

CAGNE

**Communities Against Gatwick
Noise and Emissions**

**The umbrella aviation community and
environment group for Sussex, Surrey and Kent**

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There is no one silver bullet to enable aircraft to switch from fossil fuel to a green fuel

Electric – Electricity suppliers are warning of blackouts for homes due to the shortage of power. The battery volume and weight an aircraft would need to fly any distance would seem to make this option not feasible.

Electric or hybrid planes generate considerable interest but are likely to make only a marginal contribution until after 2050.ⁱ

Aircraft powered by green electric batteries, whether hybrid-electric or fully electric, will not realistically be viable for anything but very short-haul commercial flights, even by 2050. Even if we have enough green electricity available to meet all our other needs plus aviation, the batteries are simply too heavy for medium- and long-haul flights. And, unlike burning liquid kerosene, the weight of batteries does not reduce as the journey progresses.

Synfuels – aviation synthetic fuels are produced from electricity by synthesising hydrogen with carbon to create a liquid hydrocarbon. They too face problems of scaling up, cost, and the disproportionate use of renewable energy resources – that is, there won't be enough green electricity to meet all our other needs and also produce enough synfuels for an unconstrained increase in flying.

Sustainable Aviation Fuels (SAF) – particularly electro-fuels (e-kerosene, produced using CO₂ and combined with renewably produced hydrogen) can provide an opportunityⁱⁱ. These fuels will inevitably increase fuel costs and have been found to be limited in supply. Recent research into the potential for SAF in the EU concluded: "Taking into account sustainable availability and an optimistic assumption for the deployment rate of novel conversion technologies, we estimate that there is a resource base to meet approximately 5.5% of the European Union's projected 2030 jet fuel demand using advanced SAFs".ⁱⁱⁱ

Aviation biofuels are not a sustainable or scalable solution without causing increased global food prices, water shortages, deforestation, drainage of peatland, loss of biodiversity and emissions from land-use changes. In other words, we need to use land for many purposes other than making fuel for aircraft and there's not enough land for everything. Biofuels will only be scaled up to a small fraction of existing aviation fuel consumption - even by 2050.^{iv}

Renewable Transport Fuels Obligation includes a Development Fuels target for fuels like e-kerosene, but no requirement for airlines to purchase the fuel.

Hydrogen – The carbon footprint of creating blue hydrogen is more than 20% greater than using either natural gas or coal directly for heat, or about 60% greater than using diesel oil for heat, according to joint research by Cornell and Stanford universities in the US. ^v

Green hydrogen might genuinely be a low carbon fuel. But it is years away, especially at any scale for aviation.

The government's Jet Zero expects hydrogen "to play a key role in fuelling zero emission aircraft". However, the costs and timescales required to develop and deploy green hydrogen technology and infrastructure at airports mean that it will not credibly support significant decarbonisation of aviation within the timescale needed. The volume needed to store hydrogen for an aircraft is approximately three times that needed for kerosene. This means that the size, shape and weight requirements for hydrogen fuel tanks on planes will require a major re-design of medium- and long-haul aircraft fuselages. It will take decades for new aircraft design to be accredited and for airlines to update their fleets.

Hydrogen electric flight faces serious obstacles of cost, weight, storage, aircraft redesign, availability of green energy and timescale for its commercial development and deployment. When announcing the government's Jet Zero, the Transport Secretary highlighted the recent trial of a small hydrogen-powered plane as evidence of a technology breakthrough. However, he omitted that this small aircraft actually flew using hydrogen produced from fossil fuels. ^{vi}

Greenhouse gas removals (GGRs) – the government's Jet Zero forecasts that 36.7% of UK aviation emissions reduction in 2050 will have to be via removing GHGs (greenhouse gases) from the atmosphere that aircraft have put there, as well as tree-planting schemes. However, this technology only exists at a small scale and the prospects of scaling it up to an industrial level face obstacles of cost and time.

The government draft strategy says: "GGRs are not yet implemented at commercial scale, either in the UK or globally, and forecasts of costs and scale-up potential are highly uncertain".

Carbon Trading – The International Civil Aviation Organization (ICAO) has developed a global offsetting mechanism, called CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) which aims to stabilise net CO₂ emissions starting in 2021, but it has been criticised for not requiring emission reductions.[7]

Reducing demand for air travel represents the most cost-effective method available for maintaining current emission levels.[8] 96% of the UK's aviation emissions come from international, mainly long-haul, flights,[9] while around 15% of the UK's population generate over 70% of the UK's international air travel.[10] Targeted

efforts towards those that fly frequently to adopt new behaviour could result in significant emissions reductions.

This will not reduce carbon produced by flying. Some companies and city firms are finding this lucrative as some industries decarbonise and sell their carbon credits to other industries that can't decarbonise, such as aviation. This process is currently self-regulating.

Passenger off-setting carbon – this is an aviation marketing tool that again does not remove the carbon from your flight. By paying a nominal fee towards another environmental scheme does not remove the greenhouse gases or reduce the carbon burnt during your fossil-fuelled flight.^{vii}

Our thanks to Bristol group for assistance.

ⁱ <https://s3-eu-west-1.amazonaws.com/media.afreeride.org/documents/Electric+Dreams.pdf>

ⁱⁱ <https://www.transportenvironment.org/publications/roadmap-decarbonising-european-aviation>

ⁱⁱⁱ <https://theicct.org/publications/sustainable-aviation-fuel-feedstock-eu-mar2021>

^{iv} <https://theicct.org/publications/sustainable-aviation-fuel-feedstock-eu-mar2021>

^v <https://splash247.com/study-finds-blue-hydrogen-worse-than-gas-or-coal/>

^{vi} <https://www.newscientist.com/article/2255751-zero-emissions-hydrogen-plane-test-was-part-powered-by-fossil-fuels/>

^{vii} <https://www.euractiv.com/section/aviation/news/critics-wary-of-ryanair-scheme-to-fully-offset-flight-emissions/>

[7] Carbon Brief. 2019. [Corsia: The UN's plan to 'offset' growth in aviation emissions](#)

[8] Parliamentary Office of Science and Technology. 2020. [Climate Change and Aviation](#)

[9] Climate Change Committee. 2019. [Net Zero Technical Report](#)

[10] Parliamentary Office of Science and Technology. 2020. [Climate Change and Aviation](#)

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