

## AVIATION

# Green fuels begin to take off?



Group (ATAG). 'This is even more crucial as aviation, unlike automotive, has no alternative to liquid energy fuels in the short to medium term. Hitherto, fuel refiners have not had enough incentive to generate aviation fuels at price levels the industry could afford.'

## Falling short?

SAF is a critical tool in meeting the industry's 2050 aim to reduce net CO<sub>2</sub> emissions by 50% on 2005 levels. Such fuels produce up to 80% less CO<sub>2</sub> over their lifecycle compared to conventional jet fuel. Yet, just 5.5bn litres of SAF are in forward purchase agreements by airlines, none of which uses palm oil or encourage deforestation.

If – and it is a meaningful if – governments create incentives and policies that help accelerate production and commercial deployment, then IATA expects SAF flights could carry 1bn passengers by 2025. This equates to more than 25% of the total number of passengers currently taking to the air every year. But transparency across the industry is vital. Erroneous reporting leads to erroneous forecasts, consequently splintering the industry's confidence and quelling investors' appetites.

'In Europe, airlines don't report what their biofuel use is in the Emissions Trading Scheme (ETS), so it's speculation and claims,' Bill Hemmings, Director of Aviation and Shipping at Brussels-based non-profit Transport and Environment (T&E), warned. 'What is for sure is that all the targets for biofuels in 2020 that industry and supporters have put forward, such as the Biofuel Flightpath 2020, have fallen short. Forecasts should be taken with a pinch of salt.'

But all industry stakeholders agree that environmental pressures will only intensify. Around 4.1bn passengers took to the skies last year – this number is more than twice the size of the global population one century ago. The 7.8bn passengers anticipated by 2036 is roughly equal to the size of the world's population today. Sluggish management of this financial-environmental puzzle, in an industry that would rank 20th worldwide in terms of GDP if it were a country, risks denting global

**Intensifying economic and environmental pressures are forcing aviation to (finally) take a serious look at greener fuels, writes Michelle Meineke.**

**T**he first flight using sustainable aviation fuel (SAF) in 2008 marked one of the biggest milestones in the history of flight, since the Wright brothers first took man to the skies with 12 airborne seconds in 1903. But the pace of innovation over the last decade has failed to live up to the expectations of many in industry and environmental circles. Theoretical plans for greener fuels must be realised – and quickly.

Aviation accounts for around 15% of global oil demand growth up to 2030 in the International Energy Agency (IEA)'s New Policies Scenario, a similar amount to the growth from passenger vehicles. Despite ongoing improvements in aviation efficiencies, the industry will account for 3.5% of global energy related carbon dioxide (CO<sub>2</sub>) emissions by 2030, up from just over 2.5% today. However, while fractured, progress is evident.

So far, there are five technical certifications for SAF and the number of flights using SAF-blends increased from just one in

2008 to 100,000 in 2017, with one million flights anticipated next year, according to the International Air Transport Association (IATA).

Some airlines, including United, Cathay Pacific, FedEx, Japan Airlines, Qantas and KLM are engaged in multi-million dollar forward-purchase agreements with SAF fuel suppliers and/or investments in SAF supply. And several airports now have regular SAF supplies, including San Francisco, Los Angeles, Bergen, Oslo, Stockholm and Brisbane. These proactive companies – both on the ground and in the air – are among the earliest adopters of sustainable aviation fuels, and wider adoption must be encouraged.

'This is where public policy becomes crucial, as seen in biofuels for the automotive sector that long received encouragement or even outright subsidy from the public sector to incentivise production. It is now high time that SAF is put on the same pedestal,' explained Michael Gill, Director of Aviation Environment at IATA and Executive Director of the Air Transport Action

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prosperity. Proactivity is key if the industry is to contribute \$1.5tn to world GDP in 2036, as forecast by ATAG.

### Scaling up

The world's first Hyperloop transport system will travel at over 600 mph from 2020 and humanity will head further into the solar system than ever before when a crew orbits Mars in 2023. Against the backdrop of modern engineering marvels, why is scaling up SAF so difficult?

In short, economic incentives fail to resonate with stakeholders in aviation, an archetypal boom-and-bust industry where airlines and airports must constantly sharpen their competitive edges. Equally, with current fuel costs making the biggest dent in airlines' budgets at 22% of direct costs, surely exploring potentially-cheaper SAF makes sense?

