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Testimony

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BEFORE THE
UNITED STATES SENATE COMMITTEE ON AGRICULTURE, NUTRITION AND FORESTRY

ADVANCED BIOFUELS: CREATING JOBS AND LOWERING PRICES AT THE PUMP

APRIL 3, 2014

Introduction

Airlines for America[1] (A4A) appreciates this opportunity to discuss the role that commercially viable, environmentally friendly alternative jet fuel – particularly including advanced biofuels – can play in our industry, our economy and our nation. Simply put, development and deployment of such jet fuels offers a rare opportunity to bring synergistic benefits to all three.

The steady rise of jet fuel prices in the last decade and unprecedented price volatility have had a tremendous negative impact not only on the U.S. airlines and their employees, but also on the customers and communities they serve throughout the nation. Jet fuel supply disruptions, which have been a contributor to the price increases and volatility, also lay bare the vulnerability of the airlines, our military and our nation that comes with complete dependency on petroleum-based fuel.

A stable, domestic supply of commercially viable alternative jet fuel would introduce competition to petroleum-based jet fuels and a moderating force on price levels and volatility, while improving the energy security of our industry and our nation. It would also help the U.S. airlines build on their strong environmental record and meet the industry's aggressive greenhouse gas (GHG) emissions goals. But the benefits would not inure to the airline industry alone. Our armed forces, with whom A4A is strategically allied in the development and deployment of alternative aviation fuels, would derive similar benefits, further enhancing national security. In addition, a vibrant alternative jet fuels industry would create American jobs and spur economic development in areas most hit by the recession. Rural America would benefit greatly from access to new markets for new agricultural biomass crops, while industrial areas would be revitalized.

A4A and our members have been helping drive toward the promise of commercially viable, environmentally-preferred aviation alternative fuels for the last several years. We have consistently supported the development and accelerated commercial deployment of "drop-in"

[1] A4A is the industry trade organization for the leading U.S. scheduled passenger and cargo airlines. A4A's members are Alaska Airlines, Inc.; American Airlines, Inc.; Atlas Air, Inc.; Delta Air Lines, Inc.; Federal Express Corporation; Hawaiian Airlines; JetBlue Airways Corp.; Southwest Airlines Co.; United Continental Holdings, Inc.; and UPS Airlines. Air Canada is an associate member.

alternatives, fuels that meet the rigorous safety requirements to be certified as jet fuels and can be used without changing the aircraft or other infrastructure. Our efforts have yielded real results – in large part because we have worked in public-private partnerships with government and other stakeholders to bring available tools to bear. Indeed, through concerted, joint efforts under the Commercial Aviation Alternative Fuels Initiative® (CAAFI), the *Farm to Fly* initiative, and others, we've gone beyond testing and test flights to commercial airline and military jet flights with approved aviation alternative fuels.

We have made huge strides, but obstacles remain. Government has a key role to play in helping us overcome them. Commercially viable, environmentally beneficial alternative jet fuels are an important part of a larger U.S. energy package that should be aimed at increasing U.S. energy security and reducing volatility and the alarming increases in fuel prices while delivering environmental benefit. The aviation industry and would-be alternative jet fuel suppliers are on the cusp of creating a viable alternative jet fuel industry. But steady government partnership – such as that contemplated in the Energy Title of the recently-approved Farm Bill, the Defense Production Act project being pursued by the Departments of Agriculture and Energy and the U.S. Navy, and other federal programs – is needed in the near term to provide the financial bridging and other tools to help us get over the cusp. With sustained support, advanced aviation biofuels will literally get off the ground.

The Synergistic Opportunities of Aviation Alternative Fuels

1. Addressing Jet Fuel Prices and Volatility, Strengthening the Airline Industry, the Customer Experience and the Economy

The U.S. airline industry is indispensable to our nation and its economy. What that means, of course, is that the healthier our industry is, the more that we contribute to the prosperity of America.

