

Written Testimony
Submitted by
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“Aviation and the Emerging Use of Biofuels”

INTRODUCTION AND OVERVIEW

Good Morning. Thank you for inviting me here to testify. My name is Holden Shannon and I am the Senior Vice President of Global Real Estate and Security for Continental Airlines. I am responsible for all real estate, security and environmental affairs throughout Continental’s worldwide network. For starters today, I would like to point out that we have a long-standing commitment to environmental responsibility and providing our customers clean, safe, and reliable air service. Continental is the world’s fifth largest airline operating 2,500 daily flights to 134 domestic destinations and 131 international destinations through hubs at Newark, Cleveland, Houston and Guam, and together with Continental Express, we are able to carry our annual 69 million passengers far more efficiently than we did a decade ago.

In fact, since 1997, we have reduced the fuel consumption and emissions required to transport a mainline passenger one mile by 35 percent, largely due to our \$12 billion investment in new fuel-efficient Boeing aircraft and related equipment. Today’s airplanes are not just technologically advanced – they are quieter, cleaner and use less fuel than ever before.

That is why our industry represents just 2 percent of all greenhouse gas emissions in the United States. To give you some perspective, today Continental uses about 18 gallons of jet fuel to fly one revenue passenger 1,000 miles – about the distance between Houston and Chicago. By contrast, that same passenger driving his or her car between Houston and Chicago today would burn about 45 gallons of gasoline. In fact, between 1978 and 2007 the airline industry as a whole improved its fuel efficiency, as measured by revenue ton miles per gallon of fuel, by 110 percent, resulting in 2.5 billion metric tons of green house gas (GHG) savings – roughly equivalent to taking more that 18.7 million cars off the road in each of those years! And data from the Bureau of Transportation Statistics confirms that U.S. airlines burned almost 3 percent less fuel in 2007 than they did in 2000, resulting in absolute reductions in emissions, even though they carried 20 percent more passengers and cargo. Recent data suggests further gains in fuel and GHG efficiencies in 2008.

It is an often overlooked fact that airlines have a strong economic incentive to reduce fuel consumption and the resulting GHG emissions because fuel accounts for a significant – and volatile part of our operating budget. In fact, last year, fuel cost Continental more than all of its wages, salaries and benefits worldwide, and more than

all of its airplanes worldwide, and more than all of its hubs and other facilities worldwide. And, unlike other sectors of the economy, airlines have no alternative but to consume jet fuel. Fortunately, with the industry's support, commercial aircraft and engine manufacturers have succeeded in creating significantly more aerodynamic planes and significantly more fuel efficient engines than those of prior generations, resulting in the tremendous decrease in GHG savings I have already described.

Continental, because it has invested \$12 billion in new Boeing aircraft and other related equipment, has one of the youngest and most environmentally friendly fleets in the world. While this investment has already reduced our CO2 emissions significantly, we are not stopping there. We have plans to invest over \$11 billion more in new Boeing aircraft over the next 6 years so we will further improve our fuel efficiency and reduce emissions. And, as other U.S. airlines also invest billions of dollars in new, more energy efficient aircraft, we will continue to see additional significant environmental benefits industry wide.

However, any further major advances in **aircraft** fuel efficiency will be dependent on new engine and airframe technologies that are not yet available in the market place and are not likely to be a significant factor for much of the fleet for the intermediate term.

Therefore, any **achievable** short to medium term environmental gains depend on two factors. The first factor is that the government must make a significant investment in the decades-old and out of date government-run Air Traffic Control system which, if modernized, is projected to reduce greenhouse emissions from aircraft by 12% by 2025. This action would be roughly equivalent to taking another 2.2 million cars off the road each year.

The second factor is that we need to stabilize energy supplies at stable prices which include safe and commercially viable alternatives to crude-oil based fuels.

While we are here today to discuss this second goal, I am attaching, for the record, the testimony of James May, CEO of the Air Transport Association, who just last week testified before the House Aviation Subcommittee on the near term achievable goals for NextGen, which is the modernized ATC system. For the record, we would like to thank this Subcommittee and the full Science and Technology Committee for their steady record of cooperation with the House Transportation and Infrastructure Committee in focusing on the development and funding of NextGen as discussed in last session's FAA Reauthorization Bill as well as H.R. 915, this year's FAA Reauthorization bill. We appreciate the fact that you all understand the role that NextGen can play in reducing GHG.

THE CO BIOFUELS TEST: RESULTS AND CHALLENGES AHEAD

As regard to alternative fuels, because of our commitment to the environment and our leadership in this arena, we decided over a year ago to partner with The Boeing Company and GE Aviation/CFM International to conduct a biofuels flight demonstration to help identify sustainable biofuel solutions for the aviation industry. Together, we

wanted to help continue the evolution toward fuel sources that absorb carbon before the fuel source is consumed, offsetting carbon that is emitted when the fuel is burned.

As a result, Continental performed the first sustainable biofuel flight demonstration in North America on January 7th, 2009, using a two-engine Boeing 737-800 aircraft. That demonstration flight represented many industry firsts:

- The first commercial carrier biofuel flight in NORTH AMERICA
- The first commercial carrier biofuel flight using biofuel derived from ALGAE
- The first commercial carrier biofuel flight using a TWO-ENGINE AIRCRAFT

We worked closely with our partners at Boeing, GE Aviation/CFM International, Honeywell's UOP, and fuel providers Sapphire Energy and Terasol Energy to make the flight demonstration a success. Continental's primary role in the demonstration was to show that the biofuel blend would perform just like traditional jet fuel in our existing aircraft without modification of the engines or the aircraft. We call a fuel like this a "drop-in" fuel. This is important because, as I mentioned, the current engine and airframe technology is unlikely to change materially for many years, so it is crucial that alternative fuel be safe for use with the current aircraft technology.

