

**57th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

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AGENDA ITEM 7: AVIATION AND ENVIRONMENT

**INDUSTRY VIEWS ON DELIVERING A LONG-TERM
CLIMATE GOAL FOR AVIATION**

Presented by the International Air Transport Association (IATA)

SUMMARY

This discussion paper presents industry's view that adoption of a long-term aspirational goal for international civil aviation is critical to supporting industry action to address its climate impacts and enable it to achieve net-zero carbon emissions by 2050. The air transport sector has taken a proactive, collaborative and ambitious approach to dealing with its climate change impact. This discussion paper requests the Conference to support the adoption of a long-term aspirational goal for international civil aviation at the 41st Session of the ICAO Assembly.

INDUSTRY VIEWS ON DELIVERING A LONG-TERM CLIMATE GOAL FOR AVIATION

1. AVIATION'S COMMITMENT TO ADDRESS ITS CLIMATE IMPACT

1.1 After significant analysis, in October 2021 the collective air transport industry raised its climate ambition with a new long-term commitment: global civil aviation operations will achieve net-zero carbon emissions by 2050, supported by accelerated deployment of a comprehensive program of effective emission reduction, energy transition and innovation across the aviation sector and in partnership with governments around the world.

1.2 This follows the Paris Agreement and IPCC 1.5°C special report and an earlier commitment: In 2009, the civil aviation industry set three global goals to address its climate impact: a short-term efficiency improvement goal of 1.5% per annum; a mid-term goal to cap net CO₂ emissions through carbon-neutral growth; and a long-term goal to halve net aviation CO₂ emissions by 2050 compared with 2005 levels.

1.2.1 Through the introduction of new aircraft technologies, more efficient operations and infrastructure improvements, the industry has exceeded its short-term climate action goal with analysis showing a 2.1% improvement on a rolling average – an efficiency improvement of 22.8% between 2009 and 2019¹. Fuel use and CO₂ emissions per RPK have reduced by 54% since 1990.

1.3 The industry is determined to continue and accelerate the efficiency improvements and CO₂ emissions reductions that it has achieved so far. But it also understands the climate challenge requires an even greater commitment, including critical partnership with governments and the energy sector.

1.4 The industry is now starting to progress an energy transition away from fossil fuels. This includes accelerating deployment of sustainable aviation fuels (SAF) produced from a range of sources, including waste, sustainable biomass and power-to-liquid options. In addition, significant innovation and research is underway into potential use of hydrogen and electric propulsion solutions for some aviation operations.

2. IMPLEMENTING MEASURES TO UNLOCK EMISSIONS REDUCTION OPPORTUNITIES THROUGHOUT THE AVIATION SECTOR

2.1 Industry's *Waypoint 2050* analysis² identified several illustrative pathways that will allow global aviation to reach net zero carbon emissions by 2050, confirming a significant reliance on sustainable aviation fuels to meet the decarbonization needs of the sector. The scenarios provide for different adoption rates and deployment of a range of ambitious new technology aircraft (including a push towards hydrogen and electric propulsion from around 2035). Depending on the scenario:

- Between 53% and 71% of aviation decarbonization will need to be delivered through a shift to sustainable aviation fuels – including an evolution from today's SAF sources to opportunities such as power-to-liquid as the production processes mature and costs reduce.
- Between 12% and 34% of the emissions reductions will need to come from the development and deployment of new technologies, including both evolutions in conventional airframe efficiency and radical new technology options such as hydrogen in the more ambitious scenarios.

¹ The impact of the global slowdown in traffic during Covid-19 and the subsequent disruption to normal operating procedures and efficiencies in 2020 and 2021 have been removed from these numbers. ATAG Fact Sheet, 2021

² Air Transport Action Group *Waypoint 2050*, 2021: www.aviationbenefits.org/W2050

- Between 7% and 10% of the emissions reductions will come from continued improvements in operational and infrastructure efficiency. Although this is a small part of the 2050 decarbonization profile, it is vital for both early climate action in aviation, as well as maintaining overall air transport system efficiency. Projects such as air traffic management modernization are key.
- Finally, 6% to 8% of the net-zero goal may need to be achieved through out-of-sector opportunities, dealing with any residual emissions that have not been reduced through mitigation options within the sector.

