

DRAFT VERSION. This text is a work in progress. Do not quote or cite without permission from the authors.

This text is an excerpt from the forthcoming publication “Sustainable mobility the Chinese way: Opportunities for European co-operation and inspiration”, to be published in June 2018. The publication is partially funded by the European Parliament. Neither the European Parliament nor the European Liberal Forum asbl are responsible for the content of this publication, or for any use that may be made of it. The views expressed herein are those of the author(s) alone. These views do not necessarily reflect those of the European Parliament and/or the European Liberal Forum asbl.

In-depth case study: Aviation

Author: Mattias Goldmann

Rapid increase in flights, take-off in biofuels

In 2017, more than half a billion domestic and international flights were made in China, according to data from the Civil Aviation Administration of China (CAAC), with a year-on-year increase above 10% for the past several years. IATA predicts that China will surpass the US as the world's largest commercial aviation market by around 2024¹.

Boeing estimates the total investment in new airplanes in China over the next two decades will be \$1 trillion. The state-owned Commercial Aircraft Corporation of China (Comac) is due to launch airplanes made for domestic aviation, which - given that most domestic airlines are state-owned - may take a sizeable share of the market, with export opportunities as well².

China's consumption of aviation fuel is about 20 million tonnes per year, with an estimated demand increase of 10% per year, more than double the global average and in contradiction to the International Civil Aviation Organization's (ICAO's) strategy for carbon-neutral growth³. The CAAC has set a target of reducing greenhouse gas emissions from aviation by at least 4% by 2020, compared with the 2011-16 period⁴.

The rapid rise in Chinese aviation makes it important that emissions-reduction measures are taken, with the switch to biofuels an important component. This would also lead to a reduction in oil imports, which would be beneficial to the Chinese trade balance and overall economy.

Globally, biofuels were approved for commercial use in July 2011⁵ and in October 2011, Air China flew China's first flight using aviation biofuels; one engine ran on 50% biofuel from Chinese-grown jatropha oil supplied by PetroChina⁶.

China's top oil refiner Sinopec started research on aviation biofuel in 2009, and its application for commercial use was accepted by the CAAC in 2012⁷. This makes China the fourth country in the world to produce aviation biofuel, after the US, France and Finland. Sinopec's production capacity is 3,000 tonnes of aviation fuel a year, from materials such as rapeseed,

¹ IATA, 2016-10-18

² CNN, 2017-05-05

³ China.org.cn, 2014-02-12

⁴ Global Times, 2017-11-23

⁵ Bloomberg, 2011-07-01

⁶ China Daily, 2011-10-29 and Air Transport World, 2014-02-14

⁷ Clean Technica, 2015-03-25

DRAFT VERSION. This text is a work in progress. Do not quote or cite without permission from the authors.

This text is an excerpt from the forthcoming publication “Sustainable mobility the Chinese way: Opportunities for European co-operation and inspiration”, to be published in June 2018. The publication is partially funded by the European Parliament. Neither the European Parliament nor the European Liberal Forum asbl are responsible for the content of this publication, or for any use that may be made of it. The views expressed herein are those of the author(s) alone. These views do not necessarily reflect those of the European Parliament and/or the European Liberal Forum asbl.

cotton seed and waste cooking oil, collected from McDonald's and other restaurants. According to Sinopec, the climate gain is estimated at 45%⁸.

China has very large quantities of used cooking oil, of which 3 liters can be converted into 1 liter of aviation fuel after collection, purification and processing. The UCO is particularly beneficial for biofuels, since this would mean that rather than the so-called “food versus fuel” conflict, this is clearly “food and fuel”. Furthermore, since an existing resource is being used, the carbon footprint from the biofuel will be minimal - even though the high altitude climate forcing from aviation is either only marginally reduced or not at all, implying that aviation needs to become more efficient and most likely to a large degree be replaced by other modes of transport⁹.

Any move to biofuels in aviation is expensive, given that conventional aviation fuels are not taxed. Sinopec's cost of aviation biofuels is up to three times more than for jet fuel from crude oil¹⁰. For the biofuels to become viable in aviation and for the Chinese aviation to increase to become more sustainable, China Energy Net Consulting calls for tax exemptions and subsidies for the aviation biofuels sector, in addition to regulations to ensure that used cooking oil is collected and made available for fuel production¹¹. If this happens, China's take-off for aviation biofuels may be highly relevant for other countries to follow, given that aviation's current growth has until now not been matched by the rapid emissions reductions needed to reach the international climate targets agreed upon.

⁸ China.org.cn, 2014-02-12

⁹ IPCC: Aviation and the Global Atmosphere

¹⁰ China.org.cn, 2014-02-12

¹¹ China Daily, 2017-11-23

DRAFT VERSION. This text is a work in progress. Do not quote or cite without permission from the authors.

This text is an excerpt from the forthcoming publication “Sustainable mobility the Chinese way: Opportunities for European co-operation and inspiration”, to be published in June 2018. The publication is partially funded by the European Parliament. Neither the European Parliament nor the European Liberal Forum asbl are responsible for the content of this publication, or for any use that may be made of it. The views expressed herein are those of the author(s) alone. These views do not necessarily reflect those of the European Parliament and/or the European Liberal Forum asbl.

Reference list

Air Transport World, 2014-02-14. *China approves aviation biofuel for commercial use.* Available at: <http://atwonline.com/eco-aviation/china-approves-aviation-biofuel-commercial-use>

Bloomberg, 2011-07-01. *Airlines win approval to use biofuels for commercial flights.* Available at: <https://www.bloomberg.com/news/2011-07-01/airlines-win-approval-to-use-plant-based-biofuels-on-commercial-flights.html>

China Daily, 2011-10-29. *China conducts its first jet biofuel trial.* Available at: http://www.chinadaily.com.cn/bizchina/2011-10/29/content_14000985.htm

China Daily, 2017-11-23. *Waste oil fuels aviation breakthrough in China.* Available at: http://www.chinadaily.com.cn/business/2017-11/23/content_34880563.htm

China.org.cn, 2014-02-12. *China's aviation biofuel goes into commercial use.* Available at: http://www.china.org.cn/business/2014-02/12/content_31460807.htm

Clean Technica, 2015-03-25. *Boeing, Hainan Airlines Operate China's First Cooking Oil-Powered Flight.* Available at: <http://cleantechnica.com/2015/03/25/boeing-hainan-airlines-operate-chinas-first-cooking-oil-powered-flight/>

CNN, 2017-05-05. *The numbers behind China's massive aviation market.* Available at: <http://money.cnn.com/2017/05/05/investing/china-aviation-market-c919/index.html>

Global Times, 2017-11-23. *Aviation biofuel use slow to take off.* Available at: <http://www.globaltimes.cn/content/1076901.shtml>

IATA, 2016-10-18. *IATA Forecasts Passenger Demand to Double Over 20 Years.* Available at: <http://www.iata.org/pressroom/pr/Pages/2016-10-18-02.aspx>

IPCC: *Aviation and the Global Atmosphere.* Special report. Available at: <http://www.ipcc.ch/ipccreports/sres/aviation/index.php?idp=64>