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Can the aviation industry reach a net of zero carbon emissions by 2050?

The aviation industry is currently responsible for around 2% of carbon emissions globally each year[1], and this is forecast to triple by 2050[2]. With this projected rate in mind, members of the Sustainable Aviation coalition, which includes most major airlines and airports, as well as aerospace manufacturers, are planning to sign a commitment to reach zero net carbon emissions by 2050, with a third of the reduction being achieved through carbon offsetting.

One method of reducing the carbon emissions of aircraft is to invest in the development of technology used in these aircraft, resulting in greater efficiencies of engines and lighter aircraft. By increasing these efficiencies, aircraft consume less fuel, and therefore have lower overall carbon emissions. Rolls-Royce is an example of a manufacturer that is making this investment, through the development of its next generation UltraFan engine which will have lean-burn and low-emission combustion, an advanced core with ceramic-matrix composites and super nickel alloys, and a power gearbox in order to reduce fan speed[3]. Looking towards other aircraft manufacturers, the developments made by Airbus and Boeing today are far more efficient in respect of fuel burn, emissions and noise than the previous generations of aircraft that they superseded.

When discussing carbon emissions from flights, it is important that all parties involved are open and clear in their conversations. One of Ryanair's recent advertisements was banned by the Advertising Standards Authority on the basis that its carbon emission claims could not be backed up. This was then followed by Ryanair claiming that "consumers could halve their carbon footprint if they switched to Ryanair". However, the figures used by Ryanair may appear more favourable as they have fewer empty seats on their flights, resulting in the average carbon footprint being smaller. This figure may appear lower than its competitors, however, it does not involve investment in technology to improve efficiencies and reduce the overall footprint of the aircraft.

The reduction to net zero carbon emissions includes the strategy of offsetting carbon emissions by methods such as planting trees to take in and store the excess carbon emissions, and through the use of biofuels. The issues faced by these strategies are that trees can take 15-35 years until their impact is realised, and this could be halted by the trees being felled before they reach maturity. Biofuels offer a net zero carbon possibility, however, this analysis only focuses on carbon emissions taken in by plants during their lifetime, and equates this to the carbon emissions that are released when the fuels are burned. This does not take into account any other carbon emission related activities such as using machines to harvest the grown crops.

As a result of this, there are critics of the use of carbon offsetting as a method of achieving zero net carbon emissions such as John Sauven, the UK executive director of Greenpeace, who dismisses the strategies as “greenwash”.

To ensure that the aviation industry can meet this ambitious target, these strategies and others must be implemented and followed through consistently. By improving technology, ensuring flights are at maximum capacity and by investing in biofuels and planting schemes, it may be possible to achieve the ambition of net zero carbon emissions by 2050.

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[1] https://www.atag.org/facts-figures.html

[2] https://www.nytimes.com/2019/09/19/climate/air-travel-emissions.html

[3] https://www.rolls-royce.com/media/our-stories/innovation/2016/advance-and-ultrafan.aspx#overview