2.2 The ICAO CAEP ‘LTAG’ analysis follows a very similar trajectory, although adopts a bottom-up approach as opposed to the top-down approach seen in industry analysis such as *Waypoint 2050, Destination 2050*³ and a range of national industry roadmaps. The LTAG report confirms that sustainable aviation fuels will provide the most significant opportunity for carbon reduction before 2050.

2.3 A shift to options such as hydrogen or electric propulsion would still require significant quantities of sustainable aviation fuel to meet the net-zero target⁴. However, analysis in the *Fueling Net Zero* report⁵ shows that the ramp-up in SAF production is achievable, with the right policy support and market signals. Investment in this new energy ecosystem could more fairly distribute energy production across the world and generate or sustain up to 14 million jobs. Importantly, any SAF being used by the sector must meet globally-agreed sustainability criteria to provide the necessary assurance that there is no harm to biodiversity, land-use, food or water systems, or local populations.

3. SUCCESSFULLY DELIVERING LONG-TERM CLIMATE ACTION WILL REQUIRE PARTNERSHIP, COOPERATION AND MUTUALLY REINFORCING COMMITMENTS

3.1 The aviation industry strongly believes the adoption of a long-term aspirational goal at ICAO 41st Assembly will: help the sector unlock resources to achieve emissions reductions by de-risking long-term investments and providing certainty to the capital markets; avoid a market imbalance between competing operators on international routes; ensure a common global framework and ambition on climate action; and a deliver a strong foundation for concerted international action by maintaining ICAO’s leading role in this area.

3.2 As noted in Paragraph 1.1, the industry is committed to reaching net-zero carbon emissions by 2050 across global civil operations (domestic and international). In order to achieve this and continue to provide the benefits of connectivity to the world in a sustainable way, it will require assistance from a range of stakeholders:

3.3 Governments at a global level are encouraged to support action by ICAO to deliver a long-term aspirational goal for aviation climate action at the 41st Session of the ICAO Assembly, and any subsequent work on means of implementation, including capacity building, technology transfer (particularly for SAF deployment) and financing of the decarbonization of the air transport sector.

3.4 Governments at a regional and national level should implement supportive policy environments for technology deployment; infrastructure efficiency improvements (including the full scope of the ICAO GANP); and particularly the energy transition to sustainable aviation fuels and consideration of aviation needs as part of government hydrogen strategies. The coming decade will be vital in making the investment in infrastructure to meet the needs of the sector out to 2050 and beyond. A range of supportive policy measures are identified in Appendix A (in English).

³ *Destination 2050* is a regional aviation industry roadmap to reach net-zero carbon emissions from European aviation: www.destination2050.eu

⁴ It is estimated between 330 and 445 million tonnes of SAF may be required in 2050, potentially an 11,000% increase from the 4.5 million tonnes likely to be used in 2025.

⁵ ICF and Air Transport Action Group *Fueling Net Zero*, 2021: www.aviationbenefits.org/W2050

3.5 The energy sector will need to support the energy transition, with significant scale up in sustainable aviation fuel and alternative energy production around the world.

3.6 Financial institutions – including the multilateral development banks – must understand the strategic importance of air transport connectivity and provide needed investment for the industry in deploying carbon reduction technology, infrastructure and energy systems.

3.7 Customers – including corporate purchasers of airline tickets and individual passengers – can support voluntary offsetting of CO₂ emissions and purchase of sustainable aviation fuel, particularly in the short- and medium-term as ways to help mitigate emissions and support the shift to SAF.

