CO₂ emissions reduction poses long-term challenges for industry

by Thierry Dubois

Carbon monoxide gives a human who inhales it a headache before silently killing him. Carbon dioxide (CO₂) exhalations are business aviation’s enduring headache as mankind seeks to halt its influence on climate change and stave off dire predictions.

Where does this industry stand with its ambitious long-term goals of reducing CO₂ emissions? In November 2009 business aviation’s lobbying groups issued a “commitment on climate change,” referring to “carbon-neutral growth by 2020.” AIN reviewed the stated goals with General Aviation Manufacturers Association (GAMA) and EBAA representatives, as well as an environmentalist specializing in aviation, an operator and the co-president of an aviation research committee in Europe.

It appears progress since 2005—the year established as a starting point—is questionable, and the challenges ahead are daunting indeed.

The 2009 document, authored by GAMA and the international business aviation council (IBAC), pledges “an improvement in fuel efficiency of an average of two percent per year from today until 2020” and “a reduction in total CO₂ emissions of 50 percent by 2050 relative to 2005.” A business aircraft built in 2050 “will be 45 percent more fuel efficient than one built in 2005,” according to the authors of the report. The document was endorsed by a number of lobbying groups, including Egama (the European equivalent of GAMA), EBAA, NBAA, the Asian Business Aviation Association (AsBAA) and many of their national counterparts.

These objectives are “very optimistic,” in the opinion of François Quentin, co-president of the Advisory Council for Aeronautics Research in Europe (Acare). In 2001 the group issued environmental goals for 2020, including reducing CO₂ emissions by half between 2000 and 2020—measured by passenger-mile.

**Pillars of Environmental Improvement**

Has business aviation made progress toward its goals between 2005 and 2010?

“I think so,” Ed Smith, GAMA’s senior v-p for international and environmental affairs, told AIN. Manufacturers are on target, he said, with new aircraft models offering “significant efficiency improvements.” He added that operators are on target, too, because “operators, for economic and environmental awareness reasons, are improving their fuel efficiency.”

Pedro Vicente Azua, EBAA’s COO, divides the 2005 to 2010 period into two distinct parts. “Between 2005 and 2008, business aviation was growing, causing an overall increase in CO₂ emissions,” he said. Since then, he believes the downturn has caused a reduction in CO₂ emissions.

Jeff Gazzard, a board member of the
Alternative fuels alone will cut CO2 emissions to the GAMA-IBAC roadmap, in 2050 to be measured fleet-wide, encompassing fuel efficiency? Smith explained they are and that is a significant achievement.”

What about the improvements sought in fuel efficiency? Smith explained they are to be measured fleet-wide, encompassing all business aircraft in service. According to the GAMA-IBAC roadmap, in 2050 alternative fuels alone will cut CO2 emissions by an expected 40 percent compared with “business as usual.” Technology improvements are expected to account for 15-percent reduction, say GAMA and IBAC, while operations and infrastructure will account for 14 percent.

Gazzard challenges the estimates for technology-driven emissions reductions. "They'll have a harder time trying to reach that goal than commercial aviation; in business aviation, there is no game-changing engine [such as a high-bypass-ratio geared turbofan],” he noted. "I have more faith [based on our record] in our industry’s capacity to innovate.” Smith countered. This third pillar, notably, includes best practices. Smith suggests such refinements as optimized flight planning, reducing mission weight, less use of the APUs on the ground and more accurate evaluation of passenger weights, for example. On a long haul, such adjustments can reduce the mission fuel load.

Enhancements in air traffic management (ATM), which is also part of the third pillar, offer limited potential for business aviation to cut its emissions, in the opinion of Gazzard: “Business aircraft largely fly short distances, so their routing is already as good as it can be. ATM for business aviation is already 92 or 93 percent efficient.” Smith, however, notes that "airplanes currently have to fly from imaginary point to imaginary point in the sky, not necessarily the shortest or most efficient routing.” Azua contends that future Sesar and NextGen advancements, such as continuous-descent approaches, will help business aviation reduce its carbon emissions. Such procedures eliminate the level-off segments that increase fuel burn. They call for greater precision in satellite guidance, and Europe is trailing the U.S. in that regard. The first Egnos (Europe’s equivalent of the U.S. augmented GPS, Waas) approach was flown in Pau, southwest France, in March.

