COLUMBIA THREADNEEDLE INVESTMENTS

# ESG VIEWPOINT

## Jet zero – how investors can get on board for the long haul of aviation decarbonisation

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### At a glance

- Passenger numbers are rebounding – and as they do so do carbon emissions. Aviation could account for 16% of global $CO_2$ emissions by 2050.
- It is hard for aviation to abate its carbon emissions – sustainable aviation fuels are one possible solution but there are challenges ahead, not least the scaling up of supply.
- We are engaging with companies to encourage them to accelerate their decarbonisation journeys.

Engagement efforts outlined in this Viewpoint reflect the assets of a group of legal entities whose parent company is Columbia Threadneedle Investments UK International Limited and that formerly traded as BMO Global Asset Management EMEA. These entities are now part of Columbia Threadneedle Investments which is the asset management business of Ameriprise Financial, Inc. Engagement and voting services are also executed on behalf of reo® clients.

# Introduction

After the COVID-19 pandemic grounded the global aviation industry in 2020, airlines and investors are keen to see passenger numbers take off again. However, as passenger numbers are starting to rebound, so too are the industry's carbon emissions. Aviation currently contributes 2.5% of global $CO_2$ emissions, but this could **rise to 16% by 2050**, as other sectors decarbonise while global aviation carbon emissions are projected to **double due to increased demand**.

This viewpoint explores the sector's possible flightpaths to net zero, outlines how the sector is currently tracking, and how Columbia Threadneedle Investments is working to drive the transition.

### Aviation is a hard-to-abate sector

Aviation is often called a hard-to-abate sector. Whilst electrifying ground equipment and reducing waste can reduce emissions, the vast majority of airlines' carbon emissions are driven by the burning of jet fuel, and there are less obvious and implementable methods to mitigate these emissions. These carbon contributions to global warming are exacerbated by the non-carbon climate impacts of aviation. Aircraft emit nitrogen oxides and sulphur dioxide, and induce the formation of contrails. Through these routes, aircraft generate non-carbon climate impacts which are estimated to be around double[1] their carbon-related impacts.

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Sustainable Aviation Fuels are a promising solution

Barriers to Sustainable Aviation Fuels

How can investors accelerate progress?

[1] Airline contrails warm the planet twice as much as $CO_2$, EU study finds – Transport & Environment (transportenvironment.org)


