA

2.1.1 The mitigation potential of the LCAF could be found in the [“Report on the Feasibility of a Long-Term Aspirational Goal \(LTAG\) for International Civil Aviation CO₂ Emissions Reduction”](#) and its appendix M5 (March 2022). Under a Mid-Traffic scenario and the middle-range of greenhouse gas (GHG) fuels reduction, LCAF could account for roughly 10 % (7.3) of the international aviation fuel by 2035 and 30 % (28.1) by 2050, delivering about 16 Mt CO₂e per year of reductions in 2035 and 39 Mt CO₂e per year in 2050 (see A42-WP/131).

2.1.2 The Third International Civil Aviation Organization (ICAO) Conference on Aviation and Alternative Fuels (CAAF/3) agreed to support the achievement of the LTAG as ICAO and its Member States will strive to achieve a collective global aspirational Vision to reduce CO₂ emissions in international aviation by 5 percent by 2030 through the use of SAF, LCAF and other aviation cleaner energies compared to zero cleaner energy use.

2.1.3 The technical assessment of the “2025 CORSIA Periodic Review” presented in A42-WP/28 under the Consolidated Statement of Continuing ICAO Policies and Practices Related to Environmental Protection – Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), indicates that—based on both a Mid Traffic Scenario and a Moderate SAF growth projection—SAF alone is expected to contribute approximately 2.5% in emissions reduction, relative to a scenario without cleaner energy use. This would result in only about 50% compliance with the ICAO Aspirational Vision set by CAAF/3.

2.1.4 Assuming a low to moderate LCAF pick up, varying between 10 and 20% of the conventional fuel used becoming LCAF compliant, GHG emissions reductions from LCAF would be in the range of 6.5 to 13 MtCO₂e/year, representing an additional 1 to 2% reduction in total emissions and increasing compliance with the CAAF/3 aspirational Vision to 70-90%. Such scenario is realistic and can be achieved with moderate investment costs, in the range of 75 to 150 \$/tCO₂e.

2.2 CORSIA Framework for Lower Carbon Aviation Fuel (LCAF)

2.2.1 In November 2022, the ICAO Council adopted the rest of the technical materials necessary to qualify the LCAF as CEFs, through updates to two key CORSIA implementation documents: “CORSIA *Methodology for Calculating Actual Life Cycle Emissions Values*”, and “CORSIA *Sustainability Criteria for CORSIA Eligible Fuels*”.

2.2.2 Certification of an economic operator as LCAF producer requires auditing and certification under requirements issued by an ICAO approved Sustainability Certification Scheme (SCS), in similar prerequisite applied to all CORSIA Eligible Fuels (CEFs).

2.3 CORSIA Approved Sustainability Certification Schemes and their Impact

2.3.1 The latest edition of the ICAO document CORSIA Approved Sustainability Certification Schemes lists three schemes approved by the Council: International Sustainability and Carbon Certification (ISCC), Roundtable on Sustainable Biomaterials (RSB), and ClassNK.

2.3.2 All ICAO-approved Sustainability Certification Schemes (SCSs) are currently authorized to certify economic operators as SAF producers only. None of these schemes is yet approved for certifying operators as LCAF producers. In February 2025, ISCC announced that it had initiated assessments and pilot audits to develop certification requirements for LCAF. However, as of today, LCAF remains without an ICAO-approved SCS.

2.3.3 The ICAO Council is solely responsible for approving any Sustainability Certification Scheme (SCS), based on the technical recommendations of CAEP and its Sustainability Certification Scheme Evaluation Group (SCSEG), which assesses the eligibility of candidate schemes against ICAO requirements. This process is outlined in the ICAO document “CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes”.

2.3.4 At the CAEP/13 meeting, CAEP endorsed a more rigorous submission process for new Sustainability Certification Scheme (SCS) applications. It proposed limiting the submission window for new applications to the period between 1 February and 15 March each year. Additionally, the submission of revised documentation by ICAO-approved SCSs would be restricted to the period between 15 September and 31 October. While these measures are intended to streamline the process, such narrow timeframes may hinder the timely expansion of ICAO-approved SCSs and could contradict key elements of the ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies, as stated in 1.2.2 and 1.2.3 above.

3. CONCLUSION

3.1.1 Without tangible progress in improving certification processes and expanding the number and coverage of approved SCSs, the effective implementation of CORSIA, the LTAG, and the ICAO Global Framework for SAF, LCAF, and other aviation cleaner energies would be at risk. In particular, the current certification landscape has left LCAF behind, limiting its deployment despite its near-term mitigation potential and hindering economic operators, who are technically prepared to produce LCAF, from contributing to ICAO emissions reduction aspirational goals and vision.

3.1.2 If not addressed, this gap could result in the loss of valuable low-hanging emissions reduction opportunities. The absence of an ICAO-approved SCS hinders these operators from contributing to ICAO emissions reduction objectives. Approval of such is therefore essential to enable LCAF as a lever to achieve global climate objectives in aviation and to ensure that ICAO’s aspirational goals are not only credible, but also achievable.

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