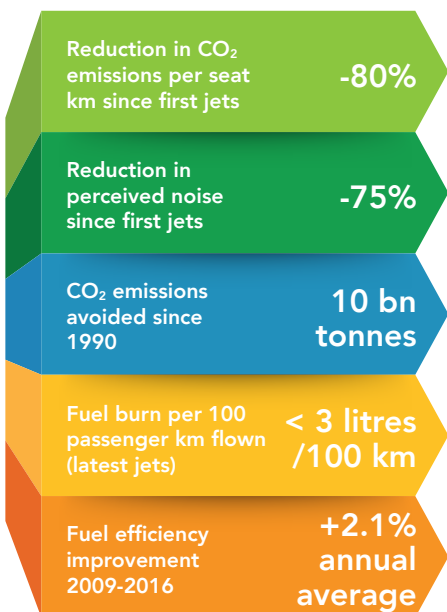




Credit: iStock.com/Thissatan

Fresh thinking on climate action

To achieve a sustainable future, the entire aviation industry must cooperate to meet environmental responsibilities.



Air transport has recognised its responsibility.

Environmental mitigation is arguably the most important issue facing aviation today.

Air transport has recognised its responsibility for over a decade and set itself three tough targets unmatched by any other industry:

- 1) A fuel efficiency gain of 1.5% per annum
- 2) Carbon neutral growth from 2020
- 3) A 50% reduction in CO₂ levels by 2050 compared with 2005.

Although there is no silver bullet, the industry has adopted a range of environmental mitigation actions to reach its goals and achieve a sustainable future.

These have been contained within a four-pillar strategy based on operations, infrastructure, technology and market-based measures.

Powering sustainability

Of recent industry work, two areas are particularly noteworthy. Sustainable aviation fuels (SAF) continue to develop and proliferate. The challenge is to accelerate the uptake. Though SAF are a proven technology – the first flight using a SAF blend was in 2008 – SAF only represent 0.01% of total fuel use.

Government involvement through the correct policies and economic incentives is essential to push this figure higher. Simply, SAF prices need to be come down substantially.

“Sustainable aviation fuel already powers a small percentage of flights, demonstrating aviation’s commitment to reducing its carbon footprint,” says the Director General of the International Business Aviation Council, Kurt Edwards.

“However, its wide availability at competitive prices remains a key hurdle. Industry urges governments to implement policies to incentivise the production and up-take of SAF to meet long-term CO₂ reduction goals.”

Supply will also be a key driver. SAF plants are slowly coming online and publicly announced projects should help SAF achieve 1% of total fuel use by 2025 – equivalent to approximately 3.5 billion liters annually. A sixth SAF certification pathway due for approval late in 2019 or in 2020 will be equally vital. The process will be based on biodiesel, which is available in large quantities, and so could lead to a significant increase in SAF.

Secondly, market-based measures took a significant leap forward with ICAO-level agreement on a Carbon Offset Reduction Scheme for International Aviation (CORSIA).

The scheme will offset 80% of the post-2020 growth in international aviation CO₂, mitigating around 2.5 billion tonnes of CO₂. It is the first market mechanism to be rolled out for a single global sector and will help mitigate the growth in air transport emissions while longer-term solutions for CO₂ are being ramped-up.

“The ATM industry is working with our partners and States to improve the environmental performance of aviation. From implementing new operational procedures to adopting the latest technologies, our members are playing an important role in developing sustainable air transport. We welcome the collaborative steps being taken to realise this.”