Biofuel Challenges

Alternative fuels are perhaps the most controversial topic. Green lobbyists such as Gazzard have long raised the question of “Do you want to eat or fly?,” referring to the encroachment of fuel crops on land that could be used to grow food. Biofuel promoters argue that second-generation biofuels do not threaten the food supply. Land use change, a process that releases huge quantities of greenhouse gases that would need decades to be recouped by biofuel production, is also a major concern.

In addition, the recent Swafea study (sustainable way for alternative fuel and energy in aviation), ordered by the European Commission, highlighted the challenging business case of building biofuel production facilities. The “biomass to liquid” option would require Europe to invest some €400 billion ($560 billion) over 40 years. About 25 percent of the biofuel produced would power aviation (not only business aviation), and the remainder would power road transportation.

Powered by biofuel, aviation could meet its 2050 target. However, there is little incentive for investors, who would not break even for 10 to 26 years. The study was led by French aerospace research agency Onera. Azua acknowledges that “biofuels are not going to be a game-changer.” He and Smith insist, though, that research activities must continue. Smith added that business aviation’s estimate of the rate of absorption of alternative fuels is actually more conservative than that of the commercial sector.

The full effect of biofuels is projected to “kick in later, around 2030,” according to Smith. As drop-in fuels (they require no change in the engines) biofuels offer the benefit of cleansing an entire fleet overnight, he points out. Smith acknowledges that Swafea’s difficult predictions are arguable. “But you have to make a forecast,” he concedes.

Azura’s Quentin maintains that biofuels are not likely to deliver as promised. In lobbying groups’ forecasts, biofuels will “surprisingly enough, fill the gap between the objectives and the ‘real’ world of technology,” he told AIN. He pointed out that lobbyists and even politicians have a vested interest in making promises about biofuels.

Europe’s ETS Starts Next Year

Are bizav lobbyists supporters of the European Union’s emission trading scheme (EU ETS)? Azua is: “We are counting on the EU ETS for a real reduction in CO2 emissions, as soon as 2012, when aviation is included in the scheme.” In preparation, business aircraft operators have already had to take a hard look at their emissions. “This has made them notice the amount of fuel they burn annually,” Azua said.

Azua, however, makes it clear that EBA is unhappy with the administrative burden and associated costs the ETS imposes: “They are disproportionate for business aviation.” Smith agrees on that point, adding another concern: “We think non-EU operators are [illegally] affected by a regional regulation.” (It is this angle that drove the U.S. Congress not to reject the ETS in July.) As it is, the EU ETS simply transfers out of the aviation industry money that otherwise might have gone into R&D via the general coffers of member states, Smith notes. According to the ICBA/GAMA plan, “market-based measures” will play just a small interim role in bizav’s CO2 cuts.

However, as Dassault Falcon Service managing director Bertrand d’Yvoire notes, a lot of business aircraft operators will remain unaffected by the ETS. The threshold, at 10 metric tons of CO2 emitted per year, is relatively high (and Dassault Falcon Service’s operations fall below the threshold). D’Yvoire estimates that only 15 to 20 European operators will have to comply. Dassault Falcon Service is an executive charter operator based at Paris Le Bourget Airport and a Dassault subsidiary.

The GAMA/IBAC “commitment” makes a bold statement about weight: “Business aviation aircraft must be as light as possible.” However, the comfortable cabin interiors, bigger luggage weight capacity (compared with the airlines) and high-end catering that make for a large part of the value of business jet travel add weight to the aircraft.

Aircraft manufacturers are working on business aircraft with single-engine con-fusion. For example, a Falcon 2000 burns less fuel than a 25-year-old Falcon 50 while providing the same number of seats and a more comfortable interior. These upgrades are a continuation process. Dassault says the efficiency gain between the Falcon 2000EX (certified in 2003) and the Falcon 7X (certified in 2007) is between 15 and 20 percent.

The airlines’ metric of fuel burn per passenger-mile does not fit business aviation, presenting industry with a challenge. Since business aviation are flying offices, the right metric for them should be the fuel burned per mission per mile, reasons a Dassault spokesman. ICAO has yet to develop an internationally accepted metric for bizav’s CO2 emissions.

