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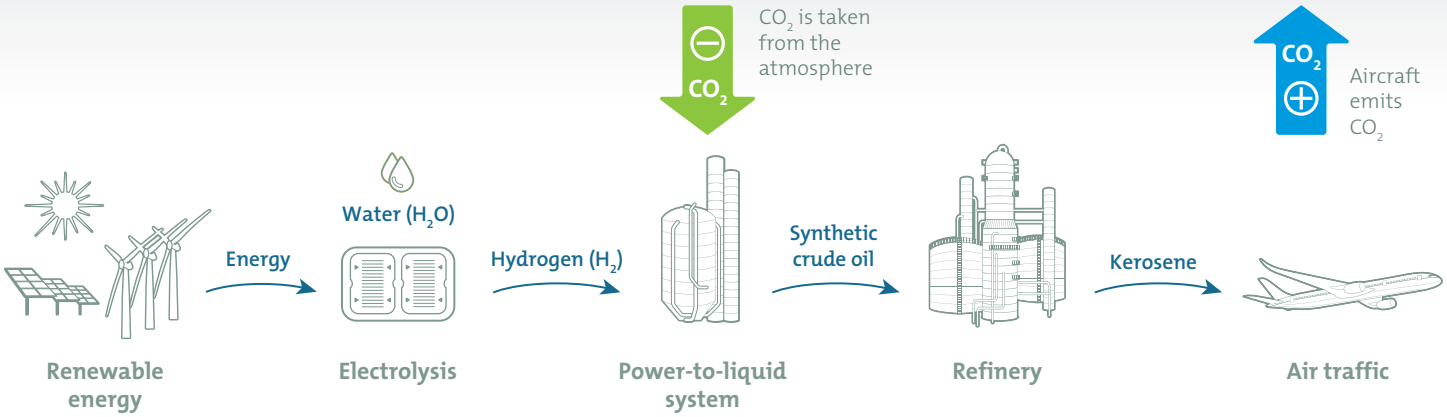
Facts and background on German air traffic
BDL Bundesverband der Deutschen Luftverkehrswirtschaft

How can aircraft fly carbon-neutral?

By using energy-efficient aircraft, aviation has significantly reduced fuel consumption and thus CO_2 emissions per flight. Against the background of the increasing global demand for air transport, however, the question arises as to how the aviation industry can not only slow down the increase in emissions, but also actually reduce them – right down to carbon-free flying. What contribution can synthetic fuels make to this, and what can aviation and politics do?

Fuels from the power-to-liquid process make carbon-neutral flying possible in the long term

Airplanes fly with synthetic kerosene and emit CO_2 – this was previously taken from the atmosphere during production



Currently, air transport is responsible for 2.8% of all CO_2 emissions worldwide. The aviation industry is pursuing the goal of flying completely carbon-neutral in the long term; however, this is more difficult to achieve than in other economic sectors. This is due to long development times for aircraft, the fact that alternative technologies such as electric flying will not be available or will only be available in the distant future, and the growing global demand for air transport.

An important lever for limiting CO_2 emissions is the replacement of older aircraft with new, more energy-efficient aircraft that consume around 25% less kerosene. In this way, CO_2 emissions per passenger have been reduced by 44% since 1990.

The reduction of CO_2 emissions through fleet modernization is supplemented by internationally agreed CO_2 pricing instruments that define a clear limitation and reduction path for CO_2 emissions. For intra-European and intra-German flights, this is implemented by the inclusion of air traffic in the European emissions trading system; for international flights, the CO_2 pricing instrument CORSIA is used.

However, the long-term goal of reducing CO_2 emissions in air travel to zero can only be achieved if fossil kerosene is replaced by regenerative fuels. There are several approaches to this. The best way, in particular from an ecological point of view, is an electricity-based fuel that is produced via the so-called “power-to-liquid” process.

This is how it works: A synthetic fuel is obtained from electricity generated from renewable sources, water, and CO_2. During production, CO_2 is taken from the atmosphere, combined with hydrogen to form a synthetic crude oil, and then processed into kerosene. If an aircraft then flies using this fuel, it emits the same amount of CO_2 into the atmosphere and thus in fact moves carbon-neutrally.

