Sustainable Aviation Fuels I – Policy Landscape

Introduction

Transport currently accounts for 29% of worldwide greenhouse gas (GHG) emissions, and for as much as 20% of all global CO_2 emissions[i]. More specifically, aviation accounts for 11.6% of all transport CO_2 emissions, amounting to 2.5% of worldwide CO_2 emissions overall[ii]. Commercial air traffic has experienced a constant increase since the start of the 21st century – with the exception of 2020 and 2021 where traffic significantly dropped as a result of the Covid-19 pandemic[iii] – and is now on track to account for as much as 27% of global carbon emissions by 2050, if nothing is done[iv]. As a result of these trends, aviation is now a prime target for sustainable innovation. Multiple low- or zero-carbon technologies are being researched, but in the short term, only sustainable aviation fuels (SAF) can alleviate some of the pressure and significantly reduce the sector's GHG emissions.

Sustainable aviation fuels are low-carbon fuels manufactured from renewable or low-carbon waste feedstocks[v]. Such feedstocks can include waste vegetable oils, animal fat, agricultural residues or even CO_2 produced from non-fossil sources. In addition to providing a valorisation route for enormous quantities of waste, SAF are so-called "drop-in" fuels, meaning that they can be easily blended with conventional fossil-derived fuels and be used in conventional jet engines[vi]. Thanks to these properties, sustainable aviation fuels are a rapidly growing industry. Market forecasts expect the sector to grow from $67 million in 2020 to $13.8 billion by 2026, registering an increase of 67% annually during the forecast period[vii]. Therefore, the sector offers an incredible number of opportunities for industrial stakeholders looking to expand their business portfolio.

The regulatory landscape surrounding SAF is rapidly evolving and provides the bedrock for the exponential expansion of the SAF market. Over the past 6 years, the global number of legally binding policies supporting the development of SAF has gone from 1 between 2013 and 2017, to 22 in 2022[viii]. With an increasing number of countries pledging to achieve net-zero by 2050, low-carbon aviation is becoming a priority area for new policies and environmental strategies.

In this first article, we will look at the current policy landscape designed to promote the global development and the incorporation of SAF, and specifically development in the EU and UK.

SAF in the world

This section intends to give a broad overview of current general trends, shining a light on countries and regions which are particularly active in promoting SAF, and which are intending to place themselves at the forefront of the SAF industry.

The Asian-Pacific region, roughly spanning from Japan in the North down to New-Zealand in the South, is a very heterogeneous area in terms of its SAF policy landscape. According to the UN International Civil Aviation Organization (ICAO), the first ever global policy for the support of SAF was adopted in Indonesia in 2013[viii], and set up the Indonesian Aviation Biofuels and Renewable Energy Task Force (ABRETF), with the aim of supporting the development of legislation to increase the country's use of SAF by 2018, and to mandate an incorporation rate of 5% SAF by 2025. Since 2013, only New Zealand and Japan have introduced new SAF-related legislations in the region, both of which have been under development since 2021. In the case of New Zealand, the proposed policy targets fuel suppliers who

would be required to reduce GHG emissions from fuels placed on the market by a specified percentage each year. This would be applied to all fuels, including aviation fuels. In addition, biofuels would need to comply with strict sustainability criteria to ensure that the feedstocks used are not interfering with food production and/or contributing to biodiversity loss[ix]. In addition, Japan are looking into a mandate that would legally bind Japanese airlines to fuel their aircraft with a minimum of 10% SAF by 2030[viii].

Other countries in the region are beginning to develop decarbonisation strategies, which often include the promotion of SAF, however, none have yet reached the stage of legally binding policies. The Asia-Pacific region may not be at the forefront of the SAF policy landscape so far, but there is a mounting interest in the sector, with regional industrial stakeholders showing themselves to be very dynamic. The industrial aspect of the SAF sector will be covered in a subsequent article, with a particular focus on Asia's keen interest in supplying feedstocks for the production of SAF.

The American continent currently hosts six relevant legislative developments spread out across the US, Canada and Brazil, although only one has been adopted so far, while the others remain under development. The Low Carbon Fuel Standard was adopted in California in 2018, and was designed to credit innovation into new low-carbon fuel projects[viii]. In 2021, two federal bills were further proposed which are now under development; these aim to support the development of SAF via substantial tax incentives and R&D funds. In Canada, so far, the proposed legislations remain more general and aims to target transport fuels as a whole, with no clear mention on SAF[viii]. Finally, since 2019, Brazil has been developing its RenovaBio bill, which is designed to promote the decarbonisation of all transport fuels. A special committee is currently looking into adding specific incentives for SAF[viii].

