The aviation industry aims to cut its environmental footprint and contribute to society’s shift towards decarbonisation. In order to meet the goals of the Paris Agreement, air travel will have to make emission cuts and now the discussion is focusing on how exactly to do that.

International aviation has pledged to offset all emission growth as of next year but changes to how aircraft are actually operated are also in the offing. Options range from greening the types of fuel used to completely changing how planes are powered.
Contents

Jet-zero: How aviation aims to clean up its emissions act 4
Airline exec: EU should incentivise production of green fuels 6
The benefits of Sustainable Aviation Fuel go beyond CO₂ 8
Aviation is on the cusp of what could be a green revolution, as pressure to reduce greenhouse gas emissions and new initiatives aimed at reducing clean power costs begin to capture attention.

Aviation accounts for just under 4% of the EU’s total CO2 emissions and, before the coronavirus pandemic decimated demand, passenger numbers and pollution were expected to grow consistently under a business-as-usual scenario.

The industry expects to mount a recovery once the virus is easier to manage via a mass rollout of effective vaccinations, although the timeframe is still unclear. Some analysts predict it will take two to three years for numbers to recover, while others are more pessimistic.

Cutting emissions will have to be a part of that rally, as governments start to crack down harder on polluters with broad environmental policies, such as the EU’s Green Deal. There are already signs that it is starting to affect how aviation does business.

Filip Cornelis, head of aviation at the European Commission’s mobility directorate, pointed out at a virtual event on 2 December that transport as a whole will have to cut emissions by at least 90% in order for the EU to hit its 2050 carbon-neutrality target.

“We should use the recovery as an opportunity for aviation to put itself on a new path and accelerate its decarbonisation. I believe the industry is supporting that approach,” the DG MOVE official insisted.

International aviation has already pledged to offset all future growth as part of a UN-led scheme, which will see airlines paying into certified renewable energy and afforestation projects. However, the so-called CORSIA system does not cap emissions.

That is why more widespread use of greener sustainable aviation

Continued on Page 5
fuels (SAFs) – produced using waste streams or renewable energy – and an eventual rethink of how aircraft are actually powered are now realistic options for the industry.

Cornelis also cited air traffic management reform, under the Single European Sky initiative, research and development into new propulsion systems, led by the Clean Sky Joint Undertaking, and the upcoming ‘RefuelEU’ initiative on SAFs.

That proposal is supposed to be released by the Commission in the first quarter of 2021.

Thorsten Lange, head of renewable aviation at Finnish refiner Neste, insisted that net-zero emission goals explicitly entail “a radical change across the entire economy and doing away with fossil fuels and other sources of emissions wherever possible”.

Lange said the EU’s 2050 target means that for every tonne of CO2 emitted, the same amount will have to be removed. This is where SAFs can make an impact, he added, as it largely locks in carbon that has already been emitted and also slashes non-CO2 pollution.

SAFs can reduce emissions by over 80% compared to normal jet-fuel and refiners like Neste are investing huge sums in trying to increase that number and broaden the types of waste streams that can be used.

Chemically-identical to kerosene, it can be used in existing engines and current standards permit a 50% blend, which Boeing recently demonstrated. Engine-maker Rolls-Royce in November started testing a 100% blend.

Cornelis added that ‘RefuelEU’ will aim to ramp up the production and use of SAFs but also make progress in scaling up power-to-liquids technology, which can be used to convert surplus renewable energy and CO2 into synthetic kerosene.

“This is an important dimension of the initiative as all of our projections show us that we will need a lot of synthetic fuels, as the biofuels side of things will reach a limit,” the official explained, adding that providing investment security will be a crucial part of the process.

Scandinavian Airlines executive Lars Andersen-Resare explained how flygskam-afflicted passengers can already contribute by opting to purchase SAF blocks when they buy tickets, which helps add to demand.

RefuelEU might set an EU-wide blending mandate for SAFs, which would oblige airlines to use a certain percentage of the fuels in every flight. Norway already sets such a rule, while Finland and Sweden, a major part of SAS’s network, are on the cusp of setting their own criteria.

“There are still some topics that need to be addressed such as who will actually get the emissions reduction [credit] and we are a little worried that it might be someone other than aviation,” Andersen-Resare warned.

He also cited the development of electric-battery technology, as well as the airline’s involvement with Airbus in its new hydrogen-power development project, as important milestones in aviation’s green flightpath.

Europe’s premier aerospace firm recently said it hopes to put a commercial airliner fuelled by zero-emission hydrogen into service by 2035, while electric aircraft are gradually increasing their range and receiving regulator approval.
Airlines are at the forefront of changes made to the aviation industry. When it comes to what to fuel aircraft with, carriers are increasingly turning to greener options. EURACTIV spoke to an airline executive about that shift.

Aerospace firms are currently in the process of developing planes that are powered by alternative energy sources such as electric-battery and hydrogen power. But the technological step-change needed to put those designs into service is massive.

Airbus announced earlier this year that it is beginning work on building hydrogen-fuelled aircraft but does not expect them to start flying passengers until 2035. Electric planes are already taking to the skies but limitations restrict their potential use in commercial aviation.

One option that is increasingly emerging as a realistic decarbonisation

Continued on Page 7
measure is sustainable aviation fuel, which can be produced using waste materials and renewable energy. It is chemically identical to kerosene so can be used in existing jet engines.

But the fuels are more expensive than their fossil counterpart and airlines are currently unable to build a business case for a complete switch. The sector has called on regulators and lawmakers to get their act together and help cut the price gap.

Lars Andersen Resare is head of environment and corporate social responsibility at Scandinavian Airlines (SAS).

To what extent is SAS involved in the use of sustainable aviation fuels (SAFs)? Are certain services or routes consistently operated using them?

