

# Sky views

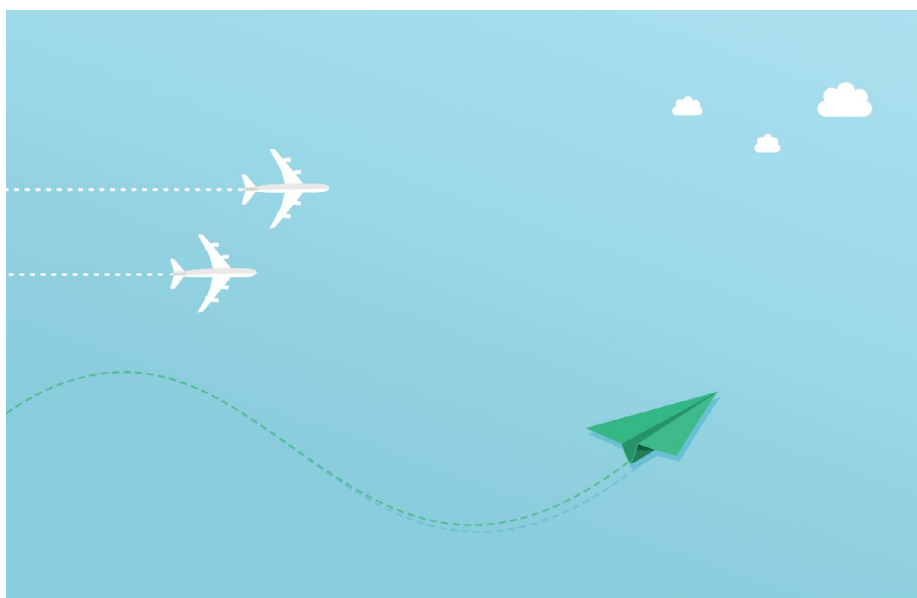
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**Aviation contributes to global emissions, yet the sector is lagging behind in decarbonization efforts. A combination of technology alongside societal change could provide a path to emission reductions.**

Contributing more than 2% of global emissions, aviation is seen as a possible easy win for mitigation. Flying can be the largest contributor to individual carbon footprints, with rapid increases in availability and affordability leading to passenger demand increasing year on year, until COVID-19 put a halt to travel. While 2020 saw a drastic reduction in air travel as quarantine measures were enforced around the world, it was not long before passenger numbers were again increasing, with 2022 increasing over 2021, but not yet returning to pre-pandemic levels – 2022 passenger levels are approximately 28% below those of 2019<sup>1</sup>. Further, it is expected that air passengers and freight will more than double in the next two decades.

There is a growing movement of individuals who want to reduce their air travel, with people making flight-free pledges – to be flight free or to reduce personal flights. Global average emissions from flights in 2018 was 103 kg CO<sub>2</sub> but there are large disparities between countries<sup>2</sup>. Topping the table for emissions from domestic flights in 2018 is the United States at approximately 326 kg CO<sub>2</sub> per year; if domestic and international flights are considered, then the United Arab Emirates (1,950 kg CO<sub>2</sub> per person) tops the emissions. These emissions from aviation considering all flights exceed the total emissions per capita from all sectors for many countries. Again, highlighting the disparity between individual footprints around the world, and how flying contributes to those with the largest footprints.

Individual choice to alter flight behaviour is one thing, but little has been done to create system change. One example of system change is France, where they are introducing a ban on domestic short-haul flights where the equivalent train journey can be completed in less than two and a half hours. This European Commission-approved ban will



initially apply to three routes – Paris Orly to Bordeaux, Lyon and Nantes; a reduction in the originally proposed eight routes because the other five routes exceeded two and a half hours or had a limited direct daily service. However, improvements to rail services would see further routes banned. High-speed rail alongside improved rail networks can make ground travel more attractive and competitive with air travel. It further has the advantage that it might remove road traffic to further reduce emissions, as was seen in a study on high-speed rail in China where new routes reduced passenger and freight vehicles on comparable roads<sup>3</sup>.

The member airlines of the International Air Transport Association (IATA) made a commitment in October 2021 to be net zero by 2050<sup>4</sup>. A large part of the strategy, 65%, is sustainable aviation fuel (SAF). Low-carbon aviation fuels, or SAF, partly made of recycled cooking oils, have been touted, along with more efficient engines, as possible ways for aviation to mitigate emissions. But SAF is made from feedstocks that need land to be produced, and is substantially more expensive than fossil fuels. This does not seem to be a viable option in the near- or long-term.

Considering technological improvements for emission reductions, in January 2023, a small twin-engine aircraft powered by

hydrogen and electricity (fuel cells) completed a 10-minute test flight. This ZeroAvia flight is a noteworthy achievement but it is only the first step on the long path to commercial use. ZeroAvia is not the only company working on zero-emission aircraft, another example is Airbus, who have publicly announced their ambition to develop a zero-emission commercial aircraft by 2035. Dubbed the ZEROe aircraft, it will be powered by hydrogen combustion and hydrogen fuel cells for a hybrid electric propulsion system.

Although aviation may not be the largest contributing sector to emissions, it is one that can improve through individual choices and systematic change in the near term while technological advancement catches up and helps in the long term.

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## References

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