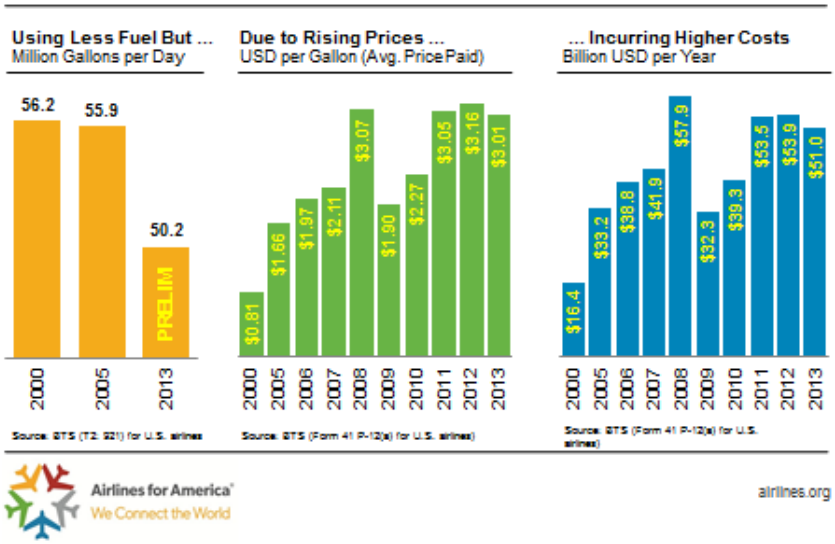
To place this in some context, the Federal Aviation Administration (FAA) estimated that in 2009 civil aviation supported more than 10 million jobs, contributed $1.3 trillion in total economic activity and accounted for 5.2 percent of total U.S. Gross Domestic Product (GDP). Civil aviation in general and the airline industry, in particular, are thus central to the U.S. economy.

While an array of government taxes, fees and overly burdensome regulations has kept the U.S. airline industry from contributing even more to the U.S. economy, so too have the cost and volatility of jet fuel. Jet fuel is the airlines' number one cost center. Every penny per gallon increase costs the industry an additional $180 million. The average price of jet fuel paid by U.S. airlines rose from an average of $0.81 per gallon in 2000 to $3.01 in 2013. *See* Figure 1. The impact of that dramatic increase is reflected in the fact that although U.S. airlines consumed approximately 5 billion fewer gallons of jet fuel in 2013 than they did in 2000, they nonetheless spent a staggering $34 billion more for fuel.[2]

[2] The year-end 2013 figures are based on preliminary data from the Bureau of Transportation Statistics.

Figure 1. U.S. Airlines' Fuel Costs Are High, Volatile and Rising

Average Price Paid for Jet Fuel Rose 272% between 2000-2013



Source: BTS (T2. 921) for U.S. airlines

Source: BTS (Form 41 P-12(a) for U.S. airlines)

Source: BTS (Form 41 P-12(a) for U.S. airlines)

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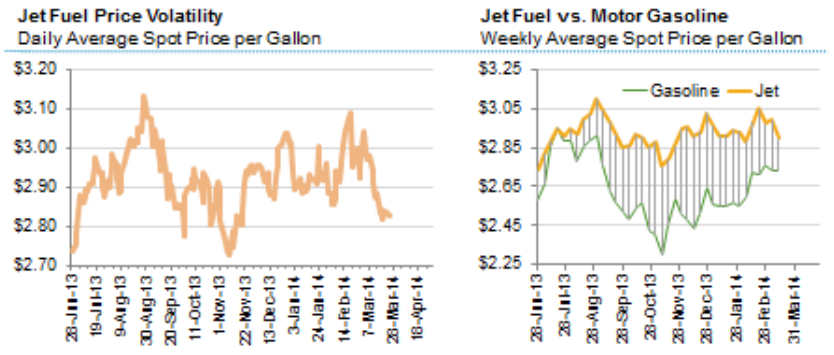
Price level is not the only concern, especially in recent years where supply disruptions, demand shocks, petroleum futures speculation and other factors have culminated in unprecedented jet-fuel price volatility. As noted in a recent analysis of the U.S. airline industry, while "airline revenues remain sensitive to events out of their control – natural disasters, diseases like SARS or bird flu, geopolitical events, government taxes… Fuel price volatility is, by far, the biggest risk…"[3] Notably, airlines' price "at the pump" continues to exceed gasoline prices. *See* Figure 2.

Figure 2. Jet-Fuel Prices Remain Volatile

And They Continue to Exceed Gasoline Prices



Source: A4A and Energy Information Administration (U.S. Gulf Coast)

