



**WORKING PAPER**

**ASSEMBLY — 42ND SESSION**

**EXECUTIVE COMMITTEE**

**Agenda Item 16: Environmental Protection – International Aviation and Climate Change**

**VIEWS ON ICAO'S ACTION TO REDUCE AVIATION'S IMPACT ON CLIMATE**

(Presented by Denmark on behalf of the European Union and its Member States<sup>1</sup>, the other Member States of the European Civil Aviation Conference<sup>2</sup> and EUROCONTROL, and co-sponsored by Japan)

**EXECUTIVE SUMMARY**

The aviation sector is advancing toward its goal of net-zero carbon emissions by 2050, through technology, operational improvements, and greater use of sustainable fuels. ICAO has adopted a tiered monitoring methodology to track progress towards this goal without adding reporting burden.

A new CO<sub>2</sub> standard for aircraft and updates to environmental requirements will drive efficiency. The Global Framework for Sustainable Aviation Fuels (SAF), Lower Carbon Aviation Fuels (LCAF) and aviation cleaner energies aims for a 5% CO<sub>2</sub> emissions reduction by 2030 and emphasises the need of support for States.

ICAO is also addressing non-CO<sub>2</sub> emissions, with further work underway.

As residual emissions will remain, CORSIA and carbon removals are expected to play a role in reaching net zero.

**Action:** The Assembly is invited to:

- a) endorse the LTAG Monitoring and Reporting Methodology approved by the Council at its 235th Session for tracking technical progress towards the LTAG, and to request ICAO to implement this methodology without delay;
- b) task the Council to review regularly the Annex 16 environmental protection standards, considering advances in design and technology;
- c) recognise the ICAO Global Framework agreed at CAAF/3 by updating Resolution A41-21 on climate change accordingly;
- d) recognise in Resolution A41-21 on climate change the importance of understanding and, at the appropriate time, addressing non-CO<sub>2</sub> emissions and their effects on climate, and the key role ICAO has to play in this regard; and
- e) recognise in Resolution A41-21 on climate change that even with ambitious efforts of in-sector measures, residual CO<sub>2</sub> emissions will remain and that other measures will be needed to address these emissions to achieve the LTAG.

<sup>1</sup> Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

<sup>2</sup> Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iceland, Moldova, Monaco, Montenegro, North Macedonia, Norway, San Marino, Serbia, Switzerland, Türkiye, Ukraine and United Kingdom.

<i>Strategic Goals:</i>	This working paper relates to the Strategic Goal – <i>Aviation is Environmentally Sustainable</i> .
<i>Financial implications:</i>	The activities referred to in this paper will be undertaken subject to the resources available in the 2026-2028 Regular Programme Budget and/or from extra budgetary contributions.
<i>References:</i>	Doc 7300, <i>Convention on International Civil Aviation</i> Annex 16 – <i>Environmental Protection</i> Resolution A41-21 A42-WP/368, <i>European Region Environmental Support to the No Country Left Behind Initiative</i>

## 1. INTRODUCTION

1.1 The international aviation sector made significant progress in reducing its environmental impact, particularly regarding greenhouse gas emissions, increasing fuel efficiency and lowering fuel consumption per Revenue Tonnes Kilometres (RTK). However, with air transport expected to substantially grow in the next decades, efforts should continue to address aviation emissions.

1.2 The 41st ICAO Assembly agreement on a collective Long-Term Global Aspirational Goal (LTAG) for international aviation of net-zero carbon emissions by 2050 marked a key milestone, in terms of the international aviation sector taking responsibility for its own emissions. By leveraging technology, operations and SAF, LCAF and other aviation cleaner energies, the carbon emissions should be further reduced but cannot be completely eliminated. Additional measures will be necessary to reach net-zero in 2050.

1.3 To regularly monitor progress on the implementation of all elements of the basket of measures towards the achievement of the LTAG, the Assembly requested the Council to consider necessary methodologies for the monitoring of progress, and report to the 42nd Session of the Assembly in 2025. Regardless of the goal itself, the establishment of a methodology for monitoring the emissions of the international aviation sector and understanding the driving factors behind those emissions is crucial when providing feedback on the sector's progress towards sustainability.

1.4 At its meeting in February 2025, the Committee on Aviation Environmental Protection (CAEP) agreed to recommend to the Council the adoption of a tiered methodology to monitor progress on technical aspects of the Assembly's request. The methodology is both backward and forward looking and for the first tier relies largely on data which ICAO is already collecting from States and industry, thus not creating additional administrative burden. The Council approved the methodology at its 235th session in June 2025.