4. ACTION BY THE CONFERENCE

4.1 The Conference is invited to:

- a) *recognize* the progress the sector has made on climate action and acknowledge the ambitious industry long-term goal to reach net-zero carbon emissions from global civil aviation by 2050;
 - b) *note* industry’s view that adoption by Governments of a long-term aspirational goal for international civil aviation is critical to supporting industry action to address its climate impacts and enable it to achieve net-zero carbon emissions by 2050;
 - c) *support* the adoption of a sector-wide ICAO long-term aspirational goal for aviation climate action, in line with the Paris Agreement stretch goal of 1.5°C and backed by the latest scientific advice on limiting the worst impacts of climate change, at the 41st Session of the ICAO Assembly this year;
 - d) *support* the development of a work-program by ICAO Council, with the full support and collaboration of industry, to determine the means of implementation for such a long-term goal for aviation climate action including, for example: the need for global policy action on sustainable aviation fuel deployment; assistance with State Action Plans in line with the new goal; and capacity building for States in need of support; and
 - e) *encourage* States to take action, such as those described in Paragraphs 3.3 and 3.4 to support progress towards the long-term aspirational goal within their own capabilities and with assistance from ICAO and other States in capacity building, technology transfer and financing.
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APPENDIX A

ACTION ITEMS FOR MEMBER STATES TO HELP DELIVER NET ZERO 2050

There are a number of broad means of implementation that ICAO can assist with, but much of the policy work needs to be done at a national (or regional) level to help ensure aviation's long-term climate goal and support industry decarbonization. Below is a list of potential action items from governments. The full list, including action items for other stakeholder groups, can be found in the *Waypoint 2050* report.

Action items and policy proposals for governments: technology

Action item	Description	Timeline	Difficulty
Continue to fund research programs where they exist and develop projects where they do not	In the coming years, government must ensure that access by aerospace industry to ongoing funding for high-value collaborative R&D, essential for delivering highly efficient future aircraft and propulsion systems, remains in place. Examples include the Clean Aviation Partnership project in the EU.	2020-2030	■ ■ □ □ □
Provide strong guidance to green aviation research	Execute a national or supra-national research agenda that places the highest priority on advances in environmentally friendly aviation, including radical new aircraft concepts, new sustainable propulsion energies, such as electricity and hydrogen, and highly efficient operations and infrastructure.	Possible today	■ ■ □ □ □
Research into non-CO2 impacts also vital	Expand the focus from 'CO2 emissions reduction' to 'climate impact mitigation', considering also the impact of non-CO2 effects and how technology and adapted flight operations can reduce these effects. Some research is already ongoing in this space and while there is better understanding, the work has so far not provided conclusive operational or technology fixes and answers for the industry.	Already underway, can be expanded immediately.	■ ■ ■ □ □
If putting in place a market-based measure, invest a portion in R&D	As global and regional market-based measures are adopted, Governments should invest a portion of any funds collected in aircraft and propulsion technology that accelerates the sector's path to reducing CO2.	Available today	■ □ □ □ □
Implement ICAO aircraft CO2 Standard	The ICAO CO2 Standard should be implemented in national legislation.	Required today	■ □ □ □ □
Develop a wider hydrogen economy strategy for all potential users of hydrogen	Build a coalition of potential users and providers of green hydrogen in your country / region to start planning for a significant increase in hydrogen use by transport, including aviation. More generally, the changing energy needs of the aviation sector should be included in national energy strategies.	Possible today	■ ■ ■ ■ □
Ensure sufficient infrastructure for low-carbon electricity across your economy	Support the introduction of hybrid-electric and full-electric propulsion, as key enablers to reach medium- and long-term CO2 emissions reduction goals.	2020-2050	■ ■ ■ ■ □

Action items and policy proposals for governments: operations and infrastructure

Action item	Description	Timeline	Difficulty
Make military air space flexible use	Large blocks of airspace are controlled by military and are often unavailable for civil operations. A number of States have successfully implemented flexible use of this airspace – handing it over to civil air traffic management when not in use by military and allowing much more direct routing of aircraft. Could reduce emissions significantly over a number of States.	Available immediately	■ ■ □ □ □

