

Clue: A major city



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Jatropha-fuelled plane touches down after successful test flight

Alok Jha, green technology correspondent
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Air New Zealand plane flown on second-generation biofuel

The search for an environmentally friendly fuel for airplanes took a leap forward today with the world's first flight powered by a second-generation biofuel, derived from plants that do not compete with food crops.

An [Air New Zealand](#) jumbo jet left Auckland just before midnight GMT with a 50-50 mix of jet fuel and oil from jatropha trees in one of its four engines. The two-hour test flight, which took the Boeing 747 over the Hauraki Gulf, showed that the jatropha biofuel was suitable for use in airplanes without the need for any modifications of the engines. It forms part of the airline's plan to source 10% of its fuel from sustainable sources by 2013.

"At an emotional level, it was an exciting day today," said Air New Zealand's chief pilot, David Morgan, who was on the test flight. "We achieved everything we wanted to achieve and it as a significant milestone for the aviation industry, doing the very first jatropha-fuelled flight. We're thrilled."

The flight was completed as the US airline Continental announced its own plans to test second-generation [biofuels](#): next week it will fly a plane over the Gulf of Mexico with fuel derived from algae.

Air travel contributes 3% of global carbon dioxide emissions, and is one of the fastest rising contributors to climate change, but the search for a greener alternative to kerosene jet fuel has been problematic. Airlines cannot use standard first-generation biofuels such as ethanol because these would freeze at high altitude. In addition, environmentalists argue that manufacturing biofuels can produce more emissions than they absorb when growing, and can also displace agricultural crops and push up the price of food.

Air New Zealand's biofuel was made from jatropha nuts, which are up to 40% oil, harvested from trees grown on marginal land in India, Mozambique, Malawi and Tanzania. The fuel was pre-tested to show that it was suitable for airplanes, freezing at -47C and burning at 38C.

The flight included a series of tests to assess how the biofuel-powered engine operated compared to the ones running on kerosene at different speeds and at different stages of a normal flight. "The flight was notable for the lack of any surprises – everything ran normally and as expected," said Morgan. "The fuel was indistinguishable from jet A1, a true drop-in fuel. You could not see a difference in the four engines."

Continental's forthcoming demonstration flight will use a mixture of jatropha-derived biofuel and fuel made from algae, supplied by the San Diego company Sapphire Energy, seen as leaders in the search to make useful oil from micro-organisms. In the first commercial test flight of biofuels in the US, one of the engines on a Boeing 737-800 will be filled with a 50-50 mix of biofuel and traditional jet fuel.

"One of the reasons we chose algae and jatropha is that both are not food sources and can be grown in arid regions and virtually anywhere," said Leah Rayne, managing director of global affairs at Continental. "So they do not compete with food crops for water."

She added that, although the jatropha and algae fuels did not require any modifications to current aircraft engines, it would take several years of test flights for the biofuels to be certified for general use by airlines.

Robin Oakley, head of Greenpeace UK's climate change campaign, warned against overinterpreting the results of the test flights. When Air New Zealand announced its biofuel plans in November, he said: "We need a dose of realism here, because this test flight does not mean an end to the use of kerosene in jet engines. The amount of jatropha that would be needed to power the world's entire aviation sector cannot be produced in anything like a sustainable way, and even if large volumes could be grown, planes are an incredibly wasteful way of using it." Environmentalists argue that curbing flights is the only true solution.

The Air New Zealand and Continental planes are not the first to use biofuels: in February, Virgin Atlantic successfully tried a mixture of 80% jet fuel and 20% biofuel - made from coconut oil and babassu palm oil - in one engine of a Boeing 747 on a flight between London and Amsterdam.

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