Dassault Falcon Service is already trying to encourage EU operation on the ground. Also, it is urging crews to fly shorter routes but, as D’Yvoire noted, this depends on the goodwill of ATM. Similarly, while flying longer at higher altitude is better for fuel efficiency, controllers do not always allow it.

From the perspective of Jeff Gazzard, a board member of the Aviation Environment Federation, the European Commission’s Global Aviation Mitigation Action Plan (GAMA-IBAC) roadmap is moving in the right direction when he speaks about withdrawing tax breaks for the owners of business jets. In the last few weeks, corporate aviation has rightly come under pressure from the most unlikely of sources-President Obama.

Gazzard told AIN, adding that “tax breaks, or extravagant and unnecessary subsidies as we would call them, have no place in encouraging business aviation to fly without regard for the environment.” He declared that “bizjets are really all about ego and status” and concluded, “if removing tax breaks puts executives back on scheduled airlines, so much the better.”

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Airframers boost recycling efforts

by Kirby J. Harrison

What do you do with 20,000 pounds of empty Challenger 600 when it reaches the end of its life cycle? Good question, and Bombardier Aerospace, which made the first Challenger 600 in 1978 and delivered 85 of them since, has an answer: recycle.

Environmental responsibility has become an important factor in manufacturers’ life cycle programs, beginning with a search for manufacturing materials that are from sustainable resources to the recycling of materials at the end of the aircraft’s life. Airlines, with far larger fleets to dispose of properly, have been tackling this issue throughout the past decade, and now business aircraft manufacturers are following suit.

According to Bruce Parry, manager of corporate responsibility for Bombardier Aerospace, the Canadian OEM’s aircraft dismantling operations received accreditation from the Aircraft Fleet Recycling Association (Afra) in February last year, and Bombardier also has an agreement to part out some aircraft with Magellan Aircraft Services of Charlotte, N.C., for dismantling and recycling.

With nearly 60 members and headquarters in Washington, D.C., Afra has a global reach and has developed what it describes as “best management practices for dismantling aircraft in an efficient and environmentally sound manner.” Members from the aviation industry include Boeing, Bombardier, Embraer, Pratt & Whitney and Rolls-Royce.

The association estimates the current level of individual aircraft recyclability is about 70 percent, and its goal is 90 percent by the end of 2016. Afra members are now recycling approximately 200 aircraft annually, according to the association, but more important is the goal of improving the quality of the recycled materials and thereby their market value.

Another of the association’s goals is the aircraft life-cycle circle in which a greater percentage of recycled materials find their way back into construction of a new aircraft. The concept has merit, but somaterials are particularly resistant. Efforts by aircraft manufacturers and recycling specialists to develop a technology for carbon fiber recycling have been somewhat frustrating. The recycled carbon-fiber product has fallen short of aerospace quality.

Recycled Carbon Fibre in West Midlands, UK, recycles some 2,000 tons of carbon-composite waste annually—dry fiber, pre-preg and laminates. However, little of it finds its way back into aviation except for injection molding because the process of recycling reduces carbon fiber’s long-thread strength.

Presumably stemming from its development of the composite Learjet 85, Bombardier in particular is pursuing technology to make composites recycling more efficient and to produce an end product with greater value in the aviation market.

“Looking at the future, we have a one-year [composite recycling] research plan with Bell and the National Research Council of Canada,” said Bombardier’s Parry.

Separating out such items as wiring and hydraulic lines from an aluminum aircraft’s fuselage and wings continues to be time-consuming, and doing so adds only about 5 percent to the recyclable materials bin.

In France, Tarmac Aerosave in Tarbes, near the Spanish border, opened in 2009 with five partners (including Airbus) and claims to have “outperformed its initial [undisclosed] targets.” Also in France is the Châteauroux Air Center, where Europe Aviation and Veolia subsidiary Bartin Aero are dismantling and recycling a dozen or more airliners annually.

Châteauroux and other recycling sites estimate 12,000 aircraft will be recycled over the next two decades.

Bizav Does Its Part

Mary Armstrong, Boeing’s v-p for environment, health and safety, addressed attendees at Afra’s annual meeting in Washington, D.C., in July. In doing so, she emphasized the aerospace industry’s commitment to enhancing its environmental performance, from sustainable biofuels to innovative environmental solutions to recycling of aerospace products at the end of service. Boeing, she said, is studying ways to recycle a wide variety of materials, from aircraft carpeting to carbon fibers.