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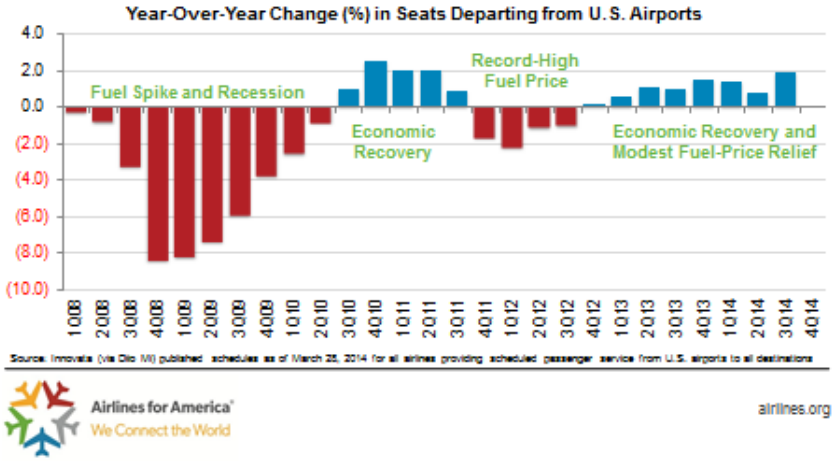
[3] Glenn Engel, Bank of America Merrill Lynch, "Industry Overview," Jan. 10, 2014.

Among other consequences, the general trend of rapidly rising prices coupled with large, unpredictable price swings over the past several years made it increasingly challenging to maintain adequate profitability on a wide number of the routes served by U.S. airlines, resulting in significant scale-backs in seating capacity for many communities and associated job cuts. *See* Figure 3.

Figure 3. Fuel Prices and Volatility Harm Airlines & Their Customers

As Airlines Generate Modest Returns on Capital, Customers Are Seeing More Seats Scheduled to Depart from U.S. Airports



Despite starting 2014 with $71.5 billion in debt, U.S. airlines' modest but encouraging financial progress has allowed them to accelerate investments in employees, products and technology to enhance the customer experience and to cope more effectively with operational impediments, such as extreme weather. Yet even small increases in jet fuel prices and the difficulty that volatility brings to planning for this, the largest of airline expenses, threatens the airlines' recovery. This is why the U.S. airlines continue to seek means to curb jet fuel prices and volatility. Commercially viable, alternative jet fuels offer a critical opportunity in that regard.

2. Building on the U.S. Airlines' Strong Environmental Record

For the past several decades, the U.S. airlines have dramatically improved fuel efficiency and reduced GHG emissions by investing billions in fuel-saving aircraft and engines, innovative technologies like winglets (which improve aerodynamics) and cutting-edge route-optimization software. As a result, between 1978 and 2012, the U.S. airline industry improved its fuel efficiency by 120 percent, resulting in 3.4 billion metric tons of carbon dioxide (CO_2) savings – equivalent to taking 22 million cars off the road on average in each of those years. Further, data from the Bureau of Transportation Statistics confirm that U.S. airlines burned 10 percent less fuel in 2012 than they did in 2000, resulting in a 10 percent reduction in CO_2 emissions, even though they carried almost 16 percent more passengers and cargo on a revenue-ton-mile basis. As a result of our efforts, U.S. airlines account for only 2 percent of the nation's GHG inventory, but 5 percent of the nation's GDP.

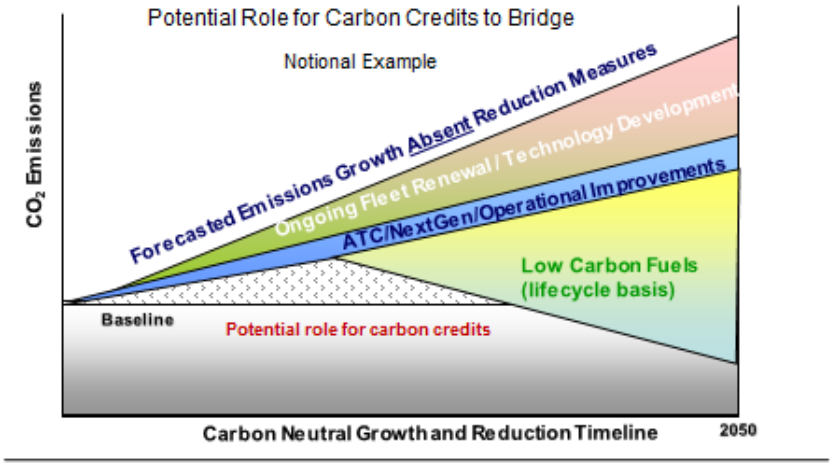
Despite our strong record to date, we are not stopping there. The initiatives U.S. airlines are undertaking to further address GHG emissions are designed to responsibly and effectively limit our fuel consumption, GHG contribution and potential climate change impacts, while allowing commercial aviation to continue to serve as a key contributor to the U.S. economy. For example, we are central stakeholders in partnering efforts to modernize the outdated air traffic management (ATM) system on a business-case basis and to reinvigorate research and development in aviation environmental technology, both of which can bring additional and extensive emissions reductions. Moreover, and of particular relevance to this hearing, A4A and its member airlines are dedicated to developing commercially viable, environmentally friendly alternative jet fuel, which could be a game-changer in terms of aviation's output of GHG emissions while enhancing U.S. energy independence and security.

