

Net zero 2050: sustainable aviation fuels

Fact sheet

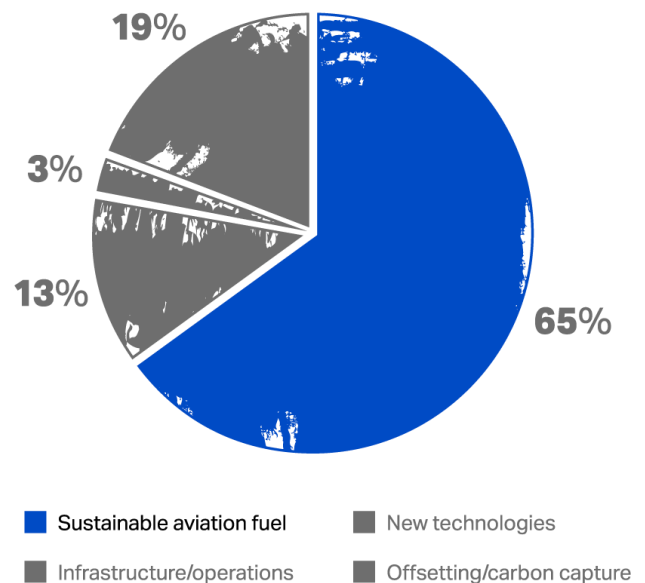
The aviation industry's net-zero carbon emissions target is focused on delivering maximum reduction in emissions at source, through the use of sustainable aviation fuels (SAF), innovative new propulsion technologies, and other efficiency improvements (such as improvements to air traffic navigation).

This factsheet looks at the potential for SAF to provide the bulk of the emissions reductions the industry will need to make by 2050.

What is SAF

SAF is a liquid fuel currently used in commercial aviation which reduces CO₂ emissions by up to 80%. It can be produced from a number of sources (feedstock) including waste oil and fats, green and municipal waste and non-food crops. It can also be produced synthetically via a process that captures carbon directly from the air. It is 'sustainable' because the raw feedstock does not compete with food crops or water supplies, or is responsible for forest degradation. Whereas fossil fuels add to the overall level of CO₂ by emitting carbon that had been previously locked away, SAF recycles the CO₂ which has been absorbed by the biomass used in the feedstock during the course of its life.

Contribution to achieving Net Zero Carbon in 2050



We estimate that SAF could contribute around 65% of the reduction in emissions needed by aviation to reach net-zero in 2050. This will require a massive increase in production (see chart below) in order to meet demand. The largest acceleration is expected in the 2030s as policy support becomes global, SAF becomes competitive with fossil kerosene, and credible offsets become scarcer.

The state of sustainable aviation fuel (SAF) in 2021

360,000 flights

2016: 500 flights
2025: 1 million flights

100 million litres per annum

2016: 8 million litres
2025: ~5 billion litres

36 countries with SAF policies

2016: 2 countries
2025: global agreement?

7 technical pathways

2016: 4 pathways
2025: 11 pathways

70% average CO₂ reduction

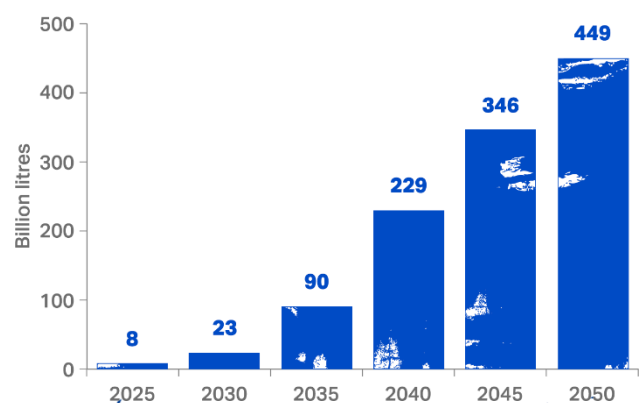
2016: ~60% reduction
2025: ~80% reduction

\$13 billion in forward purchase

2016: \$2.5 billion
2025: >\$30 billion

Source: IATA 2025 estimates

Expected SAF required for Net Zero 2050



Sustainable Aviation Fuels in Practice

Main milestones so far:

- **2008:** The first test flight with biojet fuel was performed by Virgin Atlantic.
- **2011–2015:** 22 airlines performed over 2,500 commercial passenger flights with blends of up to 50% biojet fuel from feedstock including used cooking oil, jatropha, camelina, and algae.
- **January 2016:** Regular sustainable fuel supply through the common hydrant system started at Oslo Airport. Alternative fuel producer Neste and supplier SkyNRG as well as Air BP involved.
- **March 2016:** United became the first airline to introduce SAF into normal business operations by commencing daily flights from Los Angeles Airport (LAX), supplied by AltAir.
- **June 2017:** At the 73rd IATA AGM in Cancun, IATA members unanimously agreed a [resolution](#) on the deployment of SAF, including calling for constructive government policies, and committing to only use fuels which conserve ecological balance and avoid depletion of natural resources.
- **November 2019:** Commercial SAF flights exceed 250,000 and more than 45 airlines gain experience using SAF.
- **June 2020:** Two new technical SAF certifications are approved by ASTM increasing the approved technical pathways for SAF production to seven.

IATA's Strategic Action Plan

Industry actions

- The Air Transport Action Group (ATAG) [Waypoint 2050](#) study examines the potential of different decarbonisation options, including some of the possible achievement trajectories for SAF out to the year 2050. It is feasible to replace almost all fossil jet fuel with SAF over the coming decades.
- Provide industry leadership and publicly available guidance material on best practice concerning sustainability standards, accounting procedures, logistics, communication, effective policy and business case development
- Influence policy negotiations to ensure aviation can opt into existing ground transport policies,

and in some cases, have aviation preferentially incentivized to use SAF

Role of governments

- To develop policies that efficiently accelerate the commercial production and deployment of SAF. Positive incentives are the most effective policy tool and involve the allocation of public funds (from an array of support incentives). Positive policies reduce project risk, making a business case more competitive and allowing organic supply and demand to develop into a sustainable market.
- A mandate policy (forcing airlines to use a certain quantity of SAF) is not IATA's preferred option for advancing the deployment of SAF, especially when a mandate is not accompanied by positive measures. A mandate rarely delivers the optimal economic outcome, typically resulting in higher prices, and thus diverting resources which could be deployed for other environmental investment.
- The US and the EU are pursuing different approaches to SAF policy development explained (see [factsheet](#)).

Other avenues for government support include:

- Adopt globally recognized sustainability standards and work to harmonize standards.
- Ensure existing policy incentive frameworks designed for ground transport, also include aviation and apply higher incentives for aviation over ground transport, which has other energy alternatives.
- Encourage user-friendly SAF accounting methods, including developing an industry designed functioning book and claim framework and seek to harmonize global standards.
- Support sustainable aviation fuel R&D and demonstration plants.
- Implement policies that de-risk investments into SAF production plants and engage in public-private partnerships for SAF production and supply.
- Commit to policy certainty or at a minimum policy timeframe that match investment timeframes.