Simon Hocquard, CANSO Director General

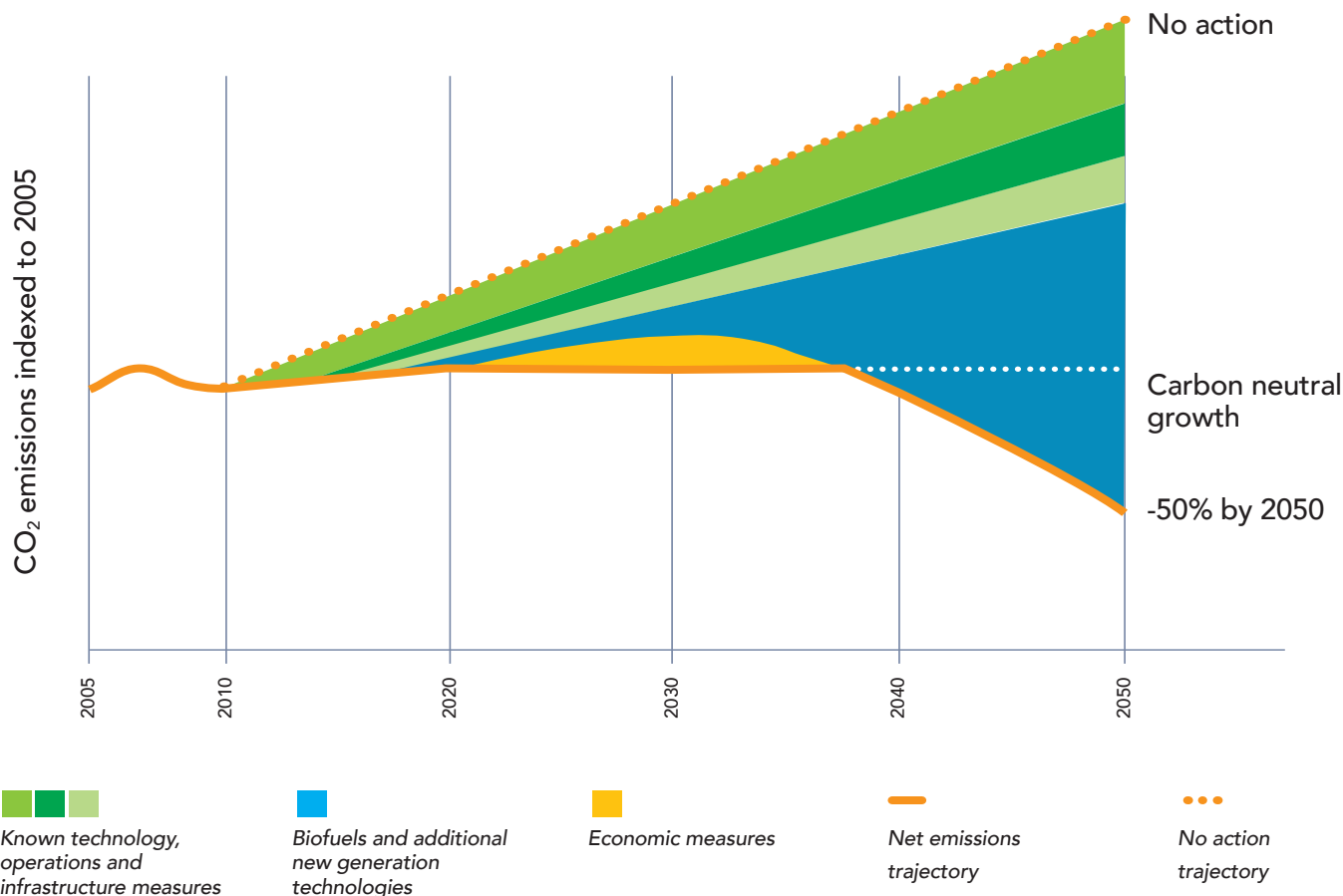
Airlines have already started the process to monitor, report and verify emissions from their international flights in preparation. Eighty-one countries are involved in the voluntary phase of CORSIA with more expected to join. Over \$40 billion in climate finance is expected to be generated through the scheme.

Efficient routes

Air navigation service providers (ANSPs) also have a role to play in ensuring aviation meets its environmental responsibilities. “As passenger numbers look set to double over the next two decades, the air traffic

management (ATM) industry is continuing to develop a range of measures to improve the efficiency of aviation and support safe, seamless and sustainable air transport,” says Simon Hocquard, Director General, CANSO. “From implementing new operational procedures to adopting the latest technologies, the ATM industry has an important role to play in improving the efficiency of aviation, reducing flying time and fuel burn, and building a strong and agile global transport network for the future.”

The goal for ANSPs is to enable aircraft to fly the most efficient and flexible routes, saving time and therefore reducing fuel burn and



Source: EUROCONTROL

The “Basket of Measures” is aviation’s four-pillar strategy aimed at meeting its ongoing environmental responsibilities.

NATS study

Aviation's environmental footprint is coming under increasing public scrutiny as movements such as "Flying Shame" generate media attention.

According to NATS' annual study of attitudes to flying, 60% of respondents wanted to see reducing emissions made the top priority for the aviation industry. Yet the number of people who believe flying should be discouraged fell from 47% to 40%, even if this might have a negative impact on the environment.

More people are willing to pay some form of climate change levy to assist environmental efforts – the number agreeing rising from 30% to 38%.