# Sustainable Aviation Fuels is the most promising solution

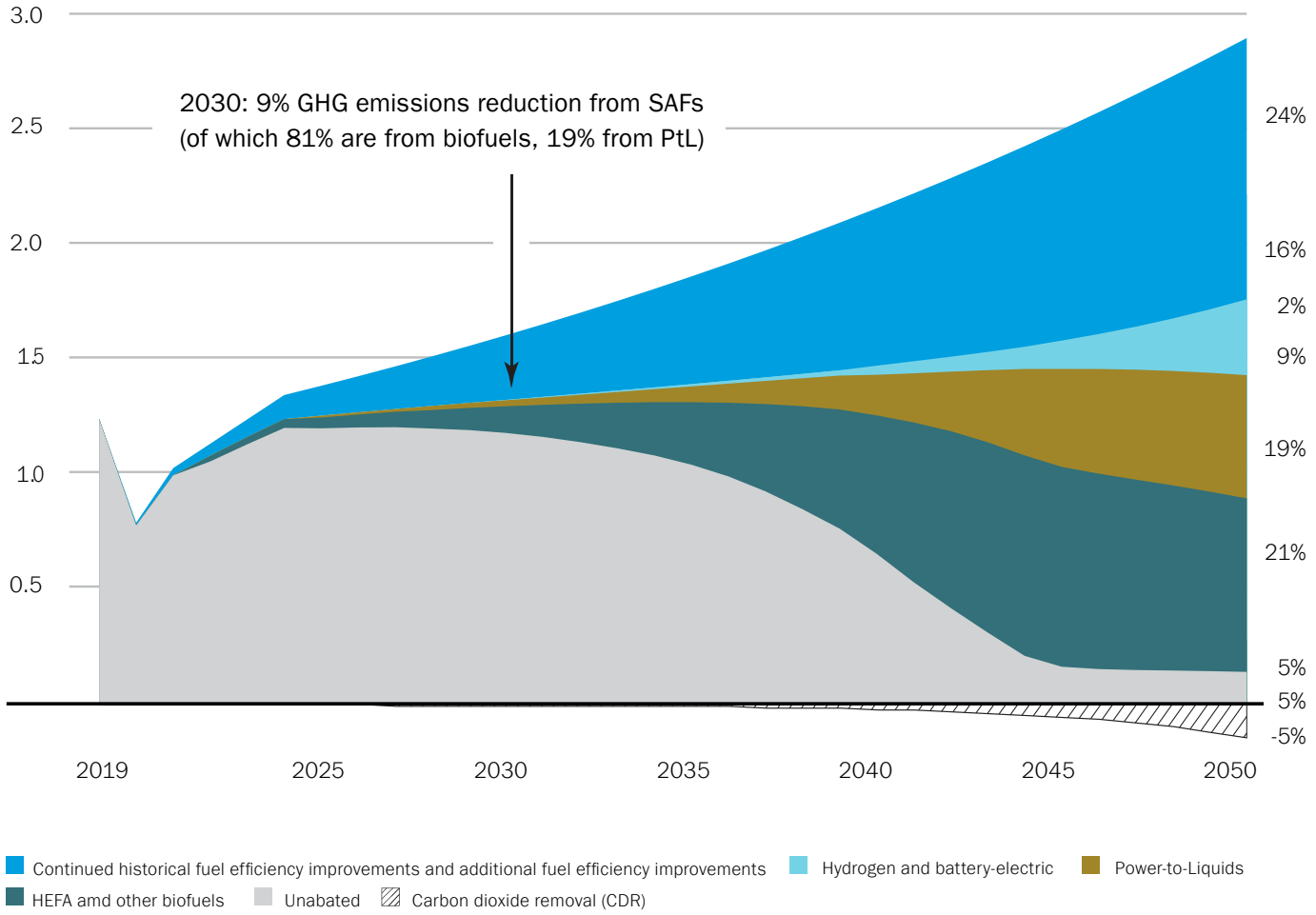
There are a number of climate solutions which are being explored for the sector to reduce emissions from burning jet fuel. One relatively simple solution is for airlines to replace older aircraft with newer, more fuel-efficient models.

For example, the Boeing 737 MAX **reduces fuel use and $CO_2$ emissions by 14%** over today's most fuel-efficient single-aisle airplanes. This is one reason why some low-cost airlines can boast a lower carbon intensity than peers – because often they have younger fleets.

Modernisation of fleets allows airlines to reduce their carbon emissions today, but to align with a 1.5 degree decarbonisation trajectory more drastic changes are essential. Electric or hydrogen aircraft and modern airships are being tested, but the industry consensus is that aircraft based on these propulsion systems will not be widely available until the 2030s and will account for only around **2% of aviation's energy use by 2050**. These alternative propulsion systems will also only be able to displace conventional jet fuel from short haul routes, which account for **27% of current industry $CO_2$ emissions**. Other solutions are needed to tackle the bulk of aviation emissions linked to medium- and long-haul routes.

In addition to efforts to replace fossil fuel-based propulsion systems, the elephant in the room is efforts to curb or reduce demand for air travel. Some airlines are **collaborating with train operators** to encourage travellers to use lower carbon travel options for certain routes, and some **national governments** are imposing regulation to control short haul flights. While we encourage these efforts through our engagement activities, wider market response to demand management efforts has been lukewarm at best.