SAS has purchased a couple of hundred tons of SAF over the last couple of years. The SAF has been used primarily on flights from Norway and Sweden. As of January 1, 2020 a blend-in mandate has been implemented in Norway.

What is the biggest obstacle to SAS using more of these fuels at a higher blend on more flights?

The cost is high. There are still other opportunities in our operations to reduce GHG emissions at a lower cost. However, we will need SAF as a key driver to decarbonise aviation.

Is SAS involved at all in the production side of the fuel supply chain?

Yes. We support and engage in multiple commercialisation initiatives in the supply chain.

How does SAS deal with SAFs in an international context? Is it easy to source supplies in non-EU airports for example?

How the emission reductions shall be allocated is an important topic to clarify. There are apparent risks that aviation might need to report SAF as fossil fuel.

The European Commission will soon unveil its ‘ReFuelEU’ initiative. What measures would SAS most welcome from that initiative?

We need to incentivise SAF production in order to increase supply.

The Commission has suggested that a blending mandate could be appropriate. Do airlines see that as the best way to stimulate demand and reduce costs?

We support well-balanced and efficient economic measures to accelerate the transition to lower emissions. As we see it right now, there needs to be incentives to produce SAF at a competitive price compared to other methods to reduce GHG emissions.
We already know that Sustainable Aviation Fuel (SAF) provides cleaner alternatives to fossil fuels, achieving up to 80% reduction in lifecycle greenhouse gas (GHG) emissions compared to fossil jet fuels. But what is less well known is the fact that SAF also provides additional climate and public health benefits due to its purity and clean-burning properties.

Alex Menotti is the US Federal Affairs Manager of Neste.

In fact, SAF has near-zero sulfur and does not include “aromatic” components found in fossil jet fuels that disproportionately contribute to the environmental impact of jet fuel. With jet fuel including substantially higher amounts of sulfur than are currently allowed in ground transportation fuel (roughly 500 parts per million on average vs 10 parts per million for European road diesel fuel), SAF offers a significant opportunity to benefit the climate while clearing the air.

SAF mandate will help build back better with substantial benefits for climate and air quality.

RECENT RESEARCH REVEALS THE SUBSTANTIAL ADDITIONAL BENEFITS OF SAF

A substantial body of research has been developed in the last ten years demonstrating the local air quality benefits of using SAF. A recent synthesis of 51 emissions measurement campaigns sponsored by the U.S. National Academies of Sciences found that a 50% SAF blend...
with conventional jet fuel could reduce particulate emissions by up to 65% and oxides of sulfur by nearly 40%. These conventional emissions reductions are substantial, can be achieved with existing aircraft and infrastructure, and can be specifically targeted at communities adjacent to airports that have historically been disproportionately burdened with pollution.

The ultra-clean nature of SAF also results in additional non-CO₂ climate benefits. According to the European Union Aviation Safety Agency’s (EASA) recent report on the non-CO₂ climate impacts of aviation, cumulative aviation climate impacts could be three times higher than what can be attributed to CO₂ alone.

Emerging scientific research indicates that the largest non-CO₂ contributor to aviation’s climate impact (and the largest total contributor as well) is from “contrail cirrus”—the warming that occurs from contrails formed by aviation exhaust plumes at high altitude and from additional cirrus clouds that are caused by contrails. CO₂ is the next largest contributor, followed by nitrogen oxide (NOₓ). The current “best estimate” from the most recent comprehensive study is that the climate impact from contrail cirrus is nearly twice the impact from CO₂.

While the science is still emerging and there is significant uncertainty as to the magnitude of the contrail cirrus impact, uncertainty in magnitude should not be mistaken for uncertainty that contrail cirrus contributes significantly to aviation’s climate impact, as there is robust evidence for the phenomenon. Even the low end of current estimates—which show that contrail cirrus causes roughly half the total warming of CO₂—warrants consideration of potential mitigation opportunities.

Fortunately, there are opportunities to address non-CO₂ impacts from contrail cirrus that are synergistic with current efforts to reduce CO₂ emissions, with SAF reducing both impacts. In addition to the aforementioned local air quality benefits, recent research suggests that particulate matter reductions from SAF also translate to reduced contrail cirrus impacts. One recent study cited in the EASA report found that a 50% SAF blend would reduce contrail cirrus climate impacts by over 20%. An eventual shift to 100% SAF, as contemplated by Rolls Royce in their recent announcement, would reduce the climate impact of contrail cirrus by 50%.

SAF MANDATE NEEDED TO REDUCE AVIATION IMPACTS HOLISTICALLY

In recognition of this emerging science, EASA has recommended further evaluation of several policy options to reduce non-CO₂ aviation climate impacts through use of SAF, including through consideration of a European-wide SAF mandate, noting this would offer a holistic “win-win” for climate and air quality. Given that the European Commission is already considering such a mandate to address the CO₂ impacts from aviation, these significant non-CO₂ and air quality benefits bolster the case for expedited consideration of a SAF mandate and other policy mechanisms, such as a credit multiplier under the Renewable Energy Directive, that recognize the unique climate and air quality benefits of SAF.

A mandatory use of SAF has many advantages, as SAF reduces SOₓ emissions, fuel life cycle CO₂ emissions, as well as particulate emissions, the latter of which contribute to both improved local air quality and reduced contrail cirrus climate impacts. In addition, as stated by the EASA report, mandatory use of SAF may lead to a small potential increase in aircraft fuel efficiency. These benefits are also noted in the new Sustainable and Smart Mobility Strategy, where the European Commission announced that it will consider EASA’s findings with regard to the non-CO₂ climate impacts of aviation. An EU-wide SAF mandate will help the aviation industry reduce CO₂, non-CO₂ and conventional air quality impacts, putting the industry on a sustainable growth path as it looks to recover and build-back-better.