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Flying With Biofuel Gets One Step Closer

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SINGAPORE — The future of biofuels in aviation is no longer so futuristic.

Having conducted several trials over the past three years, the airline industry is shifting into a new gear, starting to conduct regular commercial flights that rely in part on biofuels.

The international certifying body ASTM International, a standards group based in Pennsylvania formerly known as the American Society for Testing & Materials, approved in July the commercial use of renewable jet fuels derived from natural plant oils and animal fat, giving the green light for hydrotreated renewable jet fuels, or H.R.J. fuels, to be mixed with conventional kerosene up to 50 percent.

The German carrier Lufthansa immediately started a six-month biofuel trial on regularly scheduled flights with its Airbus A321 on the Hamburg-Frankfurt route eight times daily. The aircraft uses a 50 percent blend of bio-synthetic kerosene in one of the two engines while the other engine runs on pure jet fuel.

KLM Royal Dutch Airlines, which ran its first commercial test flight with the mixed fuel in June, started regular commercial service between Amsterdam and Paris on September 30 using biofuel made with used cooking oil. Other airlines are expected to follow suit.

Joachim Buse, vice president for aviation biofuel at Lufthansa, called the move just the beginning, and said there was “still a long way to go.”

“So far the good news after three months of trials is that there has been technically no unexpected behavior,” Mr. Buse said at a press conference in Singapore recently. He said the airline had not received any passenger complaints, though he acknowledged critical articles in German media that noted the social and environmental aspects of the use of biofuel.

He pointed out that despite a tight 40-minute turnaround time for the aircraft and the need for two separate manual refueling exercises, there had been no aircraft delays. “The test is running like clockwork,” he said.

The trial has confirmed that bio-synthetic kerosene can slightly reduce fuel consumption. “Due to the higher energy content of H.R.J., we have effectively a 1 percent reduction in fuel burn of the

right engine," Mr. Buse said. "The expectation is that if we were to use a full blend the overall reduction in fuel burn would be 2 percent." The airline is already reducing its carbon dioxide emissions by one ton per flight, he said.

According to data from the International Air Transport Association, total emissions for the airline industry stood at 649 million tons of CO2 in 2010, up 3.5 percent from the previous year.

The I.A.T.A. estimates that replacing 3 percent of the kerosene in jet fuel would reduce aviation CO2 emissions by over 10 million tons, at an initial cost of $10 to $15 billion in production and distribution facilities.

KLM, which operated its first commercial trial flight between Amsterdam and Paris in June, said its carbon dioxide emissions from the flights between Amsterdam and Paris would be reduced an average of 50 percent. An airline executive contended that this took into account the whole life cycle of producing the biofuel, including shipping it from the United States to the Netherlands.

While airline biofuels do not tend to compete with food supplies, other studies that have looked at the effects of biofuels on farm commodity prices and land use have raised questions about the benefits to be derived from biofuels.

The industry has pledged to stop increasing its carbon emissions by 2020 even as global air travel increases, and to halve its carbon dioxide emissions from its 2005 levels by 2050.

Biofuels are seen as one of the pillars to achieving this target; I.A.T.A. predicts that biofuels could replace 6 percent of kerosene in the airline industry by 2020.

But availability of supply and its cost — biofuel is more than double the price of regular aviation fuel — are now the main impediments to its wider use.

Lufthansa, for example, will need 530,000 cubic meters of biofuel a year to meet the I.A.T.A. goals, Mr. Buse said. That is the equivalent of 18.7 million cubic feet, or about 140 million gallons. The biofuel used by the airline is produced by Neste Oil, mixing jatropha oil, camelina oil, and animal fats. Mr. Buse said jatropha oil was the company's favored biomass feedstock, as jatropha can be grown on degraded land in semi-arid areas, needs no irrigation and is not in competition with anything on the food chain. But he said there was not enough available to even complete the company's current six-month test flights.

Christoph Weber, the chief executive of Jatro, which has been providing the jatropha oil used by Lufthansa and other airlines, predicted that biofuel prices would become competitive by 2014-2015 as production gears up to meet the increased demand projected by I.A.T.A.

Mr. Weber estimated the biofuel market could be worth $2 billion in 2015, and reach $11 billion to $19 billion by 2020 and to $57 billion in 2030.

“At the end of the day,” Mr. Weber said, “green fuel is only good if it can meet price expectations, because the willingness of the industry to pay a premium for something green and renewable is limited.”

In September, the California-based company SG Biofuels joined forces with a consortium including Airbus and the Brazilian carrier TAM to speed up the production of crude jatropha oil as a source for jet biofuel in Brazil.

Working with Bioventures Brasil, an energy crop developer, SG Biofuels plans a multiphased program intended to lead to 75,000 acres, or 185,000 acres, of intercropped jatropha plantations.

“Jatropha has proven to be the most cost-effective and sustainable feedstock for renewable jet fuel,” said Paul Nash, Airbus’s head of new energies, “but the challenge lies in scaling production to meet the demand.”

In the end, Mr. Buse said, the future of biofuel, not just in aviation but for general use, rests on policy decisions intended to more fully reflect the environmental costs of fossil fuels, through imposing a tax on carbon or expanding the market for CO2 emissions.