

TESTIMONY

SENATE COMMERCE COMMITTEE, AVIATION SUBCOMMITTEE

HEARING ON AVIATION FUELS: NEEDS, CHALLENGES AND ALTERNATIVES

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JULY 28, 2011

Madam Chair, Senator Thune, and Members of the Subcommittee:

Thank you for the invitation to the Commercial Aviation Alternative Fuels Initiative (CAAFI) and I as its Executive Director to testify at today's hearing on "Aviation Fuels: Needs, Challenges, and Alternatives."

CAAFI is a U.S. based supply chain coalition that has been a leader in the push toward the development and deployment of Aviation Alternative Fuels having Economic, Environmental and Security of Supply benefits.

Formed on the basis of a Boeing hosted meeting of the Transportation Research Board held in Seattle in May 2006 CAAFI was founded to propel commercial aviation to a position of leadership in the quest to secure, clean, and economic alternative transportation fuel supplies. In forming CAAFI its founders addressed the challenge of being a- a minority player (10%) of the transport market by fuel use. CAAFI sought to transform aviation from an afterthought in alternative fuel thinking to a "first mover". As a unique minority we needed to do so or run the risk of being left without alternatives. We built CAAFI using aviations inherent attributes (concentrated distribution, unified, rationale, technically skilled customers) and turning our unique characteristics into strengths (e.g. dependency on liquids, high qualification barriers).

Those who testified before you earlier are all parties to the CAAFI supply chain coalition....Boeing as a leader among Aerospace Industry Association manufacturers, the FAA office of Environment and Energy, and the Air Transport Association of North America are key CAAFI sponsors and founders.

Altair along is prominent among some 60 fuel company stakeholders and is at the cutting edge of that group in advancing deployment. Together some dozen U.S. biofuel suppliers have been responsible for nearly 80% of the aviation biofuel programs now resident in a dozen countries around the world.

USAF through its Research Lab at Wright Paterson AFB in Ohio predates CAAFI and remains at the core of aviation research and qualification efforts. None of what you are hearing today would have started without the Air Force's outstanding contributions at a time when there were few believers in aviation. The job of CAAFI would never have started and will not be completed in a timely manner without the Air Force.

CAAFI sponsor, AIA and its members Boeing and engine manufacturers General Electric, Pratt and Whitney and Honeywell, in combination with the FAA have led CAAFI Certification team in a way that has transformed an ASTM approval process. The process that took a decade and tens of millions of dollars to qualify fuel from a single producer and process location has now evolved into a robust methodology that has produced qualification of two new process categories in the 09' to 11' period for global supply. In so doing time to qualification has been cut by two thirds. Qualification costs by similar amounts. Together we have enabled the formation of an Aviation alternative fuels supply industry..

The FAA Office of Environment and industry in addition to the discrete accomplishments outlined by Dr. Maurice has been the focal point for some seventeen different government agencies having complementary responsibilities from crop growth to technology formation and through Commercial program development. In my 44 years of industry participation and government interaction the alternative aviation fuels initiative within government has had both the most dimensions and been the most successful of any intra-governmental activity that I personally have been witness to. Particular credit goes to FAA / DOT members of CAAFI leadership team, Nathan Brown of FAA and Dr. Kristin Lewis of DOT/Volpe. Nate and Kristin have been instrumental in forming this cooperation and the programs which they include, and, deserve much of the credit for that success.

The Air Transport Association of North America represents 90% of North American Airlines and nearly a quarter of aviation fuel consumption worldwide. Their roles at the top of the supply chain as buyers (ATA) has now progressed to the forefront as the issue of sustainable alternative fuels moves to the deployment phase. Clearly the centroid of the sustainable aviation alternative fuels resides with commercially viable off-take agreements between buyers and sellers at this point in time. I am pleased that in the audience today are representatives of American Airlines, United Airlines as well as ATA. Separately AA and UA purchase as much fuel as the U.S. Air Force. Together U.S. commercial aviation comprises over 85% of total U.S. Jet fuel demand. This year global commercial aviation will consume over 70 Billion gallons of jet fuel.

CAAFI member Airlines are committed to motivate development and deployment of alternatives that are both environmentally advantaged and that provide for improved economics. ATA and its members have been active in cultivating agreements among

airline buyers for fuel purchases that include four MOU's that form the basis for long term offtake agreements on fuels ranging from Altair's camelina based fuel to a recent agreement with MSW to Liquid supplier Solena in Gilroy, California. Along with Boeing, ATA is a CAAFI sponsor signatory to the July 2010 "Farm to Fly" agreement that is accelerating and focusing Biofuels initiatives for Commercial Aviation. Across the public/private purchasing communality ATA are teamed with DLA Energy to afford producers the prospects for alignment among military and Commercial purchasers.

