



DECARBONISING AVIATION FROM THE GROUND UP

From infrastructure to flight, embarking on a comprehensive path to achieve net-zero emissions

Planning for the future of aviation is a multifaceted endeavour that must include decarbonisation at the heart of all efforts. Before the pandemic, aviation was responsible for just over 2 percent of global carbon emissions,¹ and this number was projected to grow quickly because of the rapid growth in air travel. Rebounds in air travel are expected over the next several years.

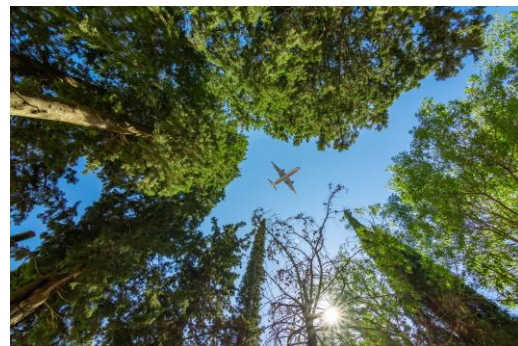
The sector has increasingly recognised the importance of reducing greenhouse gas (GHG) emissions and has already taken notable mitigating steps. Moving forward, to do its part in limiting the global temperature rise to not more than 1.5 degrees Celsius above preindustrial levels by 2050,² aviation must embark on a comprehensive path to achieve net-zero emissions.

The options to reduce aircraft emissions fall into four main categories:

- Improved aircraft and engine design – to improve fuel efficiency
- Improved airspace management – to minimise fuel consumption per journey
- Low-carbon power³ – battery-electric propulsion, hydrogen fuel cell technology, and sustainable aviation fuels (SAFs)

- Market-based mechanisms – to offset carbon emissions

Research continues to improve the viability of hybrid-electric and electric aircraft. These alternative technologies, while not poised to power large aircraft imminently, hold promise to increasingly power short- and medium-haul flights over the next decade and beyond. In light of this reality, continued concerted efforts are needed to bring about policies that will enable the commercialization of SAFs to reduce the impact of long-haul flights. Government backing will also be vital to encourage and support the development of green technologies. Airlines and airports can lead the development of SAFs through purchase agreements with suppliers and/or investments in SAF supply. Such steps can help SAFs become affordable alternatives to traditional fossil-based fuels. Taking hybrid to an even greener level, hybrid-electric planes could be designed to be SAF compatible, especially as the aviation sector continues to ramp up the utilisation of these newer technologies.



¹ IATA, Aviation & Climate Change Fact Sheet – April 2021; in addition, according to a Manchester Metropolitan University-led international study: when the non-CO₂ impacts were factored in, aviation's part was calculated to be 3.5 per cent of all human activities that drive climate change.

² Sustainable Development Goals, Partnerships Platform, Business Ambition for 1.5°

³ Considers the impact of production/manufacture— low carbon but not zero.

Collective Action

For more than 10 years, the airport industry has embraced the global Airport Carbon Accreditation (ACA) programme, which provides a certification framework for airport carbon emissions management and reduction. This voluntary initiative was co-developed by Airports Council International (ACI) Europe and WSP,⁴ and has become the international global standard for managing airport carbon emissions to support a climate-smart future. It has grown to include more than 330 airports, collectively located in more than 70 countries.

ACA delivers carbon-emissions improvements, as a combination of reductions and offsets, exceeding 1 million tonnes every year, and already has more than 60 airports certified as carbon neutral. In 2019, the ACI Europe Resolution committed Europe's airports to be net-zero carbon by 2050 for emissions directly under their control. More recently, in 2020, ACA introduced two new accreditation levels, *Transformation and Transition*, which commit airports to an emissions reduction trajectory consistent with keeping a global temperature increase to less than 2 degrees Celsius.

Aviation's continued commitment to address emissions from aircraft—the main source of sector emissions—is well represented by CORSIA, the Carbon Offsetting and Reduction Scheme for International Aviation developed by the International Civil Aviation Organization (ICAO), a United Nations agency. CORSIA, an international sector-based approach to carbon-emissions reduction and offsetting, entered a pilot phase this year.

Whilst offsetting has a very important role to play in the transition to zero-carbon aviation,

ultimately aircraft will need low- and zero-carbon fuels and radically different propulsion technologies, as outlined in IATA's Aircraft Technology Roadmap.⁵

Designing the Path to 2050

Whilst the recovery in global passenger traffic post-pandemic is likely to take some time, over the longer term the number of people flying is still expected to increase significantly, potentially doubling to 8.2 billion in 2037 from 4.4 billion in 2018.⁶ More aircraft and more ground infrastructure will be needed to support this significant growth.

The rise in air travel traffic is expected to outpace the gains made in reducing aircraft emissions through efficiency measures and technological advances over the next 20–30 years. Despite this unsettling projection, initiatives launched by ICAO, IATA and ACI, demonstrate that meaningful progress is achievable—through close attention to each impact point in the emissions chain. Progress also requires greater collaboration between the main players in the sector, perhaps along the lines of the recently launched UK Sustainable Aviation coalition.⁷ This effort brings together airlines, airports, manufacturers and air navigation service providers in a collective approach to developing a low-carbon future.



⁴ The ACA programme has been administered by WSP since its launch in 2009

⁵ IATA, Aircraft Technology Roadmap to 2050

⁶ IATA projections

⁷ Sustainable Aviation

While airports' ground operations and construction of airport infrastructure account for a relatively small proportion of the total global greenhouse gas emissions from aviation today, they are likely to attract escalating levels of scrutiny as the aviation sector takes an all-inclusive view of emissions sources, not just those generated by aircraft. This perspective is also likely to include the carbon impact of putting new infrastructure in place as airports expand to handle the anticipated growth in air traffic demand.

The path to cut emissions involves a host of measures, including increased use of electric vehicles; a heightened focus on energy efficiency and low carbon technologies; a shift to renewable energy sources; partnerships to support the introduction of new aircraft technologies; and more efficient use of airspace. Airports will need to take a closer look at the emissions sources they control directly and develop an encompassing plan to reduce them to zero. They will also need to look hard at how to work with others to reduce the indirect emissions from assets and processes that the airport does not control, but can influence—for example, companies operating on the airport site and passengers and staff travelling to and from the airport.

Global Collaboration

Tackling one of the most pressing global challenges requires strong measures from business sectors and societies worldwide. Aviation, today one of many sectors contributing to the global GHG emissions problem and arguably the most difficult to decarbonise, must lead by example if it wants to maintain its social license to operate and grow. Meaningful progress depends on the collective will and commitment demonstrated by diverse stakeholders as well as a supportive

environment established by government—concerning policy, regulation and innovation—with guidance on how to meet achievable targets. Innovative thinking and collaborative efforts are integral to the advancement of cleaner global aviation within countries and across continents as the world continues its journey to the pivotal mid-century destination of net-zero emissions. Leading by example would not only position aviation for a bright future, it would confirm that decarbonisation is possible for all sectors contributing to the world's climate-change challenge.

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