Implement the ICAO Aviation System Block Upgrades	<p>The ICAO Global Air Navigation Plan (GANP) sets out a series of Aviation System Block Upgrades or technology modernization projects focused on four performance improvement areas: airport operations; global interoperable systems and data; optimum capacity and flexible flights; and efficient flight paths. The initiatives reflect consensus around the series of technologies, procedures, and operational concepts needed to meet future capacity and ATM challenges.</p> <p>An analysis by ICAO found that if implemented Block 0 and 1 elements would deliver global fuel and CO2 savings of between 1.6 – 3.0% in 2025. Governments must carry through implementation plans for this vital project.</p>	Already underway, block 1 technologies are scheduled for 2019-2023	■■■■□□
Develop new systems for regulators to progress on national, regional and global harmonization of standards	Regulators need to accelerate the change process without sacrificing safety. With closer aircraft manufacturer, regulator and ANSP focused collaboration, the development of guidance material, criteria, and policies for new operational capabilities could likely be reduced from 5-10 years to 3-5 years. Having regulator participation supports the assurance that new investments will be returned in the form of cost savings, capacity enhancements, and other direct benefits.	Possible today	■■□□□□
Encourage and fund comprehensive intermodal planning	Bringing together particularly rail and aviation operations for seamless mobility between transport modes. To be effective, long-haul air passengers should be able to transfer to appropriate rail connections to nearby cities with ease of access (ideally connections in the airport terminal) and on a single ticket. Rail infrastructure expansion should be seamless with airport facilities, where possible, to ensure the greatest uptake by passengers.	Possible today	■□□□□□
Ensure balanced comparison of transport modes	Designing the solutions for the future sustainable mobility of citizens requires a thorough assessment of all environmental aspects for those transport modes which can be complementary. There is a need to avoid policy decisions made by only looking at one environmental aspect.	Possible today	■■□□□□

Action items and policy proposals for governments: sustainable aviation fuels

Action item	Description	Timeline	Difficulty
Clean energy transition push across government	Commit to supporting an energy transition through significant investment in sustainable aviation fuels. This can help drive new energy industries and re-use refining and other infrastructure.	Required from today	■■■■■□
Pursue partnerships for SAF scale-up	Launch SAF partnership and cooperative projects bringing together local aviation industry stakeholders, energy suppliers, research institutions and potential feedstock suppliers.	Possible today	■■□□□□
Pursue partnerships for SAF scale-up	Engage in public-private partnerships for sustainable aviation fuel production and supply.	2020-2025	■■□□□□
If putting in place a market-based measure, invest a portion in SAF	As global and regional market-based measures are adopted, Governments should invest a portion of the funds collected in SAF and SAF R&D that accelerates the sector's path to reducing CO2.	Available today	■□□□□□
Prioritize aviation (and other hard-to-abate sectors) as a user of alternative fuel	Set priorities for the sustainable energy mix in your country to ensure that the right type of low carbon energy is developed for each sector – aviation does not have alternatives at this time, particularly for long-haul operations and so should be seen as a priority user of feedstocks for liquid fuels.	Possible today	■■□□□□
Prioritize aviation (and other hard-to-abate sectors) as a user of alternative fuel	Road transport has historically had more advantages for feedstock use, making aviation use of these resources uneconomical – this situation should be reversed.	Possible today	■■□□□□