So far, there have been no policies designed to push for the development of SAF in Africa. However, there is enormous potential for feedstocks and biofuels production in Sub-Saharan countries. Environmental agencies, industrial stakeholders and academics are rallying to develop resources, perform feasibility studies and study potential supply chains to build foundations on which national policies can be established[x]. This will be discussed further in a subsequent article.

Finally, Europe is intending to place itself amongst the leaders of the SAF industry, Individual member states, as well as the European Union as a whole, are establishing bold blending mandates and sponsoring R&D projects on a large scale. Further detail is provided below.

SAF in the European Union

Reducing GHG emissions from aviation has been high on the EU's priority list for a decade now. With aviation accounting for 3.8% of the Union's total CO_2 emissions in 2017, it is a prime target for environmental policies and innovative projects. In 2012, aviation was incorporated within the EU Emissions Trading System (EU ETS), which is the world's biggest carbon trading market and a crucial tool for the Union's fight against climate change[xi]. As part of the EU ETS, all airlines operating in Europe (including European and non-European airlines) are required to record and report the emissions resulting from their activity. In return, the EU grants them "tradeable allowances", which cap the amount of pollution "allowed" at any given time[xii]. These certificates are tradeable between companies, meaning that airlines that emit less can sell their allowances to other airlines or industries that emit more than their allotted share. This is designed to incentivise innovative measures that reduce CO_2 emissions.

At the heart of the European Green Deal, adopted in 2020, is the EU's pledge to become the first net zero continent by 2050. On its way to achieving this target, the EU has set a milestone of at least 55% CO_2 emissions reduction by 2030, compared to 1990 levels. To achieve this goal, the EU has set out its "Fit for 55'" strategy, which lays out a set of proposals to update EU laws to ensure that the 2030 and

2050 targets are still within reach[xiii]. As part of its "Fit for 55" package, the European Commission released its ReFuelEU Aviation proposal, setting out the terms under which the Union aims to decarbonise its aviation sector[xiv]. The first main measure would be to establish a mandate on fuel suppliers for the incorporation of SAF. The blending obligation would start from 2% in 2025 and progressively increase to 63% in 2050. The proposed legislation also includes a sub-target of 0.7% of e-kerosene blending from 2030. e-SAF is a subcategory of SAF in this case produced from renewable hydrogen and CO_2 captured from a concentrated source or directly from ambient air[xv]. ReFuelEU also aims to provide logistical support by requiring EU airports to provide the necessary infrastructure for storage and blending of SAF.

SAF in the United Kingdom

In addition to the EU directives and initiatives supporting renewable energy, to which the UK was, and is still working to in parallel, the UK has also developed SAF policies of its own. In 2018, the UK's Renewable Transport Fuel Obligation (RTFO) was amended to include conditions under which the production of SAF is rewarded to the same extent as the production of biofuels for road transport, through tradeable certificates being awarded to suppliers[xvi].

The country's strong wish to become leader in the SAF sector was officially voiced through the Prime Minister's Ten Point Plan, published in November 2020. Point 6 of the plan is dedicated to reaching net zero emissions in aviation, by "taking immediate steps to drive the uptake of sustainable aviation fuels, investments in R&D to develop zero-emission aircraft and developing the infrastructure of the future"[xvii]. The plan was not designed as a policy *per se*, but more as an initial announcement ahead of formal strategies and future legislation.

Point 6 gave rise to the Jet Zero Strategy. In July 2021, the government published a consultation to gather feedback on the current draft of its Jet Zero strategy. The Jet Zero consultation lays out the government's five proposed policies and opens the conversation on the ideal approach to reach the 2050 target. The policies cover the following topics: improving the efficiency of the UK's aviation system; accelerating the development and deployment of sustainable aviation fuels; supporting the development of zero emission flight; ensuring a cost-effective use of markets to drive down emissions; and influencing the behaviour of consumers[xviii].

Following the Jet Zero consultation, the UK government also opened a consultation on the specific establishment of a SAF blending mandate. It closed in September 2021, and the feedback is currently being analysed. The consultation aims to gather views on the overall design of the mandate, looking at sustainability criteria, reporting methods and compliance issues. The consultation also seeks feedback on how best to develop the mandate so that it also supports the development of SAF production plants in the UK[xvi].

Conclusion

On a global scale, Europe and the US are currently leading the way for the establishment of legally binding targets for the reduction of GHG emissions from aviation and for the incorporation of SAF in fuels blends. Industrial stakeholders in Asia and Africa are evaluating the domestic and international opportunities offered by SAF. Both continents have incredible potential for feedstocks production, which might provide a solid base for national policies.

In the second article of this three-part series on sustainable aviation fuels, we will look at the sector's current technological landscape, providing an overview of current practices, as well as an outlook on future innovations.

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