



Sustainable Aviation Fuel vs Refuse Derived Fuel: Can They Coexist?

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Volumes of non-recyclable residual waste are set to decline over the next few years, assuming efforts made by the Government to implement policies enable them to meet their obligation to halve residual waste by per person by the year 2042 compared to 2019 levels under the Environmental Targets (Residual Waste) (England) Regulations 2023. This has significant implications for the amount of waste available as feedstock for the Energy from Waste (EfW) facilities across the UK. Europe has similar targets to reduce the volume of Municipal Solid Waste disposed to landfill and incineration by at least 50% by 2030 compared to 2015. Initiatives such as simpler recycling (reduction of polymer mixes in packaging, clearer recycling labelling, streamlining of bin collection processes) and a planned boost to segregated food waste collections will help to reduce the tonnage of Municipal Solid Waste (MSW) which is classed as 'residual' and 'unrecyclable'. A drive towards designing out waste through minimisation of packaging and better design for repair will further diminish the amount of overall waste generated.

“Guilt-Free Flying”?

If residual non-recyclable waste is set to become a limited resource, is now the right time for the UK government to be investing in Sustainable Aviation Fuel (SAF) which converts residual waste into jet fuel? Transport Secretary Mark Harper is quoted as saying, "Using waste or by-products to refuel airliners sounds like a flight of fancy, but thanks to £165 million of government funding, it's going to help us make guilt-free flying a reality."¹

Under the SAF mandate, the government has set a target that, by 2030, jet fuels will contain at least 10% SAF. Not all SAF will come from the pyrolysis of residual waste; other routes exist, such as via the conversion of industrial gases to ethanol or from agricultural waste and used cooking oils. Nonetheless, the three envisaged waste-related SAF plants have a combined planned output of 200,000tpa of waste-derived SAF. To create 200,000tpa of SAF, it is necessary to procure ten times that volume of processed Secondary Recovered Fuel (SRF). In other words, these three pilot plants alone would have a combined demand of around 2 million tonnes of pyrolysis-grade SRF, which may equate to the need to source around 5 million tonnes of unprocessed MSW.

Can SAF and EfW Coexist?

The Manchester Airports Group has explicitly called for waste that is presently being incinerated to make electricity to be used to produce SAF at new refineries across the UK, "giving airports a direct supply and creating tens of thousands of green jobs."

¹ www.gov.uk/government/news/over-110-million-to-unlock-zero-emission-guilt-free-flights

In a recent report produced by ICF SH&E Ltd², the research claimed that the reduction in carbon emissions from using bin bag waste to make SAF would be "at least five times greater" than that achieved by incinerating to generate electricity. It appears that the battle lines are being drawn.

Certainly, incinerating residual waste to generate electricity alone is a less-efficient use of resources. Figures from the Digest of United Kingdom Energy Statistics (DUKES) in 2021 showed that the efficiency of CHP schemes is estimated at 69.1%, compared to 48.5% when taking into account qualifying electricity only.

The notion of SAF being a 'green' option leading to 'guilt-free flying' is open to doubt, given the UK Government's own statistics³ which show that a flight from Glasgow to London produces around twice as much CO₂e per passenger compared to driving in a diesel car, or three times as much as a passenger travelling by rail (see Fig. 1).

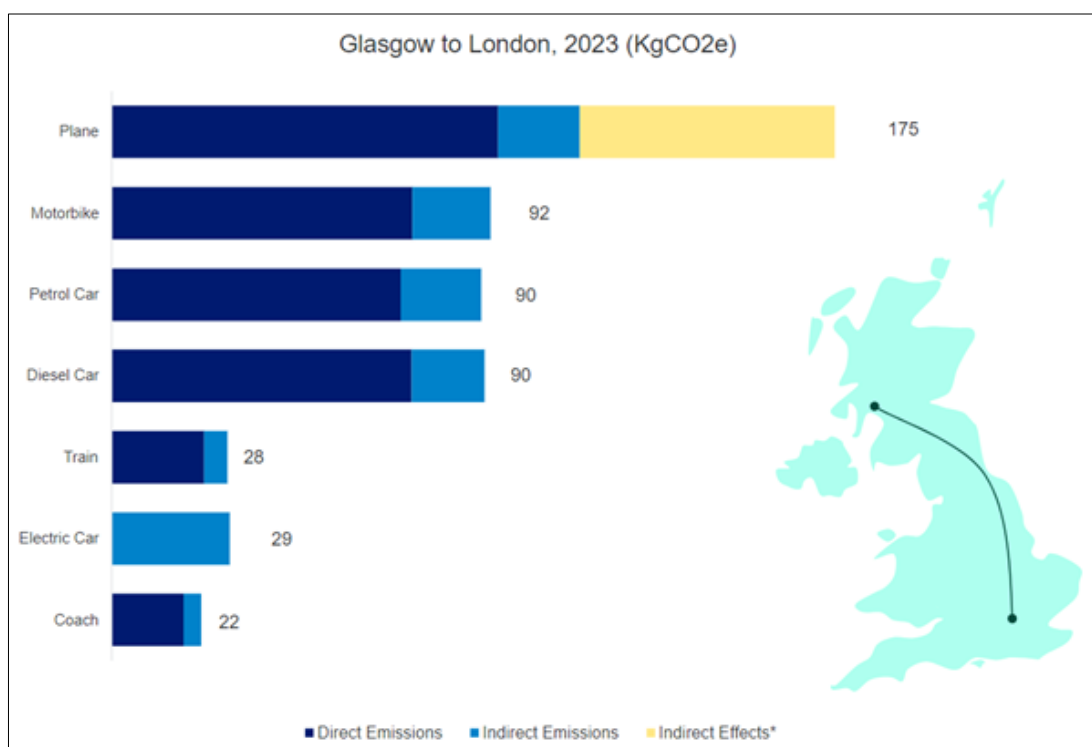


Fig. 1: Indicative GHG emissions (KgCO₂e) for a single passenger on example journeys, 2023