With fuel as the airlines' largest cost center, we have every incentive to continue to reduce our fuel burn and resulting emissions. Accordingly, we have concerns about legislative and regulatory efforts that would siphon away into government coffers the funds airlines need to continue investing in technology, operational and infrastructure measures to continue their strong record of emissions reductions. This does not mean that we oppose regulation all together. Rather, the U.S. aviation industry is supporting a global, sectoral approach to aviation GHG emissions under the International Civil Aviation Organization (ICAO), the United Nations' body charged with setting standards and recommended practices for international aviation.

At the ICAO Assembly in 2013, ICAO made further progress toward a full global agreement. The climate change resolution adopted by the Assembly focuses on technology, operations and infrastructure measures as the primary means for addressing aviation GHG emissions. It reconfirms the rigorous emissions goals established for the industry in 2010 – annual average fuel efficiency improvements through 2020 and carbon neutral growth from 2020.[4] The resolution also establishes a commitment to work toward a global market-based measure to "fill the gap" should the industry not be able to achieve carbon neutral growth from 2020 through concerted industry and government investment in technology, operations and infrastructure initiatives. As indicated in Figure 4, aviation alternative fuels could play a critical role toward achieving our targets, while minimizing the role that a costly and harmful market-based measure might play.

[4] In addition to these goals, the airline industry also has an aspirational goal to achieve a 50 percent reduction in net CO_2 emissions in 2050, relative to 2005 levels.

Figure 4. How Do We Meet Our Targets?
Technology & Alternative Fuels, Operations & Infrastructure



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3. Airlines as Catalysts for the Liquid Alternative Fuels Market

While other sectors and modes of transportation can be powered via a variety of energy sources, including electricity, nuclear, solar, hydrogen and wind, to name a few, airlines will be flying aircraft and engines requiring liquid, high energy-density fuels for the foreseeable future. Because the useful life of aircraft and aircraft engines is very long, as is the pipeline for development of new aeronautics technologies, there simply is no realistic prospect that commercial aircraft will be powered by batteries, solar cells, fuel cells, hydrogen or other alternatives within the next several decades. This drives our industry to be keenly focused on the development and deployment of significant supplies of liquid alternative fuels that will meet the rigorous safety, performance and environmental criteria the airlines have set.

Commercial aviation offers unique benefits to prospective alternative fuels producers. First, fuel demand is highly concentrated. The 40 largest U.S. airports account for an estimated ninety percent of all of the nation's jet-fuel demand, while the top ten airports account for about half of demand. The country's largest airports – Los Angeles (LAX), New York-Kennedy (JFK), Chicago O'Hare (ORD) and Atlanta (ATL) – each demand more than one billion gallons of jet fuel annually. Demand from Air Force bases and Navy installations is also highly concentrated and, in many cases, those facilities are located near commercial airports. Thus, airports essentially compose a network of markets that alone could support all the output from alternative fuels production facilities. In addition, with high-demand nodes across the country, the aviation industry can support production from the full gamut of potential producers, who will rely on different feedstocks depending on where they intend to operate.

4. Cascading Opportunities throughout Our Nation

The benefits of aviation alternative fuels would not inure to the airline industry or would-be alternative fuel providers alone. The U.S. military, which has been a very active partner to A4A

in the pursuit of jet fuel alternatives, shares many of the same interests as our airlines.[5] Like airlines, jet fuel represents a significant share of costs to the U.S. military, particularly the U.S. Navy and U.S. Air Force. Rising and volatile prices wreak havoc on military budgets and present significant challenges for military planners, especially as combat logistics become increasingly complex and supply lines extend over often mountainous or desert terrain. At the same time, GHG emissions from military jet operations represent a large portion of the federal government's carbon footprint. Access to stable, domestically produced supplies of low-carbon alternative fuels would allow the armed services to address these concerns and further enhance national security.

In addition, a vibrant alternative jet fuels industry would create American jobs and spur economic development in areas most hit by the recession. Rural America would benefit greatly from access to new markets for new agricultural biomass crops, while industrial areas would be revitalized through construction of new refineries and processing facilities or revitalization of those that have been mothballed. At the same time, a stable, domestic supply of alternative jet fuel would improve our nation's security by reducing our dependence on foreign oil and improve national economic security by improving our trade balance.