Explore potential for SAF development at a national or regional level	Undertake local supply opportunity audits to investigate where potential SAF could be developed.	2020-2025	■■■□□
Support innovation into new energy alternatives	Support sustainable aviation fuel R&D and demonstration plants with academic and research organizations across the range of feedstock sources.	2020-2040	■■□□□
Support development of SAF production	Attract capital to expand SAF capacity through loan guarantee programs for construction of SAF production facilities (de-risking the early investment anxiety for new technologies).	2020-2035+	■■■□□
Support development of SAF industry	Direct research and development activities for local SAF production pathways and new energy industries.	2020-2025	■■■□□
Support development of SAF industry	Commit to policy certainty, or, at a minimum, policy timeframes that match investment timeframes.	2020-2030	■■□□□
Demonstrate leadership	Commitment for government travel to be undertaken on SAF, either directly or through book-and-claim options initially.	Possible today	■■□□□
Demonstrate leadership	Adopt globally-recognized sustainability standards and work to harmonize global standards.	2020-2025	■■□□□
Demonstrate leadership	Encourage user-friendly sustainable aviation fuel accounting methods and work to harmonize global standards.	2020-2025	■■□□□
Provide incentives for airline use of SAF	Make SAF zero-rated under carbon taxation or other market-based measures, if they are being developed.	2020+	■■■□□
Blending or production incentives for SAF producers or suppliers.	Ensure existing policy incentive frameworks, often designed for ground transport, also include aviation and evaluate higher incentives for aviation over ground transport which has other energy alternatives.	2025+	■■□□□
Take a global leadership role in managing the aviation energy transition.	Showcase Government action at a regional and global level by championing SAF opportunities with other governments and at ICAO.	2020-2030	■■□□□

- In addition, *Guidance on potential policies and coordinated approaches for the deployment of Sustainable Aviation Fuels* has been developed by ICAO.
- The Governments of Kenya, the Netherlands, Singapore, the United Arab Emirates and United Kingdom developed the Sustainable Aviation Fuel Policy Toolkit in 2021: www3.weforum.org/docs/WEF_Clean_Skies_for_Tomorrow_Sustainable_Aviation_Fuel_Policy_Toolkit_2021.pdf

Action items and policy proposals for governments: market-based measures

Action item	Description	Timeline	Difficulty
Support CORSIA	Volunteer for the early stages of CORSIA (as of publication, 112 countries have done so) and take part in capacity building to ensure CORSIA is successful. For those States exempted from the mandatory phase from 2027, commit to participation in CORSIA anyway.	2020-2035	■□□□□
Ensure CORSIA continues to evolve	Work with other States at ICAO to ensure CORSIA meets the intended environmental ambition and remains fit for purpose. Ensure CORSIA's standards are maintained and new offset opportunities are evaluated (based on rigorous sustainability criteria) on a regular basis.	2020-2035	■■■□□
Set a long-term CO2 goal	Through ICAO, set a long-term CO2 goal for international aviation at the 2022 ICAO Assembly compatible with the most recent scientific evidence from the Intergovernmental Panel on Climate Change.	2020-2022	■■■□□
Do not duplicate market mechanisms, base any domestic measures on CORSIA principles	CORSIA should be the single robust market mechanism on international flights, to avoid duplication and danger of market distortions. If States wish to deploy market-based measures on domestic flights for climate reasons, the industry encourages the use of the CORSIA framework to ensure ease of compliance and a reduction in duplication of systems and monitoring.		■□□□□

If putting in place a market-based measure, invest in in-sector CO2 reductions	As global and regional market-based measures are adopted, Governments should invest a portion of the funds collected in SAF, SAF R&D and technology R&D (among other opportunities) that accelerate the sector's path to reducing CO2.	Available today	■□□□□
Work with fellow governments to conclude UNFCCC Article 6 discussions	Whilst CORSIA is a standalone scheme, it will rely on carbon credits traded across international jurisdictions. The establishment of global standards for such transactions is vital and Article 6 of the Paris Agreement needs to be agreed for this to really thrive.	2020	■■■□□
Promote development of carbon capture opportunities	Carbon capture – particularly direct air capture – is a vital component of long-term carbon removal and is a key component for allowing the world to meet the Paris Agreement goals	2020-2050	■■■■□
Develop robust forestry accounting standards with other States and promote forestry offset development	Cooperation is needed between private sector and government-led forestry programs, e.g. jurisdictional-level approaches and nested REDD+ projects, within national or subnational accounting systems.	2020-2025	■■■□□

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