Research Report

Committee: (ICAO)

Topic 1: Accelerating the Decarbonization of International Aviation to Prevent Irreversible Climate Damage

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1. Introduction

International aviation is a cornerstone of global connectivity, trade, and development. However, it accounts for approximately 2–3% of global CO_2 emissions, with projections indicating substantial growth in the coming decades if no additional mitigation measures are implemented. As a specialized agency of the United Nations, ICAO is the primary multilateral body responsible for regulating international civil aviation and coordinating global climate action within the sector.

In 2022, ICAO Member States adopted a Long-Term Aspirational Goal (LTAG) to achieve net-zero carbon emissions from international aviation by 2050. The core challenge now lies in accelerating decarbonization efforts while preserving global connectivity, economic development, and equitable participation for developing nations.

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2. Background and Problem Statement

2.1 Emission Sources in International Aviation

Emissions from international aviation stem primarily from:

- The combustion of fossil-based jet fuel (CO_2 emissions)
- Non-CO_2 climate effects (e.g., nitrogen oxides, contrails, induced cirrus clouds)
- Airport infrastructure and ground operations

Because international flights cannot easily be attributed to individual national inventories, effective climate governance requires coordinated multilateral solutions through ICAO.

2.2 Projected Growth in Air Traffic

Demand for air travel is expected to increase significantly, particularly in emerging markets across Asia, Africa, and Latin America. This growth implies:

- Increased aircraft operations
- Expansion of airport infrastructure
- Higher fuel consumption

Without structural reform, aviation emissions risk undermining global climate targets established under the Paris Agreement and scientific guidance provided by the Intergovernmental Panel on Climate Change.

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3. Existing Frameworks and Measures

3.1 CORSIA

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), adopted in 2016, aims to stabilize net emissions from international aviation at 2019 levels by requiring airlines to offset emissions growth beyond that baseline.

Key challenges include:

- Dependence on carbon offset markets

- Variability in offset quality and environmental integrity
- Limited mitigation impact in the context of rising demand
- Voluntary participation during initial phases

3.2 Sustainable Aviation Fuels (SAF)

Sustainable Aviation Fuels are widely considered a central pillar of aviation decarbonization. SAF can reduce lifecycle emissions by up to 80%, depending on feedstock and production method.

Challenges:

- High production costs
- Limited global supply
- Sustainability concerns (land use change, competition with food production) • Unequal global access to production technologies

3.3 Technological Innovation

Long-term decarbonization may depend on disruptive innovation, including: • Hydrogen-powered aircraft concepts (e.g., developments by Airbus) • Next-generation fuel-efficient aircraft (e.g., programs by Boeing) • Electrification of short-haul flights
- Air traffic management optimization to reduce fuel burn

However, most breakthrough technologies are not expected to reach large-scale commercial viability before the 2030s or 2040s.

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4. Core Political and Economic Tensions

4.1 Developed vs. Developing Countries

• Developed countries often possess greater financial and technological capacity to implement SAF and innovation strategies.

• Developing countries express concern about economic disadvantages, reduced connectivity, and unequal financial burdens.

4.2 Market-Based Mechanisms vs. Regulatory Mandates

A central debate concerns whether ICAO should:

• Strengthen market-based instruments (e.g., offsetting schemes), or •

Introduce binding global emissions standards and reduction targets.

4.3 Climate Justice and Equity

Many states invoke the principle of "common but differentiated responsibilities," emphasizing:

• The historical responsibility of industrialized nations

• The vulnerability of Small Island Developing States (SIDS)

• The importance of maintaining air connectivity for remote and landlocked states

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5. Policy Options for Delegates

Delegates may consider the following approaches:

5.1 Global SAF Mandates

• Establishing harmonized global blending quotas

• Creating financial assistance mechanisms for low-income states • Developing robust sustainability certification systems

5.2 Reforming CORSIA

- Tightening offset eligibility criteria
- Reducing reliance on offsetting over time
- Integrating non-CO_2 effects into regulatory frameworks
- Increasing transparency and accountability mechanisms

5.3 Establishing an ICAO Climate Fund

A multilateral fund could:

- Support green aviation infrastructure
- Facilitate technology transfer
- Provide concessional financing to developing states
- Encourage public–private partnerships

5.4 Global Carbon Pricing

- Introducing a levy on international aviation fuel
- Creating a global emissions trading system for aviation
- Redirecting revenues toward sustainable innovation

5.5 Infrastructure and Operational Improvements

- Modernizing air traffic management systems
- Supporting electrification of airport operations
- Encouraging efficiency standards for aircraft fleets

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6. Stakeholder Perspectives

Major Aviation Markets (e.g., U.S., EU Member States, China)

Often prioritize innovation, competitiveness, and gradual implementation. 5

Emerging Economies

Emphasize development rights and fear regulatory burdens that could limit growth.

Oil-Producing States

May resist rapid transitions away from fossil-based fuels.

Small Island and Vulnerable States

Advocate for ambitious climate action while preserving essential connectivity.

Industry Actors (airlines, manufacturers, logistics firms)

Seek regulatory certainty, harmonization, and long-term investment security. 6