Together with CAAFI Stakeholders in some 20 U.S. States ATA are helping to organize State initiatives which are linking agriculture, energy, business development and aviation interests in these states. For these states ATA member airlines provide buyer focals to help focus state interests around real and substantive buyers. ATA and its global partner IATA are committed to seeking Carbon neutral growth for the airlines globally by 2020.

Also critical to the progression of alternative fuels are the Airports which these fuels flow through. The emerging industry can be seen to offer unique business opportunities deployment of these fuels can offer airport business growth and environmental gain at the same time, and also can afford similar benefits for the communities in which they reside. 80% of all jet fuel flows through some 35 airports in the U.S. Such concentrated distribution offers a unique opportunity for Airport business interests and for fuel suppliers alike..

ACI North America airports are becoming increasingly important and significant participants in the progression toward aviation alternative fuels. Seattle, Portland, Spokane, in SAFN have been joined by ACI members large and small in recent months. The Port of New York Authority has been working with CAAFI stakeholder to evaluate MSW to liquid opportunities for its supply. Detroit through DTW and three Universities are evaluating the opportunity to turn the Aerotropolis linking the airport with other state owned lands into the origin of home grown biofuels opportunities both in the Aerotropolis and subsequently into bordering communities. Such developments offer economic and environmental benefits as part of the revival of that region.. Smaller airports such as Tulsa are moving to explore new options with local entrepreneurs and universities.

As the evaluation of specific fuel projects requires extensive and quantitative analysis the Airport Cooperative Research Program...under the Transportation Research Board jurisdiction, with FAA and ATA support, has launched a series of three programs to lay out methodologies to calculate benefit and cost assessments of individual projects. These projects offer detailed analysis of emissions reductions for small particles, aviation user and airport planning tools, and a just launched multi-modal assessment tools that will allow the 50% or biofuel plant output that is not jet fuel to be evaluated for

distribution potential through the airport and its clients. Many additional airports beyond those mentioned serve on ACRP the panels overseeing these projects. New candidates are coming forward all the time as momentum grows toward sustainable, secure aviation alternative fuel deployment.

The potential for a whole new business for airports, capitalizing on the concentrated distribution afforded by our industry and producing not only economic but environmental gains could well be a major "fringe benefit" of the emerging aviation alternative fuels infrastructure development . Biofuels programs supported by USDA, DOE and State and Local communities are an addition to those programs supported by the Aviation sector and offer a once in a generation opening for our industry to lead the country toward a new and promising future.

Collectively Aviation Alternative Fuels have shown great progress as has been reported to you today.. This progress is reflected in the President's Energy Policy announcement of March 30 targeting our industry. That decision is backed by a poll Biofuels Digest who in October, 2010 poll 40% of the Biofuels industry indicated that there expectation was that there would be 1 Billion gallons of biojet produced annually by 2020. Business publications such as "the Economist", in that same time period, suggested that the future of biofuels was now metaphorically, "looking up". Aviation peers have also recognized CAAFI and the progress that has been made in Aviation Alternative fuels through the award of Air Transport World's prestigious Joseph S. Murphy Industry Service award in 2010 to CAAFI and its sponsors, FAA, ATA, ACI-NA and AIA..

Indeed much has been done. Industry / government in partnership are clearly focused, unified and dedicated to making an environmentally friendly, economic and secure future for aviation alternative fuels industry practical near term. Such success enables us to more narrow the focus of Needs, and Challenges for alternatives. This charge from the committee for this session is the clear focus for the remainder of my remarks.

Aviation accomplishments with favorable environmental, economic and security of supply implications places us passed a key inflection point. The issue is no longer what or if aviation alternative alternatives as a spinoff of an energy supply sector such as oil. The needs and challenges are now when and how aviation leads not only aviation but the transport biofuels sector to success are the focus of the needs and challenges that I personally would like to focus upon as areas of emphasis across all CAAFI sponsor and Stakeholder interest.

In this regard I would like to focus on five areas that will increase supply, drive down cost, reduce environmental uncertainty, and ensure commercial success for the suppliers and aviation enterprise. With success in all five of these areas in parallel

aviation will not only lead the transport sector but the nation to create a tremendous economic and environmental asset. That is a role we have played many times.

First, it is critical and within the authority of this committee that we leverage new ASTM protocols to enable qualification of fuels emerging from catalytic processes, synthetic biology and from pyrolysis as well as other technologies that are emerging at a fast pace. Lipid seed crop production (HRJ, HEFA) while a great start simply cannot provide an adequate supply in the target time frames.. Such success requires ongoing support of FAA, NASA, USAF, Navy. With the breadth of the opportunity so large cooperation with international partners with proven capability and with whom both the agencies and private sector have considerable experience working is in order. Such an effort can be guided via an upgrading of our R&D roadmaps and use our globally accepted risk management (Fuel Readiness level) methodology to ensure aligned and complimentary efforts with little overlap. With possibility of three paths at a minimum to be pursued in parallel through the 2013 - 15 we can vastly increase candidate supplies to include cellulosic sources that grow in lands that do not conflict with food production much as the targeted seed crops do. Commitments that offer one year of such research while a good start, without needed follow-up from the inevitable questions that they produce will not provide the needed outcome in my personal view. We simply need an ongoing commitment to Advance fuels R&D through current funding sources. This committee's funding of the Advance Biofuels program at FAA last year is a good start..