'Meeting 2% of annual jet fuel demand from international aviation with SAF could deliver the necessary cost reduction for a self-sustaining aviation biofuel market thereafter,' said Pharoah Le Feuvre, Energy Analyst at the IEA. 'Meeting such a level of demand requires increased Synthesised paraffinic kerosene produced from hydro-processed esters and fatty acids (HEFA-SPK). If met entirely by new facilities, approximately 20 refineries would be required. This could entail investment in the region of \$10bn. Although significant, this is relatively small compared to fossil fuel refinery investment of \$60bn in 2017 alone.'

The ease of aviation – a passenger can see London's Big Ben and the Sydney Opera House on the same day – belies the complexity involved. In the last 24 hours alone, more than 90,000 flights and more than 6mn people have flown and landed safely and

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more than 7,000 litres of jet fuel a second have moved through the global distribution system. SAF development and volume must be aligned with these extreme logistical demands.

'The scalability of SAF is key. Using a market-based mechanism seems like yesterday's approach and not fit for purpose in today's growing aviation industry. How do you get the process going? How do you industrialise these fuels?' Hemmings asked.

Answering these questions encompasses better communication with downstream fuel operators over supply-demand dynamics, especially as refineries and storage operators need time to adjust to the market's evolving needs. The good news is that the centralised nature of aviation fuelling means that less than 5% of all airports handle 90% of international flights, so SAF availability at a small number of airports could cover a large share of demand, according to the IEA. A targeted rather than scattergun approach will save time and money (and reputational damage).

### Picking up speed

Among the many steps required to incentivise stakeholders – refiners, airlines, airports and more – are policies that de-risk investments into SAF production plants, such as loan guarantees and capital grants. Awareness and understanding of the challenges will improve the flow of funds for off-take agreements, tax incentives for public-private partnerships for early stage plant development and much-needed research and development. The latter could help to explore the use of more affordable feedstocks, such as agricultural residues and municipal solid wastes, as well as determine the value of carbon pricing.

Promoting cross-industry knowledge would also spur progress. Why 'reinvent the wheel' when other sectors have gone through, or are experiencing, similar challenges with greener fuel policies? In this vein, aviation can look to shipping, a sister industry also historically cast in unfavourable light by environmentalists.

The process of complying with the International Maritime Organization (IMO)'s bunker fuel sulphur cap, which comes into force from 1 January 2020, initially threw stakeholders into a spin. What is the biggest change in the shipping industry since engines replaced sails in the late 1800s will potentially increase annual bunkering costs by \$60bn, according to analysts Wood Mackenzie.

Yet frustrated stakeholders in the bunkering value chain have made significant – if uncomfortable – progress to meet the 2020 deadline, including rejigging balance sheets and downstream supply-demand outlooks. Aviation can cherry pick the most relevant lessons from the IMO 2020 template of how to overhaul fuel norms at relative speed. Stakeholders must still be wary of a 'one rule for all' strategy. Global applicability is rare in any business and, for example, there may be resistance to SAF in Asian countries that have developed a domestic reliance on palm oil.

The industry's extremely high safety standards – and logistical spiderweb – make it tricky to figure out how to affordably meet rising fuel demand requirements while ticking environmental boxes. But the tools and technologies do exist – it's now up to the industry to get sustainable aviation off the ground. ●

## CORSIA: Five months and counting

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is the only market-based measure to address emissions from international aviation, particularly addressing the increase in total CO<sub>2</sub> emissions from international aviation above 2020 levels.

SAF can be used as part of compliance, though production levels are not high enough for it to be a primary solution. Under the global scheme, it became mandatory on 1 January 2019 for all aeroplane operators with international operations to monitor, report and verify their CO<sub>2</sub> emissions. So far, 79 states signed up from 2021, representing 77% of international aviation activity.

'We are especially encouraged to see a growing number of developing countries that would originally have been exempted from the voluntary phase to join CORSIA. It is a very positive start.

More states joining CORSIA from its pilot phase shows greater commitment from the international community, wider coverage of the emissions to be offset and the integrity of the scheme,' Yue Huang, the Manager of Aviation Environment at IATA said.

CORSIA will mitigate around 2.5bn tonnes of CO<sub>2</sub> and generate over \$40bn in climate finance between 2021 and 2035. Consequently, it will result in a greater CO<sub>2</sub> mitigation in international aviation than any domestic policy for aviation can achieve. As CORSIA only governs emissions from international aviation, the patchwork of national and regional carbon pricing instruments – such as the EU ETS – remain a hurdle to global cohesion.