## 2. PROGRESS ON TECHNOLOGY AND OPERATIONS

2.1 Technology solutions have the potential to lower CO<sub>2</sub> emissions by increasing fuel efficiency through progress made in the technical design of aircraft including their engines. Significant progress has been made in the development of more efficient aircraft, and the expected adoption by the Council of a new standard for CO<sub>2</sub>/fuel burn will drive further innovation in this area.

2.2 The new standard requires all large aircraft with a new type certificate, applying for certification after 31 December 2031, to be 10% more fuel efficient than the current standard. This is a

significant step towards reducing greenhouse gas emissions from international aviation, and the Assembly is invited to recognise the importance of this achievement.

2.3 The regular update of the CO<sub>2</sub> standard will have a positive influence on the fuel efficiency of new aircraft types and will contribute significantly towards achieving the LTAG. It will also lead to cost savings through reduced fuel costs for airline operators. Therefore, the Assembly is invited to task the Council to review regularly the Annex 16 environmental protection standards, considering advances in design and technology.

2.4 In the long term, technology may allow zero-carbon emission flight using electrical propulsion for short distances and hydrogen for medium ranges. The ICAO Council's work to link goals and standards using regulation roadmaps and decision gates will be particularly important for ensuring that, when these technologies reach the appropriate readiness level, ICAO is ready to respond with international standards to facilitate their safe operation worldwide.

2.5 Operational improvements, such as optimised flight planning and air traffic management, also have a crucial role to play in reducing CO<sub>2</sub> emissions from international aviation through reduced fuel consumption. The benefits of operational improvements should be central to the case for and deployment of such improvements both in air navigation and ground operations.

### **3. SAF, LCAF AND OTHER AVIATION CLEANER ENERGIES**

3.1 The Global Framework agreed at the Third ICAO Conference on Aviation and Alternative Fuels (CAAF/3) provides a framework for the development and deployment of SAF, LCAF and other aviation cleaner energies. This framework includes a quantitative ambition of a 5% reduction of CO<sub>2</sub> emissions through the use of SAF, LCAF, and other aviation cleaner energies by 2030, and the Assembly should embed this Global Framework in the climate change Resolution A41-21 and call for its implementation by all ICAO States. The convening of CAAF/4 will be an important moment to take stock of progress since CAAF/3.

3.2 The technical assistance and capacity building pillar of the framework is crucial. Europe is fully committed to continue supporting technical assistance and capacity building efforts, as it has done for years. The list of those projects is enclosed in A42-WP/368. Europe recognises the need for support to be provided based on the specific needs of States in the development and deployment of these types of cleaner aviation fuels. Also, it enhances global cooperation in achieving the 2030 ambition of CAAF/3 as well as providing a basis for future ambitions.

### **4. NON-CO<sub>2</sub> EMISSIONS**

4.1 There are still scientific uncertainties regarding the determination of the climate impacts of non-CO<sub>2</sub> emissions, such as persistent contrails and nitrogen oxides (NO<sub>x</sub>). Significant resources are being dedicated by States, industry and academia to collaborative efforts to improve scientific understanding of this issue.

4.2 ICAO demonstrated leadership through the organization of the first Symposium on non-CO<sub>2</sub> Aviation Emissions in 2024, and the continuation of this effort during the Climate Week in June 2025. Momentum is building for exploring solutions to quantify and address the effects of non-CO<sub>2</sub> emissions. If this can be done without increasing CO<sub>2</sub>, it will further foster aviation's sustainable development. Therefore, the Assembly is invited to recognise in the climate change Resolution A41-21 the importance of

understanding non-CO<sub>2</sub> emissions and their effects on climate, and the key role ICAO has to play in this regard.

4.3 The Council has approved the CAEP work programme for the next cycle, which includes many tasks aimed at understanding and, at the appropriate time, addressing non-CO<sub>2</sub> emissions. Coordination between these tasks is paramount to achieving progress in this challenging field.

## 5. RESIDUAL EMISSIONS

5.1 Even with ambitious efforts to reduce CO<sub>2</sub> emissions from international aviation through in-sector measures (technology, operations and fuels), residual emissions will remain through to 2050 and beyond. The comprehensive LTAG report from 2022, and the subsequent 2025 ICAO Global Trends in CO<sub>2</sub> emissions from International Aviation, clearly recognise this fact.

5.2 It is anticipated that additional measures, such as a possible continuation of CORSIA after 2035, will be needed in order to achieve net zero carbon emissions by 2050. The Assembly is invited to acknowledge the need for the inclusion of carbon removals in the framework of reaching the LTAG, thus aiming to minimise the need for measures outside of the sector.

— END —