

Position Paper Sustainable Aviation Fuel in the Federal Republic of Germany

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German and international airlines have committed to flying and operating in a CO₂-neutral manner by 2050 ("Net-Zero"). Politicians and the public expect aviation to make its necessary contribution to achieving the climate targets.

Aviation is a so-called "hard-to-abate" industry. On the one hand, there is no other, more environmentally friendly form of mobility that could replace air transport, and on the other hand, there is a lack of technological options and solutions that would lead to a rapid and substantial reduction in aviation emissions. It will likely take decades before electricity and hydrogen can make a noticeable contribution to CO₂ emissions reductions. The only way for aviation to get on the path to net-zero today, and to even be able to achieve the net-zero goal by 2050, is through sustainable aviation fuels (SAF). All stakeholders agree on this insight.

As part of the "fit for 55" package, the EU will oblige European aviation via the ReFuelEU Aviation Directive to gradually introduce SAF ("blending mandate"). The EU Commission's proposal provides for the mandatory use of 2% SAF from 2025, and 5% from 2030, 20% from 2035, 32% from 2040, 38% from 2045, and 63% from 2050. The EU Parliament, in response to the Commission's proposal, proposes an even more ambitious ramp-up. 2% from 2025, 6% from 2030, 20% from 2035, 37% from 2040, 54% from 2045 and 85% from 2050.

Sustainable aviation fuels have the same properties as fossil kerosene and can therefore be blended with it. The production process uses CO₂ that is already present in the atmosphere, i.e., ideally, no additional, new CO₂ is added to the atmosphere. Roughly speaking, two types of SAF can be distinguished, based on their basic materials. On the one hand, SAF that is produced from biomass or waste (biogenic feedstock). On the other hand, fully synthetic SAF, which is produced from water, CO₂ and energy via so-called power-to-liquid processes (PtL).

In 2019, approximately 10 million tons of kerosene were refueled in Germany alone. Air traffic is expected to continue to grow steadily after reaching pre-pandemic levels by 2024 at the latest, and with it kerosene demand. Current SAF production capacities in Germany are estimated to be well below 10,000 tons p.a., i.e. less than 0.1% of consumption in Germany in 2019.

Based on the planned requirements of the EU Parliament, 200 thousand tons of SAF would have to be used in Germany in 2025, and 600,000 tons c.p. in 2030. This means that current capacities would have to be increased more than 20-fold and 60-fold, respectively, over a period of 2 to 7 years.

How is this supposed to work? The German government and the EU are increasingly focusing on the development and use of power-to-liquid processes and plants. So far, however, there are only pilot plants in which this process is being tested and optimized. The efficiencies of these plants are still low compared to other processes and are therefore still far from industrial use. In addition, the feedstocks for PtL SAF are green hydrogen and CO₂, which is extracted from ambient air, industrial processes or biogases. Neither of these feedstocks is currently available in a quantity sufficient for significantly large-scale production of SAF, nor will it be for the foreseeable future. This circumstance has also been taken into account by the EU Parliament. In its proposal for the blending mandate, only 1/3 of the 6% SAF share in 2030 is to be covered by PtL SAF. In other words, in 2030, 2/3 of SAF production, or 4% of fuel demand, is to come from biogenic production processes that use biomass

and waste as feedstock. In 2035, biogenic SAF is expected to account for 15% of fuel demand (5% PtL), 24% in 2040 (13% PtL), 27% in 2045 (27% PtL), and 35% in 2050 (50% PtL).

It becomes very clear that a one-sided focus on PtL processes today is short-sighted and certainly not expedient. Even if PtL processes are to be regarded as the gold standard for SAF production, the lion's share of SAF production will have to be carried by biogenic processes for at least the next 25 years. And even after 2050, large quantities of SAF will have to be produced by these processes. A major advantage of biogenic processes is that certified and feasible production processes already exist for a comprehensive range of biogenic feedstocks. Accordingly, all over the world, new plants are being planned, built, or are already in production that process oil- and fat-containing, starch-containing, sugar-containing, and/or lignocellulosic (wood- and stalk-based) biomass into SAF, i.e., using, among other things, organic municipal and industrial waste or residues from agriculture and forestry.

If there is going to be such a large growth in demand for SAF, why aren't production facilities springing up? Unclear, inconsistent requirements from Brussels, costly approval processes, and a lack of financial incentives lead to uncertainty that prevents investments in such large and long-term projects. It would be fatal if policymakers were to adopt binding requirements regarding the use of SAF, but at the same time fail to create the necessary conditions for the expansion of production capacities. Whoever says A must also say B. Otherwise, it will be difficult for aviation to play its part in achieving the climate targets. Especially for the state of Hesse, which is home to Frankfurt Main, Germany's largest airport and one of the largest airports in Europe, and which serves as the main location for Lufthansa AG, it is crucial to take a pioneering role in the provision of SAF. With the provision of technical facilities in Frankfurt Höchst for a PtL pilot plant by Ineratec, the first step has been taken in the field of PtL. However, in order to be a comprehensive technology location in the field of SAF and, more importantly, to be able to produce and provide quantities of SAF that actually make a difference and meet the political targets, all stakeholders in the state of Hesse should also set about planning and building a production plant that processes biogenic feedstock into SAF.

We therefore advocate the establishment of a roundtable of top representatives from the state government of Hesse, German aviation companies, Fraports, the fuel industry, and KfW bank group, with the goal of discussing and initiating the development of SAF production capacities in the state of Hesse in a sustainable and comprehensive manner.