Critical Public-Private Partnerships to Support the Development and Deployment of Commercially Viable, Environmentally-Preferred Aviation Alternative Fuels

From an airline point of view, before any alternative fuel can have commercial application in aviation it must be demonstrated to be (1) as safe as petroleum-based fuels for powering aircraft; (2) more environmentally friendly than petroleum-based fuels; (3) capable of being produced so as to provide reliable supply; and (4) cost competitive.[6] A4A and its members have been working with government partners and other stakeholders in a concerted effort to meet these criteria – and we have made tremendous progress, going from test flights to commercial and military flights with advanced biofuels. But we must continue to tackle each challenge, using every tool to get to full viability.

As the challenges to standing up a self-sustaining aviation alternative fuels industry cut across multiple disciplines – from aviation, to agriculture, to fuel production, to investment capital, to logistics and beyond – no one initiative or program can do it all. Yet the U.S. aviation industry and FAA determined early on that a coordinating body would be needed to establish a clear vision and leverage the efforts across initiatives. Accordingly, in 2006, A4A, FAA, the Aerospace Industries Association (AIA) and Airports Council International-North America (ACI-NA) co-founded the Commercial Aviation Alternative Fuels Initiative® (CAAFI) to serve as the driving and coordinating force for the industry's efforts. "CAAFI's goal is to promote the development of alternative jet fuel options that offer equivalent levels of safety and compare favorably on cost with petroleum-based jet fuel, while also offering environmental improvement and security of energy supply."[7] To meet its goal, CAAFI is organized into four teams, which are focused on addressing and overcoming the challenges to commercial-scale deployment of aviation

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[5] A4A is in a "Strategic Alliance for Alternative Aviation Fuels" with the U.S. Department of Defense's Defense Logistics Agency-Energy (DLA-Energy, which previously was known as the Defense Logistics Agency's Defense Energy Support Center).

[6] *See* Commercial Aviation Alternative Fuels: The A4A Commitment, available at http://www.airlines.org/Pages/Commercial-Aviation-Alternative-Fuels-The-A4A-Commitment.aspx.

[7] *See* www.caafi.org.

alternative fuels – ensuring safety, environmental benefit, supply reliability and cost-competitiveness.

1. Ensuring Safety

No matter what issue or challenge we face, airlines never lose sight of their core mission: safety. Our fuels must meet rigorous specifications that ensure safe operation, whether in the icy cold at 30,000 feet or while filling tanks on the ground at airports crowded with activity. Accordingly, before an alternative fuel can be approved for commercial use, it must meet rigorous safety and performance standards set out in the applicable specification, which is controlled by ASTM International, an organization devoted to the development and management of standards for a wide range of industrial products and processes. This specification, in turn, is included in FAA product approvals and required air-carrier manuals.

One of CAAFI's most significant contributions to date has been the development of the approval process for alternative jet fuels through ASTM. Not surprisingly, the original jet fuel specification, ASTM D1655, titled "Standard Specification for Aviation Turbine Fuels," covered only jet fuels derived from specific fossil-fuel sources. The CAAFI team worked within ASTM to identify means for gaining approval of jet fuels derived from alternative feedstocks provided that those fuels are equally safe and effective.[8] As a result, in August 2009, after completing its rigorous review process, ASTM approved D7566, "Aviation Turbine Fuel Containing Synthesized Hydrocarbons." This specification allows for alternatives that demonstrate that they are safe, effective and otherwise meet the specification and fit-for-purpose requirements to be deployed as jet fuels, on par with fuels under ASTM D1655. It is structured, via annexes, to accommodate different classes of alternative fuels when they are demonstrated to meet the relevant requirements. The initial issue of the specification enabled use of fuels from the Fischer-Tropsch (FT) process in up to a 50 percent blend with conventional jet fuel. FT fuels can be generated from a variety of feedstocks, including biomass (biomass to liquid) and natural gas to liquid, in addition to coal to liquid and combinations thereof. In 2011, an additional annex was added to ASTM D7566 for alternative jet fuels generated from conversion of triacylglycerides from plant oils and animal processing waste, referred to as "Hydroprocessed Esters and Fatty Acids" or "HEFA." Notably, advanced biofuels can be produced through both of the fuel pathways approved to date and the additional pathways currently under review.

By meeting the rigorous jet fuel specification and fit-for-purpose requirements, sustainable alternative aviation fuels are demonstrated to be "drop-in" fuels, completely compatible with existing airport fuel storage and distribution methods and airplane fuel systems. Accordingly, they do not carry added infrastructure costs for airlines, fuel distributors or airport authorities, enhancing prospects for their commercial viability.