The Rising Environmental Impact Of Aviation

The most effective and responsible way to reduce the emissions caused by aviation is to curb the expansion of aviation, which has grown faster in recent decades than rail, road or shipping⁴ (see Fig. 2). That could be done through taxation on jet fuel which is currently - and astoundingly - tax-exempt. Alternatively, taxes on greener forms of transportation could be reduced or abolished altogether. Creating jet fuel through the pyrolysis of waste does not lead to environmental improvements or 'guilt-free flying'. Rather, it endorses and promotes a form of transportation that is highly polluting, SAF or no SAF. Any governmental endorsement of so-called 'sustainable' aviation fuels gives a misleading message which is likely to lead to increased flying. The environmental impact of such an outcome will rapidly outweigh any modest benefits accrued by the 10% use of SAF.

² www.letsrecycle.com/news/saf-is-the-answer-to-lower-carbon-emissions-says-mag-ceo/

³ www.gov.uk/government/statistics/transport-and-environment-statistics-2023/transport-and-environment-statistics-2023

⁴ www.iea.org/energy-system/transport/aviation

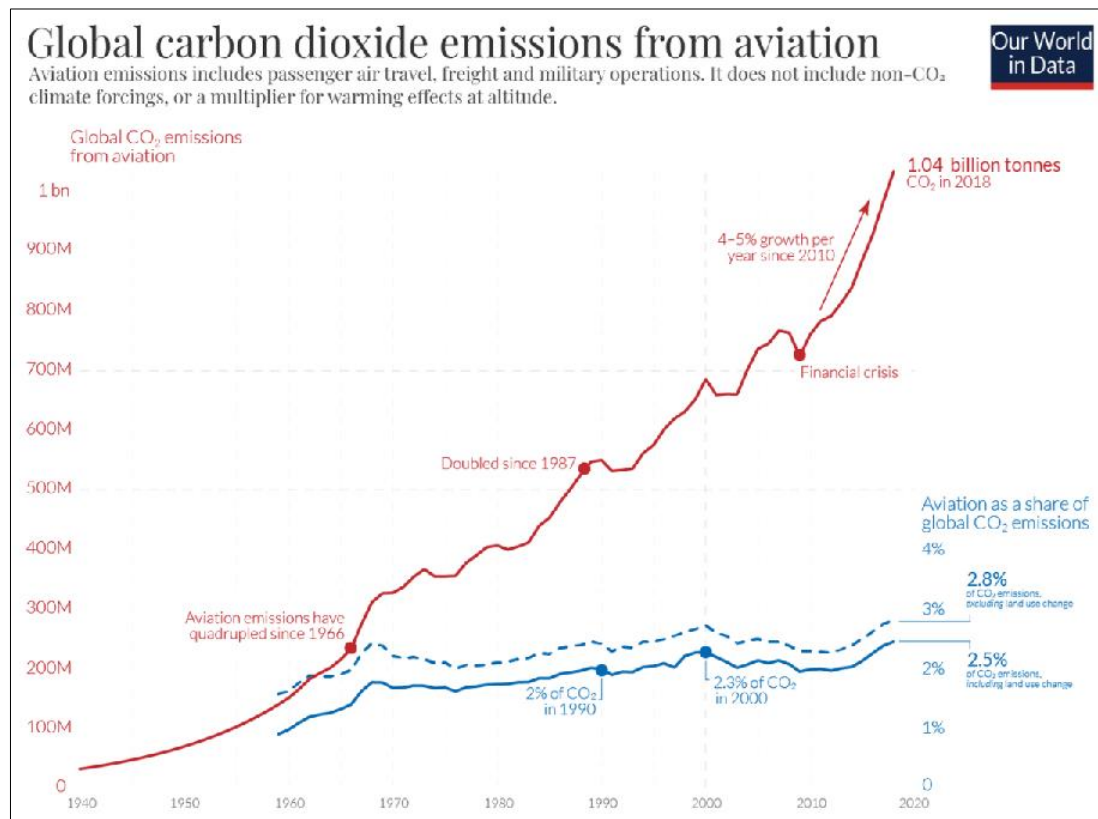


Fig. 2: Carbon dioxide emissions from aviation (<https://ourworldindata.org/co2-emissions-from-aviation>)

The ICF report acknowledges that the waste hierarchy does not currently differentiate between approaches to recover energy from waste, including incineration with energy recovery and production of SAF. This, the report argues, presents a challenge for the aviation industry as, currently, SAF production is a more complex process with several technical challenges to overcome, resulting in uncertainty across commissioning timelines. This, in turn, puts SAF producers at a disadvantage as authorities responsible for waste management generally prefer greater certainty that is provided by the comparative incineration with energy recovery.

Conclusion

In the opinion of Footprint Services, any suggestion that the use of 10% SAF for aviation is a higher calibre of recovery than producing electricity and heat for established municipal and industrial networks is questionable. Governments and regulators should be cautious about any proposals to change waste hierarchy guidelines to prioritise SAF production over energy recovery from RDF in a facility operating in CHP mode with heat utilisation. Instead, governments should focus on promoting low-carbon transportation methods and setting targets to reduce, rather than encourage, unnecessary air travel.