Embraer director of environmental strategy and technology Guilherme Freire said the company has no aircraft yet nearing end of life. Nevertheless, he noted, “What we learn about recycling old airplanes will help us better understand how to make new ones. We want a proactive aircraft life-cycle approach,” he explained, “from sustainable alternatives to recyclable materials.”

Gulfstream Aerospace takes a similar approach. According to corporate sustainability process manager Roger Bowman, “Most everything that comes off a Gulfstream—either at a mid-life update or end-of-life—is recyclable in some way.”

At the end-of-life stage, he said, 75 to 85 percent of the airplane, in terms of total weight, can be recycled into some other aircraft component after disassembly and separation. “The remaining materials are foams, plastics and compounded materials that are difficult to separate, difficult to recycle or have no market demand.”

Most of the materials in an end-of-life Gulfstream, however, are eminently recyclable. For example, cabinets, mostly aluminumplyester, can be fed directly to a smelter. Carpets are recyclable. Natural fibers such as silk or wool can have second lives as jute, rags or feedstock for paper mills, while synthetics such as nylon and polyester are sought after by carpet mills to use as feedstock to create more carpet.

In terms of aircraft engines, Rolls-Royce sustainable development manager Dr. Andy Clifton emphasizes the importance of integrating end-of-life planning into the product design phase. “In considering the end-of-life of aerospace products, the key issue is not simply reducing waste, but ensuring that the maximum amount of strategic materials possible is retained in the supply chain and continues to contribute to the sustainability of the aerospace industry.”

In broader terms, the aviation industry is likely to find itself required to participate in recycling as part of government environmental mandates, particularly in Europe.

“We are trying to get ahead of the regulatory forces,” Parry added. “But from a bigger picture, it’s a matter of product stewardship; we build it, so we have an obligation as a producer that goes right to the end-of-life responsibility.”

Biofuels see slow market entry

by Curt Epstein

At the Paris Air Show in June, history was made with the arrival of a Gulfstream G450 that crossed the Atlantic using a biofuel blend in one engine for the entire trip. A few days later a Boeing 747-8F made a flawless nonstop flight from Seattle to Paris, with all four engines burning a biofuel “Green Jet Fuel” blend supplied by Honeywell subsidiary LOP.

Such proof-of-concept flights became a thing of the past on July 1, when the aviation biofuels industry passed a major milestone: ASTM International, the governing body that approves the specifications with which fuels must conform, announced it had—after approximately two-and-a-half years of testing and review—amended its specification D7566 for aviation turbine fuel containing synthesized hydrocarbons to include bio-derived synthetic components, thus finally certifying biofuel blends for regular use.

In 2009, ASTM approved the use of a 50/50 blend of jet fuel and synthetic paraffinic kerosene derived through the Fischer-Tropsch process using coal, natural gas and biomass. The new specification allows for jet fuel blends to include, along with standard jet-A, up to 50 percent hydroprocessed esters and fatty acids (HEFA), which are identical to the hydrocarbons found in jet fuel, according to the standards body.

Over the course of its development, the new product has acquired several names. In addition to HEFA, it is also referred to as hydrotreated (or hydroprocessed) renewable jet fuel (HRJ) and bio-derived synthetic paraffinic kerosene (Bio-SPK) or even just bio-kerosene, but no matter what it is called, the feedstocks for this new biofuel component are the naturally occurring oils from sources such as the inedible but oil-rich plants jatropha and camelina, as well as algae and animal fats. The process works by adding hydrogen to remove oxygen from the oils. It is then processed further to produce the bio-synthetic kerosene that is blended with standard jet fuel for aviation use.

The announcement “is a significant step forward because it makes the hydroprocessing of plant oil a reality,” said Dilip Ballal, director of the University of Dayton’s Von Ohain Fuels and Combustion Center. “This is another pathway for the production of alternative fuels, and the industry now has a specification so they will know what to manufacture.”

Since the certification announcement, several airlines have made additional flights spotlighting use of the products. On July 15, Lufthansa inaugurated a
Biofuels destined for slow market entry

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six-month trial using a 50/50 blend produced by Finland-based Neste Oil. As part of a program partially subsidized by the German government’s Ministry of Economics and Technology, the airline will use the biofuel in one engine of an Airbus A321, which will fly the Hamburg-Frankfurt-Hamburg route four times daily.