"What these results show us is that people are concerned about the real impact aviation has on our environment, but that flying and global connectivity is also totally intrinsic to our way of life," says Ian Jopson, NATS Head of Environment. "What's needed is a way to radically improve the efficiency of every flight, part of which is down to more efficient aircraft, but we can also make a big contribution by transforming how our airspace is structured and managed."

NATS alongside many of the UK's major airports will be bringing forward proposals for how to modernise the UK's airspace at the end of next year to help radically improve flight efficiency. Measures are likely to include keeping aircraft higher for longer and cutting the amount of fuel-thirsty, low-level stack holding at airports.

the corresponding emissions. One pathway to this ideal is through performance-based navigation (PBN), where greater positional accuracy leads to improved trajectories.

In the Dominican Republic, for example, local ANSP, IDAC, is using PBN to save approximately 20,000 nautical miles (NM) a month while COCESNA – the Honduran ANSP – cut over 18,000 tonnes of CO₂ in 2018 thanks to PBN and is set to register even bigger savings this year.

Free route airspace (FRA) in Europe, meanwhile, is making an enormous difference to congested skies. In 2017, the implementation of FRA in Europe saved one million NM. This figure will only grow as FRA becomes more widely adopted. EUROCONTROL estimates FRA has already delivered 2.6 million tonnes of CO₂ emissions savings since 2014.

Collaborative measures

Among the many developments in ATM are air traffic flow management (ATFM) and collaborative decision-making (CDM), which rely on cooperation and the sharing of information to improve traffic flow in a coordinated manner.

Multi-Nodal ATFM has delivered qualitative and quantitative benefits in Asia Pacific. Alongside enhanced safety and predictability, it has enabled significant fuel burn and emissions reductions.

The Civil Aviation Authority of Singapore (CAAS) estimates ATFM has cut 43,000 metric tons of emissions at Changi Airport. In addition, CDM has allowed CAAS to optimise the departure sequence and reduce take-off waiting time of flights at the runway holding point. On average during

peak departure periods, departures can experience a reduction in taxi-out time of approximately 90 seconds.

Across the world in Argentina, the successful implementation of CDM between air traffic control, airlines and the regulator in October 2018 led to the modification of 43% of the route network. The optimisation has saved 11 million litres of fuel, 44,000 tons of CO₂ and USD29 million in operating costs for domestic flights.

Continuous descent and climb operations, space-based automatic dependent surveillance – broadcast (ADS-B) and digital towers will also help ATM streamline the network and operations to ensure environmental gains.

Other green initiatives going forward will rely on big data and artificial intelligence. A case in point is a NATS analysis of actual flown data versus flight plans that showed one airline carried an extra 550kg of fuel in anticipation of flying at lower altitudes but rarely had to do so.

Similarly, the Maastricht Upper Area Control Centre (MUAC) uses big data to report on the efficiency of the capacity planning process, past air traffic regulations and controller workload. The findings feed into tactical decision-making and future planning.

Artificial intelligence will help to process large amounts of data fast and accurately. By making it easier for ATCOs to predict and avoid situations that could become critical, safety, capacity and efficiency will be improved throughout ATM.

Automation will be crucial in this regard. Experts anticipate that automation will enable global, real time, predictive and more complex decision-making and will be especially important as drones proliferate. System-wide information management (SWIM) is ATM's main development in this regard.