2. Ensuring Environmental Benefit

Working through CAAFI, we also have made tremendous progress on demonstrating whether a particular aviation alternative fuel provides environmental benefit relative to petroleum-based fuel. As carbon is fundamental to powering aircraft engines, this and the CO_2 generated upon

[8] CAAFI worked within ASTM to issue a specific standard to facilitate the approval of alternative jet fuel made from varying feedstocks and production processes, ASTM D4054, "Standard Practice for Qualification and Approval of New Aviation Turbine Fuels and Fuel Additives."

combustion cannot be eliminated from drop-in jet fuels, but they can be reduced, either through increasing the per-unit energy provided in the fuel, reducing carbon somewhere along the "lifecycle" of the fuel, or some combination of the two. Indeed, there can be emissions all along the "life" of the fuel – from growing or extracting the feedstock, transporting that raw material, refining it, transporting the finished fuel product and using it. By examining the emissions generated at each point in the lifecycle, one can ensure that the emissions benefits that are sought are in fact real and do not create emissions "dis-benefits" along the way.

Ensuring the environmental benefit of aviation alternative fuels is critical to A4A and its member airlines. Accordingly, as far back as 2008, we agreed on a set of alternative fuels principles, which include a commitment that the alternative fuels we accept need to have reduced lifecycle emissions compared to today's fuels and not compromise the food basket. In that commitment, we agreed to work through CAAFI to ensure this. Accordingly, CAAFI's Environment Team, which I co-lead along with Dr. James Hileman of the FAA, has developed and supported seminal guidance on the methodologies for lifecycle analysis of alternative aviation fuels[9] and case studies that use these methodologies.[10] While seeking emissions benefits from aviation alternative fuels, A4A and its members recognize that use of such fuels must not create environmental problems in other areas. Aviation alternative fuels ultimately must be produced in a fashion meeting all relevant environmental criteria, including land use, water management and the like. Put another way, the production, transport and use of these fuels generally must be deemed "sustainable." CAAFI also has provided peer-review guidance on making sure relevant sustainability criteria are met.[11]

3. Fostering Supply Reliability and Commercial Viability

As noted by Bill Harrison, Technical Advisor for Fuels and Energy at the U.S. Air Force Research Laboratory, scaling up supply and making aviation alternative fuels cost-competitive may well be the most significant challenge to their commercial deployment.[12] A key role that A4A and its member airlines are playing as end-users of such fuels is to send appropriate market signals to would-be producers, the farmers and others who generate energy feedstock, and investors in the alternative fuels industry.[13] Our vigorous pursuit of alternatives has sent an unmistakable signal: U.S. airlines are committed to making alternative jet fuels viable and will do their part to overcome the obstacles that may stand in the way. But we recognize that we cannot do it alone. Again, ongoing commitment in public-private partnerships is needed to get the

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[9] *See* "Framework and Guidance for Estimating Greenhouse Gas Footprints of Aviation Fuels (Final Report) (2009, AFRL-WP-TR-2009-2206); *see also* Young, CAAFI Environment Team: Developing Tools & Means to Address Environmental Issues (April 16, 2013), available at http://www.caafi.org/files/presentations/Environment_Young_ABLC_Apr17_2013.pdf.

[10] *See, e.g.*, Stratton, Wong & Hileman, Life Cycle Greenhouse Gas Emissions from Alternative Jet Fuels (April 2010).

[11] *See* CAAFI, Alternative Jet Fuel Environmental Sustainability Overview (July 2013), available at http://www.caafi.org/information/pdf/Sustainability_Guidance__Posted_2013_07.pdf.

[12] Harrison, *Alternative Fuels: How Can Aviation Cross the Valley of Death* (Massachusetts Institute of Technology Master's Thesis, 2008).

[13] One of many such signals is a "how to" document on how aviation alternative fuels producers can work with airlines on purchase agreements. This document, "Guidance for Selling Alternative Fuels to Airlines," was co-authored by A4A Chief Economist John Heimlich, who is co-leader of the CAAFI Business Team.

aviation alternative fuels industry over the cusp, just as was the case when the federal government jump-started the Internet, satellite systems and other backbone infrastructure – working with industry to help make these ventures self-sustaining.