The following week, Mexican carrier Interjet flew an Airbus A320 round trip from Mexico City to Tuxtla Gutierrez on UOP fuel derived from locally grown jatropha, while Finnair flew an A319 from Amsterdam to Helsinki using a 50/50 blend made from recycled cooking oil produced by Dutch firm SkyNRG. At the beginning of August, AeroMexico successfully completed the first biofuel-powered intercontinental commercial passenger flight from Mexico City to Madrid in a Boeing 777 using UOP’s Green Jet Fuel.

One of the major factors fueling airline interest in burning the new fuel blends is its simple promise of lowering carbon dioxide emissions. “The CO2 emissions of biofuels are similar to those of hydrocarbons, but the main advantage is that when you burn the biofuels they absorb carbon from the atmosphere,” said Ballal, who describes the burning of biofuels as “a zero sum gain.” But the answer is not that simple if one examines the complete lifecycle environmental costs of producing biofuel. Studies have shown that the numerous variables in biofuel production such as the feedstock source, how it is harvested, the distance the raw material must be transported to the refinery, and the process used to turn the feedstock into biofuel, mean the environmental implications such as the feedstock source, how it is harvested, the distance the raw material must be transported to the refinery, and the process used to turn the feedstock into biofuel, mean the environmental impact than biofuels, with all facets of production are considered. “You can’t simply say a biofuel is good or bad,” said James Hileman, principal researcher in the university’s department of aeronautics and astronautics. “It depends on how it’s produced and processed.”

Years from Widespread Use

While the use of the biofuels slowly increases, it will still be several years before appreciable amounts arrive on the market. As the world economy recovers, many would-be biofuel producers have found it difficult to secure the funding that will be needed to establish the scale of production required to make a splash in the aviation fuels market which, according to estimates from the International Energy Agency, will burn 7.6 million gallons per day by year next year. “Even one facility up and operating will not make a dent in the overall quantity of [hydrocarbon] fuel that is consumed,” said Jim Rekoske, UOP’s vice president and general manager of renewable energy and chemicals, who noted that a bio-refinery will probably produce up to 100 million gallons of biofuel per year. “A typical top-20 airport uses 200 million gallons of jet fuel a year, so it’s not even enough to supply one of the top-20 airports.”

To put the demand further in perspective, given a range in production of 40 million to 100 million gallons of biofuel annually per facility, it would take between 300 and as many as 750 bio-refineries to address the worldwide supply of biofuel needed to blend with 30 billion gallons of jet-A to slake the industry’s annual thirst. At a cost of approximately $200 million to $300 million for a newly built 100-million-gallon-capacity bio-refinery, the capital requirement is clearly immense. Estimates as to what the industry might require in terms of financing vary; but Mitchell Hawkins, president and CEO of California-based integrated renewable fuels provider BioJet, believes that the industry requires an infusion of roughly $70 billion in the near term to meet some of the stated future targets of biofuel adoption. Others believe that number could total in the hundreds of billions. That’s a huge amount of money, and you have to write a check by day one or you will never make those targets,” Hawkins said. “There’s nobody out there to write that check because the investment community has not stepped up to the plate on aviation biofuels.”

Honeywell subsidiary UOP has been a major catalyst for the biofuel approval process, supplying (in partnership with feedstock oil provider Solazyme) hundreds of thousands of gallons of HRJ to the military and commercial carriers for testing. Now that the industry has a green light to produce an actual product, UOP expects to license its process to biofuel producers. “Before [certification] it was difficult to get projects to go forward in funding because you didn’t have fuel that was certified for use,” said Jim Andersen, UOP’s business director for renewable energy and chemicals. “Now you’ve got the fuel certified, there’s product we can sell, so it’s going back and putting together all the documentation that is needed, getting permit, getting feasibility studies lined up and getting ready to kick off some engineering work. A lot of activities need to be pulled together to make the projects happen.”

As the industry gathers steam, securing financing could become easier, but most lenders will tend to remain skeptical at first, as they do with any industry in its infancy. “You have to demonstrate the technologies of scale if you are going to use project finance,” said Jim Lane, editor and publisher of industry observer Biofuels Digest, “because with the low-interest loans that you want, they are not going to be able to absorb much technology risk. A lot of people will finance your second commercial plant–or your third–but they are not interested in the first one.”

