Why the world's first flight powered entirely by sustainable aviation fuel is a green mirage

Published: November 27, 2023 4.07pm GMT

Authors

Gareth Dale
Reader in Political Economy, Brunel University London

Josh Moos
Lecturer in Economics and Politics, Leeds Beckett University

On 28 November a Boeing 787 Dreamliner will take off from London's Heathrow Airport and head for New York's JFK, powered by sustainable aviation fuel (SAF). According to its operator, Virgin Atlantic, the world's "first 100% SAF flight" will mark "a historic moment in aviation's roadmap to decarbonization." It demonstrates that the industry "can deliver 100% SAF" for the long-haul market.

It is proof of concept, we are led to believe, of the dawn "guilt-free" green flying. Unfortunately, we have been here before, and the results last time were anything but green. Insanity, the saying goes, is doing the same thing over and over and expecting different results.

Virgin's sustainability initiative dates back to the 2000s, when Richard Branson was at the helm. He hadn't been especially troubled by climate change until Al Gore came to his door. "Richard," said Al, "You can help lead the way in dealing with climate change. It has to be done from the top down, not from the grassroots." Listening to Gore, the Virgin tycoon recognized at once that drastic cuts in greenhouse gas emissions are imperative, or else "in a very short space of time most of the Earth will be uninhabitable." Branson re-branded himself a guru of "Gaia Capitalism," and his company announced a prize of $25 million to be awarded to the inventor of a new technology that can mitigate climate change through removing atmospheric carbon dioxide at scale.

Then in 2008, to some fanfare, a Virgin aircraft flew from Heathrow to Amsterdam using a fuel derived in part from coconuts and palm oil. Technically the mission was a success, but the sustainability claims were laughable. To have fuelled that short hop with 100% coconut oil would have consumed three million

coconuts. The entire global crop would supply Heathrow for only a few weeks — and it is one of 18,000 commercial airports worldwide. Following this stunt, Virgin gave up on coconut oil and the prize – never awarded – was discreetly retired.

Fifteen years on, Virgin's latest flight is simply a repeat of 2008, while expecting different results. It's a smoke-and-mirrors exercise to convince governments that SAF will enable aviation to continue its relentless growth on a sustainable basis – and in this it is succeeding.

Even waste products aren't sustainable

Virgin's defense rests on the claim that its new SAF no longer comes exclusively from crops. It is blended with waste products. One of the main suppliers for Virgin's transatlantic flight is Virent, based in Wisconsin. They make SAF from conventional sugars such as corn, mixed with wood and agricultural waste as well as used cooking oil (UCO). This is hardly an improvement on 2008. As with coconuts, any crop grown for fuel competes with foodstuffs and pushes the agricultural frontier further into the forests and peatlands, with large releases of carbon.

But what of the waste products? Surely reusing cooking oils offers a sustainable solution? Unfortunately, in a notoriously unregulated market, it seems not. One of Virgin's suppliers, Neste, collects cooking oils from sources worldwide, including McDonald's restaurants in the Netherlands and food processing plants in California, Oregon and Washington. The US Department of Agriculture alleges that some trade in SAF feedstocks – including from Indonesia to Neste's refinery in Singapore – may be "fraudulent". It is a claim denied by Neste, yet even if its UCO were entirely legitimate, the fact remains that palm oil from plantations responsible for tropical deforestation *is* being marketed as UCO. If the aviation industry bets big on UCO it will turbocharge tropical logging and the ongoing extermination of the orangutan and countless other endangered species.

The real kicker is that even if all UCOs were traceable and sustainably sourced, they are not scalable. The energy required to propel the world's 24,000 planes through the skies cannot be likened to frying burgers. The US collects around 600,000 tons of UCO each year. If every last drop were diverted to SAFs, it would at most meet one percent of America's current aviation demand. In Britain, the Royal Society notes that if three-quarters of available UCO were diverted to jet fuel production it would yield 0.6% of the jet fuel Britain uses each year.

Capturing the White House

The problems of scalability, the competition of agricultural inputs with foodstuffs, forests and wildlife, and the carbon emissions that result from land use change are just three of the shortcomings that ensure SAFs will not be the magic bullet that the aviation industry would have us believe. Despite this, SAF fever has won over the White House. The Inflation Reduction Act set targets for SAF production at 3 billion gallons by 2030 and 35 billion by 2050. These targets are fantasies. But to the extent that they are approached, they will only add to the pressure on food prices and wildlife.

That SAF is being touted so zealously attests to the dearth of alternative technologies. Battery-powered planes are viable but only as short-haul "flying taxis", in competition with ground transport. The other panacea, hydrogen, confronts colossal technological and infrastructural barriers, problems of scalability, competing uses for hydrogen, and environmental concerns. Tinkering with aircraft technology, such as engine size or wing shape has faced diminishing returns. Efficiency improvements lag far behind the sector's growth, which is why aviation emissions are still soaring.

Where do we go from here?

Ahead of the 2007 coconut-fuelled flight, Virgin's chief executive Steve Ridgway explained its logic: the aviation industry needs "to be seen to be doing something." Sixteen years on, the playbook remains the same: create the illusion that the airlines are taking carbon emissions seriously. The Virgin Atlantic SAF flight promises to rescue the airlines from the threat of climate change, to allow them and their passengers to "keep calm and carry on." In buying into this fantasy, governments give themselves an excuse to take climate breakdown seriously: as an emergency, one that requires radical action if the planet is to remain habitable for humans.

There *is* the potential to create a good life for all within planetary boundaries. But to get there requires clipping the wings of the aviation industry. This would begin, for short-haul, with ground-based alternatives. In the US, over a quarter of flights could swiftly be replaced by ground transportation. For long-haul, the first step is demand management, which will expedite the use of virtual conferencing, marine transportation and other alternatives. Developing alternatives would be practical, efficient, and creates jobs. And now is a propitious time to begin. In recent years, Americans have been "falling out of love with flying," in part due to climate breakdown bringing weather chaos and flight cancellations. As the weather chaos worsens, the aviation industry will find it harder to shrug off its responsibility through PR stunts and greenwashed gimmickry.