CAAFI Progress Update
An Aviation Industry Coalition Established to Facilitate and Promote the Introduction of Alternative Aviation Fuel

Goal is development of non-petroleum jet fuel production with:

* Equivalent safety & performance (drop-in)
* Comparable cost
* Environmental improvement
* Security of energy supply for aviation

Enables its diverse stakeholders to build relationships, share and collect data, identify resources, and direct research, development and deployment of alternative jet fuels

Synthetic kerosene, primarily from renewable sources
CAAFI Sponsors
From across the industry
How CAAFI works
Bringing interested parties together*

- 15 Aircraft, Engine, Subsystem OEM’s
- 19 Countries / 5 Continents
- 20 Airlines, Military, Airport orgs.
- 15 U.S. States / State Univ’s
- 30 U.S. Government Offices
- 54 fuel producers
- 30 U.S. Government Offices

300 Global Sponsor/Stakeholder Attendees
180 Different Organizations, 32 EXPO Participants

* Attendance at 2011 Annual General Meeting

13 August 2013
CAAFI Work Teams
Building the foundation to enable commercialization

Research & Development
Enabling Multiple “Drop-in” Solutions

Certification / Qualification
Fostering ASTM D7566 Approval

Environmental
GHG LCA, PM2.5 Quantification, Sustainability

Business
Facilitating Deployment, Investment
Industry making progress on all fronts:

- R&D: Public/Private work and progress continues, DOE intent to engage with additional cost reduction efforts, FAA CoE pending, academia, ...
- Demonstration: multiple DOE projects, DPA, private efforts ...
- Cert/Qual: 2 paths approved, 4 more in-process (research reports drafted), 3 more in development, others to follow
- Environment: working to harmonize GHG methodologies, and evaluating methodologies for broader sustainability guidance
- Business: recent announcement of commercial agreement (UAL and AltAir), others in works, published engagement guidelines, ...

Key issues remaining for US goal achievement:

- Feedstock supply-chain development – led to F2F2 discussions
- Bridging valley-of-death on investment & deployment
… “THEREFORE, AS OUR GOAL, we the undersigned, jointly signify our intent to continue working together over the next five years in an expanded collaboration entitled “Farm to Fly 2.0”, to enable commercially viable, sustainable bio-Jet Fuel supply chains in the U.S. that are able to support the goal of one billion gallons of bio-Jet Fuel production capacity and use for the Aviation Enterprise by 2018.
1) **Define/execute multi-year programs aimed at enabling the agri-related elements of an integrated national strategy**
   a) Forecasts, road-mapping, gaps, needs, projects
   b) Define and engage local agents for execution

2) **Address requirements needed for sustainable scale-up of promising feedstocks, addressing risk and risk abatement in key areas**
   a) Feedstock and Infrastructure development
   b) Grower Acceptance/Approval – Education – Adaptability - Risk
   c) Accessibility Risk: Sustainability: Feedstock / Conversion Overall Acceptability:

3) **Serve as a vehicle for enhanced communication and coordination**

13 August 2013
Progress Update
CAAFI facilitation leading to engagements ...

* Pathway Development
* Price Point
* Sustainability
* Political Alignment
* Airport Engagement
* Feedstock Development
* Analysis / Tools
* Int’l, Regional, State, Local Engagement
* Initiatives
State Initiative Progress
Activities in 20 states – advancing to all 50+

* **VT:** Successful RBEG award
  * New England Fuels Institute Branch, Vermont Fuels, and NEFI
  * Heterotrophic algae production of jet and fuel oil using waste streams from beer breweries & dairies

* **CT:** Successful RBEG award
  * CCAT, CAAFI, MSW handler and 2 fuel companies – central region development
  * Potential for MSW & wood waste-to-liquid facility to support fuel needs at BDL

* **NC:** Significant state development at BCNC
  * Next steps include potential communication summit and RFI

* **OH:** OAI/OBIC/OFBF applied for USDA Foundational Grant
  * To establish an OBBWG (Ohio Biofuels and Bioproducts Working Group)

* **KY, CO, FL, CA, …** communicating interest in advancing
MASBI
Midwest Aviation Sustainable Biofuels Initiative

* Year-long study of potential commercialization elements and options, “...to accelerate the commercialization of advanced biofuels in the Midwest”, with a 3+B usg annual Jet-Fuel demand
* Targeting demand solutions for ORD, MDW, DTW, MSP
* Led by UAL, Boeing, Honeywell/UOP, Chicago Dept. of Aviation, and Clean Energy Trust, with participation of 40 other organizations

* Study concluded with summit in Chicago on 27Jun
* Key findings and 14 recommended actions in 5 areas
  * R&D
  * Production
  * Financing
  * Policy
  * Sustainability
Doing business with airlines

- Addresses CAAFI recognition, and one of the MASBI recommendations – communicate engagement guidelines
- On 17 Jun, CAAFI released “Guidance for Selling Alternative Fuels to Airlines”
- Ties with other CAAFI guidance
  - Path to Fuel Readiness (RJF-101)
  - Fuel Readiness Level Tool (or FRL)
  - FRL Exit Criteria
  - Feedstock Readiness Level Tool (FSRL)
  - Environmental Progression & Sustainability Overview guidance
- Intent is to augment with appendices of actual D.P.A. lessons-learned
Airlines moving forward
e.g. UAL D.P.A. with AltAir Fuels – 2014 Production

* “…cost-competitive, commercial-scale, sustainable aviation biofuel”

* 5M usg/yr targeted for LAX

* AltAir to produce HEFA-SPK Jet Fuel from plant and animal triglycerides at 30M usg/yr renewables refinery

* UOP instrumental in working for “bolt-on” refinery solution

* Numerous opportunities for replication
Advancing use of alternative jet fuels is key for meeting industry’s commitments

Industry is working in concert to catalyze promising, renewable jet fuel technologies

Making progress with a broad range of topics / issues / challenges across the supply chain

Regional and Global engagement vital to achieving broad success

Public private coordination and interagency collaboration vital (e.g. via CAAFI, airline efforts)

CAAFI seeking additional opportunities and collaborators – coming to an initiative near you!
Join us at our next BGM
28-29 Jan’14, Washington, DC

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CAAFI
FUELING SOLUTIONS FOR SECURE & SUSTAINABLE AVIATION