**Figure 1: Sustainable aviation fuels dominate 2050 emission reduction contributions (Mission Possible Partnership, 2022)**




The aviation industry is increasingly focusing on SAFs as the most promising decarbonisation lever. These fuels are projected to contribute almost half of the decarbonisation necessary for the aviation sector to reach net zero by 2050 (Figure 1). SAFs have similar chemical and physical properties to conventional jet fuel, meaning they can be safely blended with jet fuel, use the same supply infrastructure and do not require the adaptation of aircraft or engines. SAFs can have lifecycle carbon emissions up to 80% lower than conventional jet fuel and also have been found to **reduce the non-carbon climate impacts** of aircraft by reducing contrail formation.

There are a rapidly increasing number of routes to produce SAFs, many of which are variations on **five key processing pathways**. Most commercially available SAFs today use biomass feedstocks, with the **conversion of used cooking oil** making up most of the global market. In the US the conversion of energy crops to ethanol to jet fuel (termed the alcohol-to-jet (AtJ) pathway) look set to make up the bulk of the market in the shorter term due to **laxer biofuel regulation than in the EU**. The next generation of biofuels are being pioneered by companies like **Velocys**, which can produce advanced biofuels from sources such as household waste and forest residues through the **Fischer Tropsch** (FT) process. By 2030 most analysts expect Power-to-Liquids (PtL) fuels to come to the fore. PtL fuels are produced through the use of renewable energy to create green hydrogen and carbon, which are combined to make a synthetic kerosene. Compared to biogenic SAFs, PtL fuels do not compete with agricultural production for land, require lower water input, and can have **lower carbon footprints**. One example of an initiative in this area is the EU-backed **'Sun to Liquid'** process.

SAFs can have lifecycle carbon emissions up to 80% lower than conventional jet fuel

# Significant barriers to scaling-up SAFs exist

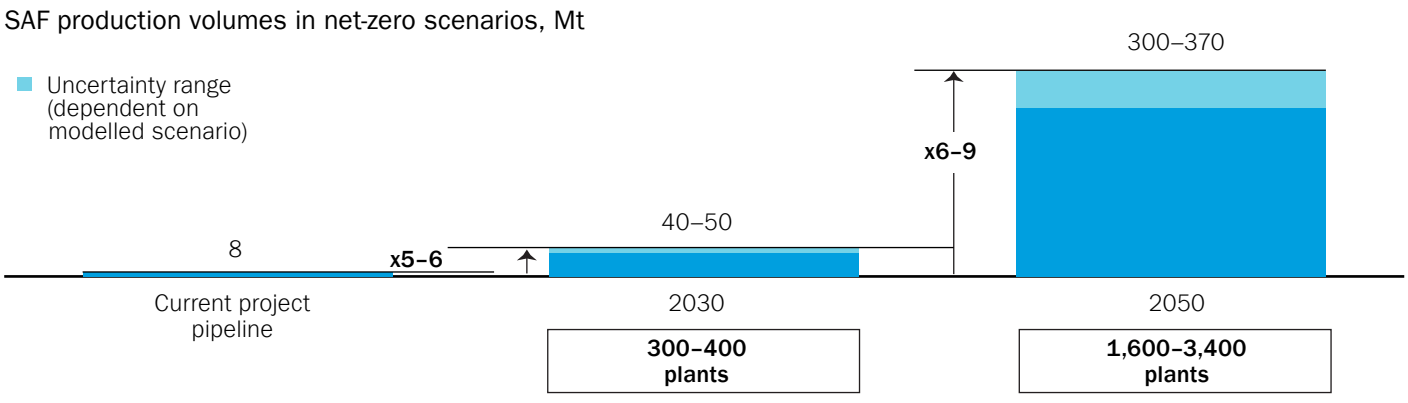
Despite the strong development of SAF technologies, the take-off of SAF as a commercial jet fuel alternative looks set to be delayed. SAFs are currently around **three to six times more expensive** than conventional jet fuel. This is a substantial cost barrier to the widespread roll out of SAFs given that fuel accounts for 20-30% of costs, and airlines have notoriously tight margins.