While CAAFI has focused on supply reliability and commercial viability, other public-private partnerships and initiatives have been needed to bring appropriate resources to bear to support this new supply chain. Perhaps most notable in this regard is the *Farm to Fly* initiative, which A4A, the U.S. Department of Agriculture (USDA) and The Boeing Company (Boeing) created in 2010 to help meet the direction set in the 2008 Farm Bill that U.S. programs aimed at energy crops should be equally available for air transportation fuels as for ground transportation fuels.[14] Indeed, the aim of the original *Farm to Fly* initiative was "to accelerate the availability of a commercially viable sustainable aviation biofuel industry in the United States, increase domestic energy security, establish regional supply chains and support rural development." Although A4A, USDA and Boeing already were working together under CAAFI, we had determined that an even more focused effort would be needed to further align U.S. biofuels agricultural policy – which up to then had almost entirely been focused on the production of biofuels for automobiles and trucks – to provide opportunity for farmers and fuel producers to generate feedstocks and fuels for aircraft.

The initial *Farm to Fly* initiative helped make accessible to farmers, fuel producers, airlines and military aviation the tools and programs that had been available to ground-based alternative fuels for some time. It also resulted in a two-part report in January 2012 which offered a blueprint for continuing to advance opportunities for Rural America and the aviation sector through aviation biofuels.[15] Moreover, the initial *Farm to Fly* initiative helped spawn two regional initiatives to foster the development and deployment of alternative jet fuels derived from sustainable biomass grown in the United States. The first of these, the Sustainable Aviation Fuels Northwest (SAFN) initiative, led in part by A4A member Alaska Airlines, together with the Port of Seattle, Port of Portland, Spokane International Airport, Boeing and Washington State University, found that an aviation biofuels industry can be commercially viable in the Pacific Northwest and identified four, particularly promising feedstocks, oilseeds, forest residues, municipal solid wastes and algae, for generating advanced aviation biofuels.[16] The second, the Midwest Sustainable Aviation Biofuels Initiative (MASBI), led in part by A4A member United Airlines, Boeing, Honeywell's UOP, the Chicago Department of Aviation, and the Clean Energy Trust, developed recommendations to help "achieve the potential economic, environmental, and energy security benefits that can be delivered from a robust sustainable aviation biofuels industry in the Midwest."[17]

In April 2013, the U.S. Secretaries of Agriculture and Transportation signed an agreement to

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[14] Conf. Rpt. 110-627, on H.R. 2419; p. 911, May 13, 2008.

[15] *See* Agriculture and Aviation: Partners in Prosperity, available at http://www.airlines.org/Documents/usda-farm-to-fly-report-jan-2012.pdf; *see also* Agriculture and Aviation: Partners in Prosperity: Putting Aviation at the Forefront of the President's Biofuels Targets, Part II. Industry Recommendations, available at http://www.airlines.org/Documents/Farm_to_Fly_Recommendations-A4A-Boeing-Jan2012.pdf.

[16] *See* SAFN, Powering the Next Generation of Flight, available at http://www.safnw.com/wp-content/uploads/2011/06/SAFN_2011Report.pdf.

[17] *See* MASBI, Fueling a Sustainable Future for Aviation, available at http://www.masbi.org/content/assets/MASBI_Report.pdf.

expand the *Farm to Fly* program, to include additional stakeholders and extend the program by five years. The *Farm to Fly 2.0* agreement focuses on future goals – such as designating personnel, evaluating current and potential feedstock types and systems, developing multiple feedstock supply chains, developing state and local public-private teams, and other activities to, as Secretary Vilsack stated, "create jobs and economic opportunity in rural America, lessen America's reliance on foreign oil and develop a thriving biofuels industry that will benefit commercial and military enterprises."[18]

Although the *Farm to Fly* initiative is important for bringing together tools and the various participants in the aviation alternative fuels supply chain, there would be no *Farm to Fly* initiative without the Energy Title of the Agricultural Act of 2014, more commonly known as the Farm Bill. Thus, we would like to thank this Committee for its leadership in seeing that legislation through to passage. By assuring multi-year authorization and funding for critical programs such as the Biorefinery Assistance Program, Bioenergy Program for Advanced Biofuels, Biomass Crop Assistance Program and Biobased Marketing Program, among others, Congress will leverage the investments that the U.S. government and the private sector have already made and provide the stability needed for further progress.

Our joint efforts are bearing fruit. For example, after having conducted test flights and the nation's first commercial flight with aviation biofuel, in June 2013, United Airlines executed a definitive purchase agreement with AltAir Fuels for cost-competitive, sustainable, advanced biofuels at commercial scale.[19] With United's strategic partnership, AltAir Fuels will retrofit part of an existing petroleum refinery to become a thirty-million gallon, advanced biofuel refinery near Los Angeles, California. The facility will convert non-edible natural oils and agricultural wastes into low-carbon, advanced biofuels and chemicals. United has agreed to buy 15 million gallons of the resulting jet fuel over a three-year period, with the option to purchase more, with deliveries slated to begin at the end of 2014.