According to Lane, not all the biojet fuel refineries will need to be newly built. Based on the new technology processes, existing bio-diesel plants–many under-utilized as a result of the pricing difficulties the product has faced in the market–could be converted quickly into producing bio jet fuel, potentially adding by Lane’s estimation capacity for another 1.5 billion gallons.

Feeding the Demand

While those underused bio-diesel plants could represent an opportunity for potential bio jet fuel makers, they also present a cautionary tale, according to BioJet’s Hawkins. He warned that producers who do not control their own feedstocks could be placing themselves at the mercy of oil prices and all that’s at stake is in the first-generation bio-diesel business,” he told AIN. “None of those people owned their feedstock or controlled it in any way, and the feedstock guys raised the price until the feedstock was more expensive than the finished product. [Producers] were upside down on day one.” Hawkins describes BioJet as a fully integrated supplier, “probably the largest jatropha developer in the world,” and added that by 2013 it will likely hold that title for camelina as well. While some in the industry have faced financing difficulties, in February the company received a $1.2 billion investment from Equity Partners Fund, a large chunk of the more than $6 billion Hawkins says the company needs to fulfill its goals over the next decade.

While infrastructure will certainly consume money, the planting of feedstock crops will present additional hurdles in the path toward increased capacity. Customers are demanding sustainable feedstocks that do not conflict with food crops, leading to the use of exotic plants like jatropha, a bush whose seeds are 40 percent inedible oil. While it readily grows in wasteland unsuitable for most other agriculture, the plant takes several years to mature and bear seeds. Camelina, which also produces high oil-yield seeds, is still in the process of being genetically refined to produce varieties that will perform in different climates. It will then have to be bred to produce enough seeds to plant for harvest.

Potential biofuel producers are looking to maximize the yields, according to local sources. BioJet, named last year as the International Air Transport Association’s (IATA) first alternative-fuels strategic partner, said it has jatropha plantations under development in many tropical and near-tropical areas such as the Philippines, Indonesia, India, Dominican Republic, Honduras, Haiti, Peru, Colombia and Senegal, with expansion planned for Mali, Ghana, Haiti and Thailand. For supply of camelina, which can also be used as a rotation crop in wheat fields, for example, the company has a project under way in Argentina, with others scheduled for the U.S. and Eastern Europe. With plans to produce feedstock not only for its own use but also for others, BioJet says it already has nearly 7.5 million acres under control and is in negotiations for 57 million more.

To ensure non-competition with food production in these locations, industry groups such as CAAFI and the Swiss-based Roundtable on Sustainable Aviation International News • September 2011 • www.ainonline.com 24
U.S. spearheads last-minute push to undermine ETS

by Charles Alcock

With just four months to go before full implementation of the European Union’s emissions trading scheme (ETS) from Jan. 1, 2012, U.S. politicians are leading a renewed battle to block its application to non-European aircraft operators. Opposition to ETS is also growing in intensity in powerful circles such as the Chinese government, raising the possibility that the controversial cap-and-trade program for restricting carbon dioxide (CO2) emissions could be derailed at the eleventh hour.

Even though the latest political and legal agitation against ETS appears to emanate from a successful airframer, the outcome will have a direct bearing on aviation too. ETS rules make no distinction between different categories of traffic, applying to all aircraft weighing more than 5.7 metric tons (12,566 pounds) that fly into or within European Union airspace.

In Washington, D.C., the European Union Emissions Trading Scheme Prohibition Act of 2011 would require the U.S. Secretary of Transportation to ensure that U.S. operators do not participate in ETS. This would put the U.S. government and the nation’s air transport industry on a collision course with the European Commission (EC), which has yet to indicate how it would respond to this officially sanctioned mass noncompliance.

If passed into law, the bill would also require the EC to “use their authority to conduct international negotiations and take other actions necessary to ensure that operators of civil aircraft of the United States are held harmless from any emissions trading scheme unilaterally established by the European Union.” As it was pressed, it was not clear what practical measures the U.S. government might be able to take to shield U.S. operators from sanctions for noncompliance with ETS. Fines can be levied at rates of €100 ($140) per metric ton of CO2 emitted and ultimately aircraft can be banned from landing or taking off at European airports if their operators fail to comply.