Although the flight demonstration was one small step of many toward the development of alternative energy solutions, we were able to help gather important data that is needed for the fuel certification process before the biofuel can be used by the airline industry.

The algae and jatropha biofuel blend used in our demonstration flight is considered a second-generation fuel and represents a significant advancement over first-generation fuels like ethanol. Second generation feedstocks like algae and jatropha produce more energy per hectare than traditional, first-generation biofuels and, as a result will be more stable and commercially viable. Moreover, they do not compete with foodstocks, as for example corn-based ethanol does.

To this end, Continental was pleased that the fuel property and performance tests showed that the biofuel blend we tested acted just like traditional jet fuel. The multitude of tests performed by Boeing, CFM, UOP, the Air Force Research Lab, as well as other third party labs on the biofuel prior to our flight, all show that the biofuel we used performs just like traditional jet fuel, with no difference in engine or system performance. Continental is working with Boeing and all of its other flight test partners to compile the results of the testing performed on the various biofuels used in other carriers' flight demonstrations. The results will be shared with the industry and used to help certify alternative fuel for use by the aviation industry.

After we performed our biofuel demonstration flight, we analyzed the digital flight data recorder and other data from the flight to measure the engine performance. We found that the engine and aircraft successfully performed just as they would have using traditional jet fuel, so the test aircraft was returned to revenue service the next day. We

do not anticipate any long term negative impact on aircraft from biofuel use as long as it meets the American Society for Testing and Materials (ASTM) fuel certification standard and “drop-in” fuel criteria. Preliminary tests do show that the biofuels exhibit less smoke, so there may be some benefits that will require closer study, but we are not aware of a need to perform any additional demonstrations.

While we were pleased with the test results we have obtained to date, we would like to see additional long term materials compatibility testing for system components like o-rings and seals by the manufacturers and the wide dissemination of these results. The U.S. organization that certifies jet fuel specifications for use in commercial aircraft is the American Society for Testing and Materials (ASTM) International. They will engage in an extensive data review process before approving new fuel specifications and will decide whether any additional demonstrations are necessary.

While the test itself was highly successful, significant challenges must still be overcome to meet our goal of widespread use of biofuels in aviation.

- A fuel specific standard must be developed which meets key performance and compatibility criteria to ensure safety.
- We will also need to develop a U.S. regulatory requirement mandating the level of quality throughout the supply chain; starting at the refinery all the way through to the airport.
- Federal support will be needed to accelerate the approval and deployment of several alternative aviation fuels that have already been developed and tested.
- Increased funding will be needed for ongoing U.S. military efforts to develop alternative fuels for military jet fleets that will transition to commercial fleets.
- Because of the economic slowdown, investment dollars for already conceived pilot plants and full-scale production plants has dried up. Direct federal support for such infrastructure investments and greater support in the area of research and development, including the feasibility of pipeline use for biofuel transport, may be needed to allow the development plans to proceed.
- In the end, we not only need a stable supply of energy which is independent from foreign oil, but any alternative fuel sources need to be produced in large enough volumes that they are available at an economically viable price. It will take many years to make a robust supply of alternative fuels and a network to deliver it to airports, so continuing our work toward that goal is important now.

With the help of the government and continued coordination of the industry, manufacturers and fuel suppliers, we believe that, as long as an alternative fuel is certified for aircraft use, meets the “drop-in” fuel requirement and is available at an economically competitive price as compared to traditional jet fuel, aircraft operators will have the confidence to start using biofuel blends in revenue flights in the next 5 to 10 years. As the supplies increase in a commercially viable way, we will be able to increase the blend percentage over the years. Continuing this process is a priority, even though there has been a downturn in fuel prices. Fuel efficiency remains an important

concern for us and for our nation, and further reducing carbon emissions and increasing fuel efficiency remains our goal.

CONCLUSION

One final message for today -- as an airline which has invested billions and taken a leadership role in the efforts to increase fuel efficiency, we do want to raise our concerns over certain global climate change proposals which could act to disincentivize companies like Continental who have been proactive in their efforts to reduce their carbon footprint without government mandates.

Any government action that has the effect of capping a company at its existing carbon footprint and then "rewarding" any improvement from that cap punishes companies like Continental, who have been doing the right thing for years by reducing our greenhouse gas emissions.

Biofuels represents an important option for the airline industry to reduce their already small greenhouse gas footprint. And we know that this Committee is well aware of the potential for the use of alternative fuels in the airline industry. We would be remiss if we did not mention that more focus on the potential, the development and the use of alternative fuels is far more productive than to consider the imposition of some kind of cap and trade policy on the airlines

If it is our goal to encourage investments in infrastructure and innovations which improve the environment, leaders must be careful to support and nurture the efforts of companies like Continental who are leaders in those efforts.

We are confident that the measures that Continental, Boeing, and so many others are undertaking and supporting will continue to limit and even reduce aviation's emissions footprint. Commercial airlines can and will remain a very small source of greenhouse gas emissions while continuing to provide our communities, our states and our countries with a way to move people and goods around the globe. Job growth and the global marketplace are critically dependent upon a viable air transportation system and it is clear to us that more air transportation capacity will be necessary, not less.

Again, my thanks to the Science and Technology Committee for holding today's hearing and inviting our participation. We appreciate your leadership in these matters and look forward to working with you to integrate sustainable alternative fuels into the aviation industry in the future.