In another example, after having flown 75 commercial flights powered by 20 percent biofuel blends, in July of 2013, Alaska Airlines entered an agreement for the future purchase of sustainable aviation biofuel from Hawai`i BioEnergy LLC. The feedstock for the biofuel is anticipated to be woody biomass meeting peer-reviewed sustainability criteria.[20] Hawai`i BioEnergy is hoping to be able to begin delivering the biofuel to Alaska Airlines in 2018.[21]

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[18] *See* USDA Press Release, Agriculture Secretary Vilsack and Transportation Secretary LaHood Renew Agreement to Promote Renewable Fuels in the Aviation Industry, available at http://www.usda.gov/wps/portal/usda/usdahome?contentid=2013/04/0070.xml&navid=NEWS_RELEASE&navtype=RT&parentnav=LATEST_RELEASES&edeployment_action=retrievecontent.

[19] *See* United Airlines and AltAir Fuels to Bring Commercial-Scale, Cost-Competitive Biofuels to Aviation Industry, available at http://www.prnewswire.com/news-releases/united-airlines-and-altair-fuels-to-bring-commercial-scale-cost-competitive-biofuels-to-aviation-industry-210073841.html.

[20] *See* Alaska Airlines and Hawai`i BioEnergy Sign Agreement for the Carrier to Purchase Sustainable Fuel, available at http://online.wsj.com/article/PR-CO-20130724-908441.html.

[21] The opportunity for the State of Hawaii, those generating the feedstock, Hawai'i BioEnergy, Alaska Airlines and the flying and shipping public in Hawaii was captured in press statements when the fuel purchase agreement was announced. "The development and commercialization of local, renewable energy is of critical importance to Hawaii, given the state imports 95% of its energy needs. Use of locally grown feedstocks for biofuel production will improve Hawaii's energy sustainability and security while creating jobs in our communities," said Joel Matsunaga, Chief Operating Officer of Hawai'i BioEnergy. Alaska Air Group's Executive Vice President and General Counsel, Keith

Although these initial purchase agreements for advanced aviation biofuel are promising, two critical observations capture why we cannot be complacent in our efforts. First, these projects would not exist without the public-private partnerships we have engaged in to date. And second, while meaningful to the parties involved, they still are relatively small scale, particularly when compared to the demand for jet fuel in the United States, which currently is approximately 18 billion gallons a year. Accordingly, to see these projects to fruition and to spur more, we must continue to employ all the tools and partnerships we have identified and created to date and we need to take action to further scale up supply so a foundation is laid for all supply-chain elements to become self-sustaining.

This is exactly what the Defense Production Act (DPA) project between the Department of Energy (DOE), USDA and the Department of Defense (DoD) is designed to do. In 2011 these departments pledged a federal investment of $510 million in partnership with the private sector. This three year effort advances the timeline for the commercialization of domestically produced, cleaner drop-in aviation and marine biofuels. Under the terms of the Memorandum of Understanding among the departments, $170 million would be provided by each participating federal agency over the course of the initiative. Notably, the program requires equal or greater private matching funds. As previously noted, adopting advanced, “drop-in” aviation biofuels will help the DoD and the nation achieve broader national and energy security objectives.

To date, DoD and the USDA have made significant progress awarding grants under the DPA in collaboration with private industry and the DOE is providing research and development support. A4A is working with a diverse, multi-stakeholder coalition to support the continued funding of this important program. Marshaling funding and other mechanisms across agencies to support projects will go a long way to demonstrating commercial viability to reluctant private capital, “jump starting” this industry and building the necessary bridge to a future in which the industry is entirely funded by private capital. To be clear, A4A is not calling for perpetual government funding. Rather, we and our partners are supporting a key public-private partnership to accelerate progress toward cost-competitiveness. We urge Congress to continue to support this important initiative.

Conclusion

In sum, the aviation industry and would-be alternative jet fuel suppliers are on the cusp of creating a viable alternative jet fuel industry. But we cannot become complacent. Steady government partnership is needed in the near term to provide the financial bridging and other tools to help us get over the cusp. With sustained support, advanced aviation biofuels will – quite literally – get off the ground.

Loveless, commented: “Beyond the environmental advantages, it improves the fuel supply integrity in the state of Hawaii, which will allow for the further growth of our airline operations throughout the islands.”