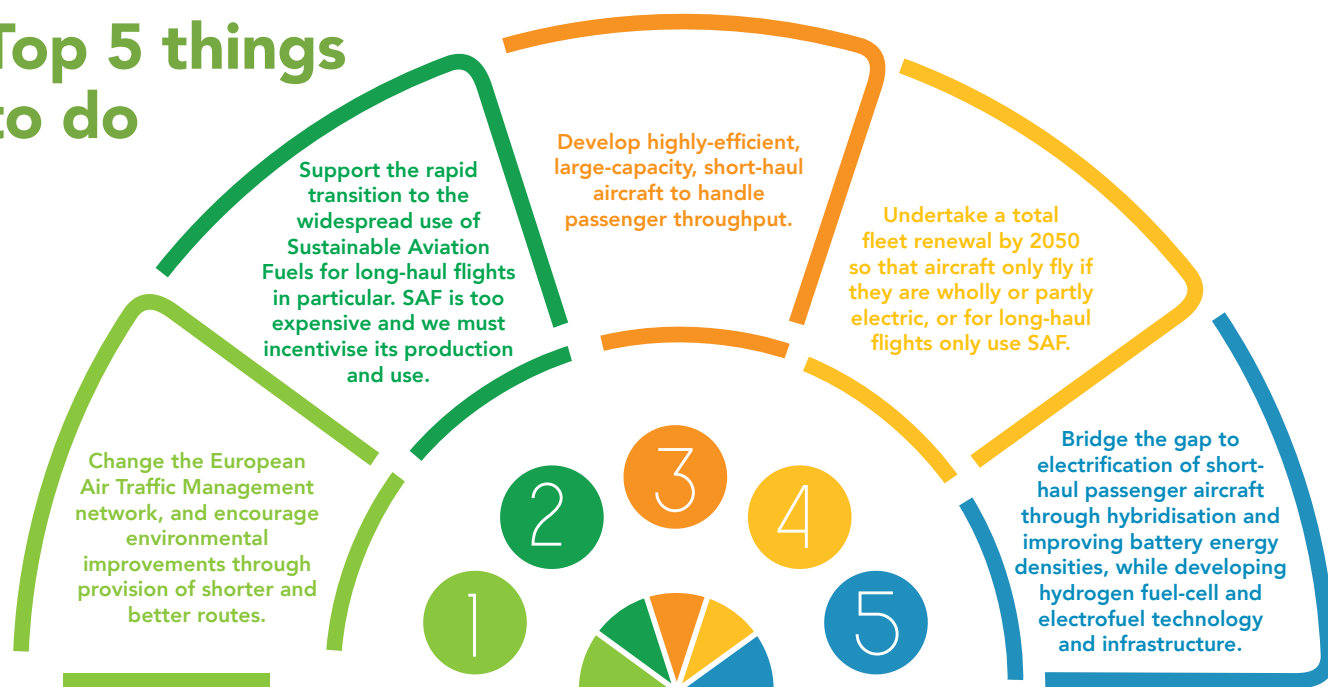
2050 focus

The industry is now seeking a timeframe for agreement on a long-term target to reduce CO₂ emissions from air transport. Speaking on the sidelines of the UN Climate Action Summit, Michael Gill, Executive Director of the cross-industry Air Transport Action Group said: "Aviation helps power the global economy and provides connectivity to families, business and society whilst also supporting 65.5 million jobs. It is growing to meet the needs particularly of developing economies, but we also recognize that with growth comes responsibility."

"Along with its commitment to CORSIA, the aviation industry has invested billions in measures and practices which have made significant progress in reducing its environmental impact. This is a global challenge that requires a coordinated global response. Collaboration across the whole industry is needed to reduce emissions and airports remain committed to the active steps needed to address the environmental impact of operations."

Angela Gittens, Director General of Airports Council International

Top 5 things to do



According to a EUROCONTROL paper, net zero carbon aviation by 2050 will require a focus on five key areas.

“The industry is committed to further reducing its climate impact – already a flight taken by a passenger today will produce half the CO₂ that the same flight would have in 1990 – and our existing industry long-term goal to halve net total CO₂ emissions by 2050 remains a robust and ambitious focus for industry action in line with the Paris Agreement,” he continued. “We urge governments also to adopt a pathway towards a UN-backed long-term goal for aviation and set in place the right policy environments to meet the needs of that goal. Importantly, those policies must be implemented by governments in the short-term to help build a foundation for meaningful long-term reductions in CO₂: we can’t wait until 2049 to take action.”

EUROCONTROL’s report on decarbonization notes that “ATM’s “benefit pool” is finite and will eventually run dry, as efficiency improvements currently planned are delivered. Indeed, it may be challenging to maintain efficiencies as traffic grows”.

It suggests, therefore, that ATM will also need to turn its attention to the safe introduction of new types of aircraft into congested airspace and airports, so that “neither a drop of SAF, nor a kilowatt-hour of electrical energy”, is wasted.

It also advises ANSPs in Europe to look at the route charges system, through which aircraft operators pay for air traffic control-related services, to incentivise green flights. “This is perhaps an underappreciated tool that ATM could use to support decarbonisation of our industry,” the report concludes. ➔

“The most promising means to achieving a sustainable future is with sustainable aviation fuels. Airline investments in SAF have powered hundreds of thousands of commercial flights. But the potential of SAF is far from being realised because costs are too high. Governments must play their role and set a comprehensive policy framework to support the commercialisation of this critical key to sustainability.”

Alexandre de Juniac, Director General and CEO of the International Air Transport Association



Airbus E-FanX – a short-haul hybrid-electric aircraft demonstrator due to fly in 2021.

Credit: Airbus