

4. SUSTAINABLE ALTERNATIVE FUELS

PROGRESS IN CLEAN RENEWABLE ENERGY SOURCES FOR AVIATION

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Sustainable Alternative Fuels

The use of sustainable alternative fuels is an important element of the basket of measures for reducing aviation's impact on the global climate and also on air quality. Recognizing the need for information exchange in this important area, ICAO held its first Conference on Aviation and Alternative Fuels in 2009 and launched the ICAO Global Framework on Aviation Alternative Fuels (GFAAF). This online platform (<http://www.icao.int/altfuels>) provides a continuously updated database of activities and developments in the field of alternative aviation fuels, as well as useful documentation and links, to support information sharing and dissemination for the benefit of the aviation fuels community.

In the nearly seven years that have passed since the ICAO Conference, the progress achieved in this area has been impressive. At that time, ASTM D7566, *Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons*, which provided the framework for approving alternative jet fuel pathways had just been published. Today, there are five pathways that have been approved under ASTM D7566 for producing alternative jet fuel and two airports are providing significant quantities of biofuel to their customers, demonstrating beyond any doubt the technical feasibility of producing alternative fuels for aviation that do not require changes to aircraft or fuel delivery infrastructure.



Global Framework for Aviation Alternative Fuels

While the technological feasibility for alternative jet fuels is proven, barriers to large-scale deployment of such fuels remain. The most significant challenge affecting the demand for alternative fuels is the tremendous price gap between conventional fuels and biofuels for aviation. Suppressed demand for alternative aviation fuels then, in turn, limits the investment in biorefineries that is needed in order scale-up production. Incentives and policies are possible means to facilitate sustainable, commercial-scale deployment (see articles page 155, page 159 and page 166).

2009	2010	2011	2012	2013	2014	2015	2016
<ul style="list-style-type: none"> • ASTM D7566 Approved • ICAO GFAAF Launched 	<ul style="list-style-type: none"> • First single-engine propeller transatlantic flight from Canada to Germany powered on biofuel 	<ul style="list-style-type: none"> • First commercial flights operated using biofuel 	<ul style="list-style-type: none"> • Flightpath to a Sustainable Future, an ICAO special Rio+20 global initiative, the first-ever series of connecting flights powered by sustainable alternative fuels, on which the ICAO Secretary General, travelled from Montréal to Rio de Janeiro 	<ul style="list-style-type: none"> • First regular flight operations using alternative fuel began between New York, United States and Amsterdam, Netherlands 	<ul style="list-style-type: none"> • 21 airlines used alternative fuel on commercial flights 	<ul style="list-style-type: none"> • Oslo Airport in Norway became the world's first "bioport" by offering 2.5 million litres of aviation biofuel annually to its users 	<ul style="list-style-type: none"> • Fifth pathway for alternative jet fuel approved on 14 April 2016 and Los Angeles international airport in the United States, will have more than 56.8 million litres of aviation biofuel available over a 3-year period

Other Sources of Clean, Renewable Energy

Sustainable alternative fuels is an important form of clean energy being embraced by the aviation sector, but it is not the only one. As reported by the International Renewable Energy Agency, IRENA, the cost to install renewable electricity facilities, in particular wind and solar power, has fallen sharply in recent years and are expected to continue declining over the near term. This trend is enabling the transition to renewable, clean sources of energy for aviation. Based on the Action Plans on Emissions Reduction submitted by States, 59 States representing 79 per cent of global international air traffic indicated that they will pursue investments in sustainable alternative fuels for aviation and 37 States representing nearly 35 per cent of global international air traffic intend to engage in clean and renewable energy use at airports. ICAO is currently implementing a pilot project in Jamaica for the use of solar power at airport gates for providing electricity and pre-conditioned air to parked aircraft. In addition, as described in later in this chapter, a methodology under the UNFCCC Clean Development Mechanism (CDM) for the quantification of emissions reductions from the use of solar-at-gate was approved in 2016 (see article page 151).



Figure 1. Solar at airport

Emerging Technologies

Although not ready for wide-scale application today, the use of solar energy offers promise for aircraft propulsion over the long term. As announced in 2014, ICAO is an Institutional Aeronautical Partner for the Solar Impulse around-the-world flight that is demonstrating the potential of using clean, renewable, solar energy for powering an aircraft in flight. In addition, a number of experimental electrically-powered aircraft demonstrations have been conducted, showing a future where aircraft may no longer be dependent on liquid fuels (see article page 174).



Figure 2. Solar impulse (courtesy of Solar Impulse)

Next Steps

Promotion, further information sharing and exchanges between States on clean, renewable sources of energy continue to be pursued through ICAO. Recognizing the substantial progress achieved in recent years, an ICAO seminar on the topic is planned for February 2017 to serve as an information session for a Conference on sustainable alternative fuels and clean energy for aviation that will be held in November that year to ensure the right steps are taken to foster the development and deployment of clean energy sources to power aviation activities.

Sustainable Development Goals