The cost barrier is exacerbated by supply-side constraints. In 2021 around **100,000 tonnes of SAF** was produced globally, but it is projected that SAF supply needs to grow to over **300 million tonnes a year** by 2050 for a 1.5 degree aligned aviation sector (Figure 2). This steep growth is even more challenging as the aviation industry will be competing with other sectors for feedstocks, most PtL fuels are at early stages of development, and SAF supply needs to be globally distributed to match aviation demand. SAF suppliers need access to finance to establish and scale up pilot plants, and longer term offtake agreements to provide pricing certainty.

Several factors are also slowing market development from the demand side. Airlines are setting 2030 SAF targets that are significantly less ambitious than the level needed to be aligned with a 1.5 degree trajectory. According to the **IEA 1.5 degree scenario** SAF needs to represent 18% of aviation energy consumption by 2030, but most airlines with SAF targets are aiming for them to make up 10-12% of energy consumption by 2030 (**Deutsche Post with 30% by 2030** is a notable outlier). This is unlikely to be enough to push SAF investment to the **US$1-1.4 trillion estimated to be needed by 2050**.

Timid airline targets are partially explained by the uncertain regulatory landscape. SAF blending mandates are being proposed in the EU and UK to ensure a minimum of 5% and 10% SAF respectively is used by 2030, alongside an increase in EU taxation on conventional aviation fuel. In the US, the Californian Low Carbon Fuel Standard (LCFS) prices in greenhouse gas emissions to the aviation fuel used, and a **SAF tax credit proposal** is currently in Congress by the Democrats. While these would accelerate SAF roll out, few are yet to be enacted, and the uncertainty dampens investor and aviation industry enthusiasm to enhance their ambition levels.

**Figure 2: How the SAF project pipeline needs to scale to make net zero possible (Mission Possible Partnership, 2022)**




# How can investors accelerate progress?

The stakes are too high and timeline too short to leave the aviation industry in autopilot on decarbonisation. As a responsible investor with a strong legacy of active ownership, we engage with our internal funds' and ***reo***® clients' holding companies in the aviation sector to accelerate their decarbonisation journeys.

Our initial departure point is ensuring that airlines have long-, medium- and short-term carbon targets which are aligned with a 1.5 degree trajectory, ideally through validation by the Science Based Targets initiative (SBTi). For example, we have engaged with **Singapore Airlines** to set medium-term targets. We also ask airlines to set 2030 SAF blending targets aligned with 1.5 degrees, increase CapEx committed to SAF procurement and establish long-term offtake agreements with SAF suppliers to support market scaling. **Wizz Air** and **Lufthansa** are some of the airlines we have engaged on these topics. **Lufthansa** we believe needs to set SAF targets to exceed the levels which will be mandated and move beyond procuring SAF supply on the spot market and transition to longer term offtake agreements. Once companies have committed to expanding their SAF sourcing, we expect them to publish their SAF procurement policies to provide investors with reassurance that ESG risks such as food supply displacement and biodiversity impacts are being screened. We have engaged many aviation companies on this topic, in particular **Southwest Airlines** and **DHL**. An engagement ask which has risen in importance recently is aviation climate lobbying. We have engaged with **IAG** on its **reported efforts** to dilute the ambition of the EU's climate proposals, encouraging the firm to enhance its lobbying disclosures and articulate how it supports international regulation.

While there a number of decarbonisation levers which can support the aviation industry to reach net zero, there is now strong industry consensus that sustainable aviation fuels will be the heavy lifter. The challenge now is to scale and mainstream these alternative fuels, and investors have a crucial role to play.

## Get to know the author

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Joe joined the Responsible Investment team in 2021 and is focusing on climate change and biodiversity. Before joining us, Joe worked as a sustainability consultant with a range of private and public sector clients. Outside work he enjoys playing sport, hiking and birdwatching.

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