Second, is the question of cost. As one who spent the first 39 years of his career I am intimately familiar with challenges of production learning. No new technology, not computers, not the material we use today in our households and very especially aircraft with which this room is most familiar with ever produced learned out, mature, costs at the outset of production. Those siting the cost of limited supplies in the short term as the true state of affairs should ask computer makers what the first computer cost, or perhaps aircraft makers what the fist of a kind aircraft cost. Success comes from learning and the needed infusion of production technology to enable acceleration of that learning trough accepted methodologies.

No one is better at that than the agriculture sector. Working with the CAAFI R&D community and FAA we have now created a Feedstock Readiness level methodology via a unique intergovernmental MOU with USDA. Aviation systems technology and learning combined with well structured USDA efforts at its new research centers combines the best know how in the world to speed learning for fuels from oilseed sources. Qualified HRJ/HEFA fuels are dominated 80% or more by feedstock costs.

For other advanced processes is driven through process cost reduction. This is the sanctuary of DOE biofuels research. I personally have seen in detail DOE's plan to

attain \$2 a gallon cost for pyrolysis oil. It depends primarily on increasing the life of catalysts used in pyrolysis production to that of similar catalysts in oil refineries. The DOE programs have finite plans with check points along the way. It is a challenge to attain similar life under higher pressures and temperatures but it is a challenge that I know aviation engine manufacturers successfully addressed during my tenure in manufacturing sector. It is doable and the plans are sound ones/

Third are questions of financing. Clearly USDA's suite of products under section 9003 loan guarantees and the Biomass crop assistance programs (BCAP) are the kind of near term and finite lived programs needed to ensure jobs and energy independence for America. Having been a part of programs in Europe and those that are seeking to be formed in other places I can advise that they are truly the envy of the world. Such Incentive based approaches clearly produce positive results. Without these first of a kind programs private sector participation, particularly after the crisis that we just encountered in the financial sector will not keep pace with technical achievements.. Retaining such programs will enable reduction in the costs of protecting access to foreign supplies. That cost is a much smaller order of magnitude in dollars and human sacrifice and as such is an excellent national investment..

Beyond first of a kind funding via the USDA programs a simple emphasis in allowing institutions that lend overseas as part of their charter to encourage investments from overseas in our country to fund aviation biofuels projects as real commercial efforts are in order and are now enabled for USDA programs. Aviation biofuels is a real industry that should be supported by our overseas financial support institutions that support U.S. companies, and by "Invest in U.S" programs just started by the Commerce Department. CAAFI fuel stakeholders were invited by DOC Undersecretary Sanchez and Assistant Secretary Nicole Lamb Hale to engage in discussion of these matters and other follow-on measures to what was a highly successful Paris Airshow CAAFI showcase. We are proceeding to develop that direction with DOC and our government stakeholders.

Fourth, certainty and quantitative means of certifying environmental performance of future facilities for both carbon life cycle and sustainability is a critical need for fuel producers and buyers alike. In this regard Aviation has benefited from a comprehensive, peer reviewed analysis of carbon life cycle outcomes executed by the Air Force and DOE with the aid of quantitative carbon life cycle analysis from ground to wake funded by FAA Partner. We need to continue the process of adding to the data base as processes and feedstocks mature and to ensure full coverage . In addition the benefits of carbon savings need to be attributed equitably to all who purchase the fuel in calculating economic benefit.

Lastly the tools that we use to assess alternative fuels project and permit their analysis by airlines, airports as well as fuel producer and grower stakeholders that are being

defined by ACRP need to be kept up to date. While the ACRP projects, of which I personally am a party to constructing, are excellent in scope and purpose the methodology must be fed by an up to date data base of information regarding feedstocks and processes. Currently ACRP executes its work at a given point in time. Shelf life of the data bases is inversely proportional to the speed that the space is growing. The aviation alternative fuels space is growing rapidly. A mechanism should be found to keep these tools up to date and relevant for the intended use.

In closing I would again like to thank you, Madam Chair, and the Subcommittee members for giving the CAAFI coalition as a whole the opportunity to present its views today. I would also like to take the opportunity to invite the members of the committee and your staff to gain more comprehensive exposure to the both our Coalition and our sponsors and stakeholders through attendance at the CAAFI bi-annual meeting and CAAFI Expo to be held in Georgetown on Nov. 30 and Dec 1. In Georgetown our full complement of sponsors and stakeholders will demonstrate the breadth and depth of what has been achieved and what, with the assistance of the committee, we can achieve in the future.

Thank You

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July 28, 2011