



# Backgrounder

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## **Boeing and Sustainable Aviation Fuel Development**

Boeing is committed to protecting the environment and supporting commercial aviation's long-term sustainable growth. As part of our commitment, Boeing is an industry leader in efforts to develop and commercialize sustainable aviation fuel. This helps reduce reliance on petroleum fuel, makes flying a responsible choice for travelers, and supports our industry and customers in achieving environmental goals.

Commercial aviation committed itself to three ambitious environmental goals in 2008: improve airplane fuel efficiency by 1.5% annually from 2008 to 2020, stop the growth of CO<sub>2</sub> emissions in 2020 onward and cut them to half of what they were in 2005 by 2050. The industry achieved the first goal with an average 2.3% annual improvement. Sustainable aviation fuel is a pillar of aviation's strategy to achieve the other goals.

Among transportation modes, aviation is unique for its dependency on liquid fuels into the foreseeable future. Unlike ground transportation, electric or hybrid-electric power will not be available for short-range commercial aircraft until at least 2030 and even later for long-range models.

Aviation fuel produced from a wide variety of sustainable sources represents a significant opportunity for commercial aviation to reduce its carbon emissions. Scientific studies have shown that sustainable fuels lower greenhouse gas emissions by up to 80% over their life cycle compared to petroleum fuel while supporting economic growth, particularly in rural areas.

Five sustainable aviation fuel production methods, or pathways, have been approved for use in commercial aviation. These fuels are "drop-in" substitutes for petroleum fuels,

requiring no modification to airplanes, engines or fuel delivery infrastructure. Boeing led the approval of the first pathway in 2011 and that fuel has been flown successfully on thousands of commercial flights. Boeing continues to work tirelessly within ASTM, the international standards body, to secure more pathway approvals.

As part of its work, Boeing works with partners on six continents to research, develop and commercialize new sources of sustainable aviation fuel. Boeing collaborates with airlines, governments, non-governmental organizations and private entities to create and execute regional roadmaps in the United States, Canada, Brazil, Mexico, China, Europe, the Middle East, South Africa and Australia. These roadmaps have led to fuel projects utilizing sustainably produced feedstocks such as saltwater-tolerant plants in the United Arab Emirates, nicotine-free tobacco in South Africa and agriculture waste in China.

Boeing is also partnering with the U.S. Federal Aviation Administration and other stakeholders to gain approval for a sustainable fuel called HEFA+, which is produced from agriculture waste. To verify this fuel's performance and characteristics, Boeing tested two blends of HEFA+ on its ecoDemonstrator program using 787 and 757 airplanes.

Known as "green diesel" in ground transport, global production capacity exceeds 1 billion gallons annually. Approval of this fuel would make a price-competitive sustainable supply available that could meet more than 1 percent of global aviation needs.

The commercialization of sustainable fuel is steadily growing. More than 225,000 passenger flights have flown on a blend of sustainable fuel and petroleum fuel — a number that grows every day. Airports in Oslo and Bergen, Norway, Stockholm, Los Angeles and Brisbane, Australia, regularly offer sustainable fuel, and a number of other airports are working to do so.