

Cooking oil just fueled a transatlantic flight. But is it a solution or a distraction?

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Virgin Atlantic Flight100 arrived at John F. Kennedy International Airport on November 28. The flight was run on 100 percent sustainable jet fuel, but is the new fuel alternative really as green as it seems?

Photograph by Jason DeCrow, AP Images for Virgin Atlantic Airways Ltd

ENVIRONMENT

Virgin's Flight100 is the first commercial flight to make a transatlantic journey on 100 percent Sustainable Aviation Fuel, but the progress it represents depends on what type of expert you ask.

ByMelissa Hobson

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The first commercial transatlantic flight using 100 percent Sustainable Aviation Fuel (SAF), made from used cooking oil, recently flew from London’s Heathrow airport to New York’s JFK airport—a project called Flight100. But while some hope this could be a step forward for sustainability, many have criticized Flight100’s green claims.

Globally, aviation made up around 2.5 percent of the world’s carbon emissions in 2022, and in the next 20 years, reports suggest those emissions will triple as more people and goods fly around the world.

Flights powered by electricity and hydrogen have traditionally been seen as more sustainable forms of air travel, but the nascent technology is still decades away from being used. Virgin, which operated the flight, claimed in a press release that SAF is currently the only viable way to sustainably power long-haul flights.

But is this flight really an environmental milestone or a distraction from better alternatives?

What exactly is Sustainable Aviation Fuel?

Definitions for SAF vary, but the term generally refers to a type of aviation fuel that’s not produced by fossil fuels and has a smaller carbon footprint over its lifecycle as a result.

How SAF is produced can influence just how sustainable it is, but studies show some forms of SAF can reduce the emissions of a fossil-fuelled powered jet by more than 90 percent.

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“In other words, it still has some CO2 emitted,” says Mohamed Pourkashanian, head of University Energy Research at University of Sheffield, who was involved in Flight100.

Flight100 was powered mainly by used cooking oil, currently the only SAF being produced at a commercial scale. This type of fuel is made from vegetable oils and animal fats—rather than fossil fuels—but powers an engine similarly to conventional oil, says Joshua Heyne, director of Washington State University’s Bioproducts, Sciences, and Engineering Lab. The oil is collected from a variety of sources, including McDonald’s restaurants.

Current regulations from ASTM International—a global standards organization—allow commercial aircraft to use up to 50 percent SAF mixed with traditional jet fuel, but Flight100 received a permit to use 100 percent SAF. Regulators reviewed technical elements ahead of the journey, and the flight itself proved long-haul planes can fly safely using 100 percent SAF.

“Governments, policymakers, and aviation stakeholders can no longer say we’re a long way away from the technology. The technology is there,” he says. But it will still be years before these flights are rolled out across commercial fleets because of the amount of fuel needed. Currently, SAF makes up less than one percent of the global jet fuel supply.

The unsustainable side of sustainable flights

Environmentalists, however, have called Flight100 a greenwashing exercise.

One criticism of SAF is that the land used to grow the crops used for fuel should be used to produce food crops instead. Developing more land for biofuels like SAF could result in the loss of important carbon stores, such as forests and peatlands, or habitats for endangered wildlife.

“Any crop grown for fuel competes with foodstuffs and pushes the agricultural frontier further into forests and peatlands, with large releases of carbon,” writes Gareth Dale, a political economist at Brunel University in London, and Josh Moos, a political scientist at Leeds Beckett University for *The Conversation*.

While new SAFs repurpose used cooking oil that might otherwise go to waste, Dale and Moos argue that even massive collection efforts would be insufficient for the large volume of jet fuel needed to power the thousands of flights taking off every day.

When it comes to used cooking oil, Heyne acknowledges that “there’s only so much of that type of oil in the world, and there’s even less of it that can be sourced sustainably,” but highlights that SAF can be made from other types of waste such as alcohol, municipal solid waste, and sewage sludge.

“Everything you flush down the toilet or throw away in the trash, if there’s carbon in it, it can be turned into SAF,” he says.

SAF is currently more expensive than conventional aviation fuel—around “\$2 per unit rather than \$0.6 dollars per unit”—but prices are likely to change, says Pourkashanian.

Large-scale production could make it cheaper, says Heyne, in the same way it has for wind and solar.

Supporters of SAF are excited because this so-called drop-in fuel—which can directly replace traditional jet fuel—is compatible with existing technology.

“Airlines don’t have to change their operations. They don’t have to buy new aircraft,” says Heyne.

The long-term future of sustainable air travel

Competing low carbon aviation technologies—namely, hydrogen and electric—are also in development, but both will take decades and would require new industry-wide infrastructure.

“A lot of airports really don't have the space to add a whole new fuelling system to their infrastructure,” says Heyne.

And powering planes with electricity and hydrogen isn't without its downsides. The batteries used to store massive amounts of electricity require extensive mining, and hydrogen's environmental benefit varies widely based on how it's produced.

“So, we can't simply say if we switch over to hydrogen everything will be fine, that isn't the case,” says Pourkashanian.

The race for a solution is urgent. “We have very little time to figure this all out and do it at scale,” says Heyne.

Environmental experts say one sure-fire way to reduce aviation emissions is to reduce how much we fly.

Measures to reduce flights are being taken in some parts of the world. In France, domestic flights are banned if the same journey can be completed by train in under two and a half hours.

Improving rail networks and other public transport is key to encouraging people to choose lower carbon forms of transport over short distances. One study suggests that replacing short-haul flights with rail journeys across 87 German routes could reduce carbon emissions by 2.7–22 percent.

But for now, flying remains an increasingly popular form of travel. This year, TSA screened more than 2.9 million people on November 26, a day the agency said was the “busiest day for air travel ever.”