The resulting fuel is interchangeable and mixable with conventional kerosene and can therefore be used in compliance with all quality and safety requirements. The use of these fuels does not require any modifications to aircraft, turbines, or refueling infrastructure.

The use of alternative fuels in regular flight operations cannot be realized overnight as these are currently only available in small quantities and are still too expensive.

But the technology for the production and use of synthetic fuels is proven and feasible. The question of whether and when such fuels can be used is therefore essentially not one of technical feasibility but of the energy policy framework.

Prerequisite: Construction of production plants

Until now, synthetic fuels from renewable energy sources have not been available in sufficient quantities but are mainly produced in very small amounts as part of research projects. The most important starting point is therefore to set up industrial plants for the production of power-to-liquid fuel so that it can be produced in appreciable quantities.

The German aviation industry is prepared to participate financially in pilot projects and is also involved in the Global Alliance Power Fuel, an association of the energy industry, plant manufacturers, aviation, and the automotive industry.

In addition, the aviation industry proposes that the German federal government uses the revenues from air travel tax in future for the production and market introduction of regenerative fuels. At present, the government collects around €1.2 billion in air travel tax per year without using the tax revenue specifically for climate policy purposes in air travel.

Prerequisite: Ensuring competitive prices

To date, synthetic fuels cost many times more than conventional kerosene. While the market price for fossil kerosene is €0.45 per liter, under current conditions power-to-liquid fuel would cost an average of €2.40: five times as much.

The establishment of a binding quota for blending synthetic fuels would be a viable option at a global level as it would affect all airlines in the same way. However, any attempt to set such a quota in national exclusive agreements would severely distort competition in air transport.

Fuel costs already account for around a quarter of an airline's operating costs. If it was stipulated purely at a national level that German airlines must add 10% power-to-liquid fuel, the operating costs of such companies, which have their main flight operations in Germany, would suddenly increase by 11% as every flight would be subject to this regulation. With a 50% quota, operating costs would increase by 55%.

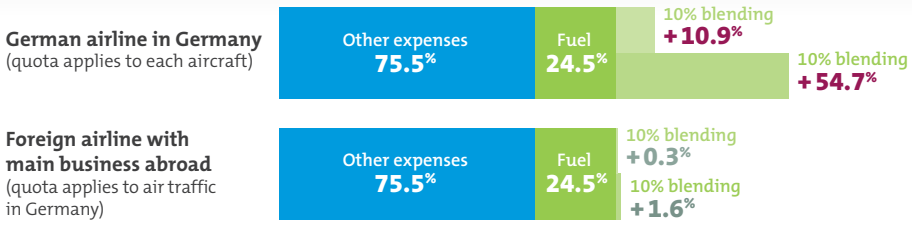
On the other hand, the effects on airlines with their main operations abroad would be marginal. Even if the quota were designed in such a way that foreign companies would at least have to blend in accordingly for traffic with Germany, this would have only a minimal effect on their operating costs. Such unequal costs could not be passed on to customers by the German airlines in the form of higher prices and would therefore result in a clear competitive disadvantage.

International roadmap required

In any case, an internationally coordinated roadmap is needed to ensure that plants are built and that fuel is sold at marketable prices. Any quota regulations should ideally be defined globally (analogous to the internationally agreed CO_2 pricing instrument CORSIA). In addition to the UN aviation organization ICAO, which must set the global framework, the EU and its member states should also launch a joint industrial policy initiative for the market launch of power-to-liquid fuels. In Germany, the federal government, states, aviation industry, and trade unions have agreed to the "Leipzig Statement" on the development of a joint roadmap.

National quotas would make operating costs unilaterally more expensive

Effects of a purely German blend ratio on operating costs in Germany and abroad*



* Underlying assumptions: The price for power-to-liquid fuels is €2.40 per liter. Fuel costs account for 24.5% of operating costs (IATA average over the last five years). German business accounts for 3% of total business with foreign airlines (average of British Airways, Air France, KLM, and Turkish Airlines).

About the BDL:
The German Aviation Association (BDL) was founded in 2010 as a joint representation of the interests of the German air-transport industry. Members of the association are airlines, airports, German air traffic control and aviation service providers. These companies employ more than 180,000 employees. Air transport in Germany enables mobility for more than 200 million passengers a year and contributes to the transport of goods worth more than €200 billion to strengthen Germany as a business location.

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