Supporters of the proposed bill are arguing that the application of ETS to operators based outside the European Union and for flights beyond EU airspace is in contradiction of international law. The bill grew legs after attempts to negotiate a compromise agreement between the U.S. and the EU broke down in June.

At the same time, China’s government has indicated that it could be willing to declare a trade war over the issue, having already blocked at least one planned order by a state-backed airline for airliners built by the European airframer Airbus. In Washington, D.C., there are indications that senior policy officials at the U.S. Transportation Department, FAA and State Department are showing stronger resolve to take on Europe over this issue, even to the extent of filing a complaint with the World Trade Organization, which would consider ETS in terms of alleged anti-competitive behavior.

Plan Imposed Unilaterally

The imminent application of ETS to non-European carriers has drawn anger from airline industry groups across Asia, North America and Latin America. In July, the U.S. Air Transport Association started contesting a lawsuit in the European Court of Justice, which is not due to deliver an initial ruling until October 6. It is unclear whether the court could issue a preliminary injunction halting the application of ETS to non-European operators pending a final ruling.

NBAA has backed the European Union Emissions Trading Scheme Prohibition Act. The European Business Aviation Association has focused its lobbying efforts largely on seeking to mitigate the impact of ETS on its operators, seeking ways to make the compliance process less burdensome than it undoubtedly is.

The EU’s position remains that it has no choice but to apply ETS comprehensively to air transport to meet its legally binding commitments to reduce carbon emissions under the Kyoto Agreement. The U.S. and other critics of the ETS argue that any action to reduce aviation’s carbon footprint should be agreed through the International Civil Aviation Organization (ICAO) and applied multilaterally.

At the end of ICAO’s 37th assembly in October 2010, ICAO unveiled what it called “a road map for action” calling on its 190 member states to take a common approach to cutting carbon emissions, without citing any specific targets or deadlines. In U.S. legislation, deferred plans for what it says will be a global market-based scheme until further discussion is held at the next assembly in 2013. ICAO has declared a loose commitment to achieving a 2-percent annual fuel efficiency improvement through 2050, while giving no mandate for how this would actually be achieved.

This apparent lack of concerted action through ICAO channels has led European officials to take the view that ICAO-level discussion has become little more than institutionalized procrastination over emissions reductions.

The EU has said that it will exempt carriers from any country that applies its own equivalent to ETS, which the U.S. has declined to do. On July 9 the Australian government announced plans for carbon tax of A$23 ($24) per metric ton of carbon emitted, but this will apply only to domestic operators. China says that it intends to apply ETS to manufacturing and energy industries in six of its regions beginning in 2013 but it has no plans to extend this to airlines. In Europe, ETS applies to the 27 member states of the European Union and Iceland, Liechtenstein and Norway.

Biofuels coming

Biofuels are working to develop best practices for producers and processors.

“We’re working with the airlines and other stakeholders to define sustainability criteria and non-compliance with food sources, so that you can evaluate where the products come from,” said Dr. Lourdes Maurice, executive director of the FAA’s office of environment and energy. Such criteria could eventually involve certification processes for feedstock producers, detailing how crops are planted and harvested.

Among the most promising feedstock sources is garbage, according to Biofuels Digest’s Lane. British Airways has partnered with a company called Solena to build a 15-million-gallon-capacity refinery in the London area using the organic component of the city’s trash. “Garbage is a popular feedstock because there is energy value in it, nobody wants it and you can get it for free,” he said.

Whatever the source, refiners will have to produce the fuel at a price the customer will pay, either at or near the price of jet-A. A few days after the ASTM announcement, BioJet announced it will make one billion gallons of sustainable jet fuel (10 percent of its planned output through 2023) available for long-term contracts at a guaranteed price of $2.97 a gallon or on par with petroleum-based jet fuel with a $3.50 cap and a $2.50 floor per gallon. According to Hawkins, the announcement served as a shot across the bow to those who are considering charging more for their product than the price of jet-A. “You can’t charge your end user more than he can afford to pay, or he can’t afford to buy the stuff,” he said. Setting this price will define the market and increase biofuel acceptance, thus attracting more financial investment to the industry, according to Hawkins.