

# Alternative Jet Fuels Research & Development

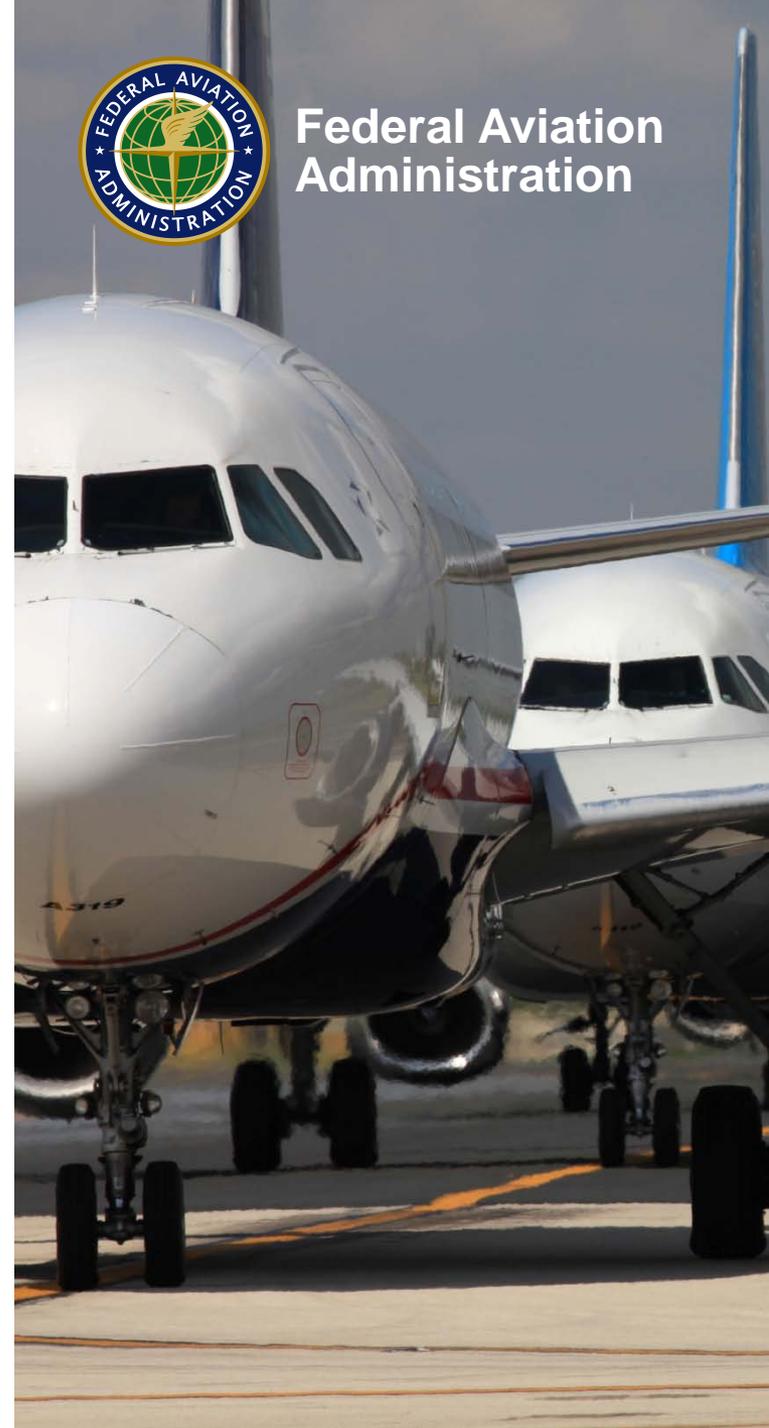
Presented to: DOE Bioenergy 2016, Breakout 1-D  
Launching Renewable Aviation Fuels

By: Nate Brown  
Office of Environment & Energy  
Federal Aviation Administration

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Federal Aviation  
Administration



# FAA E&E Policy Statement

## Vision:

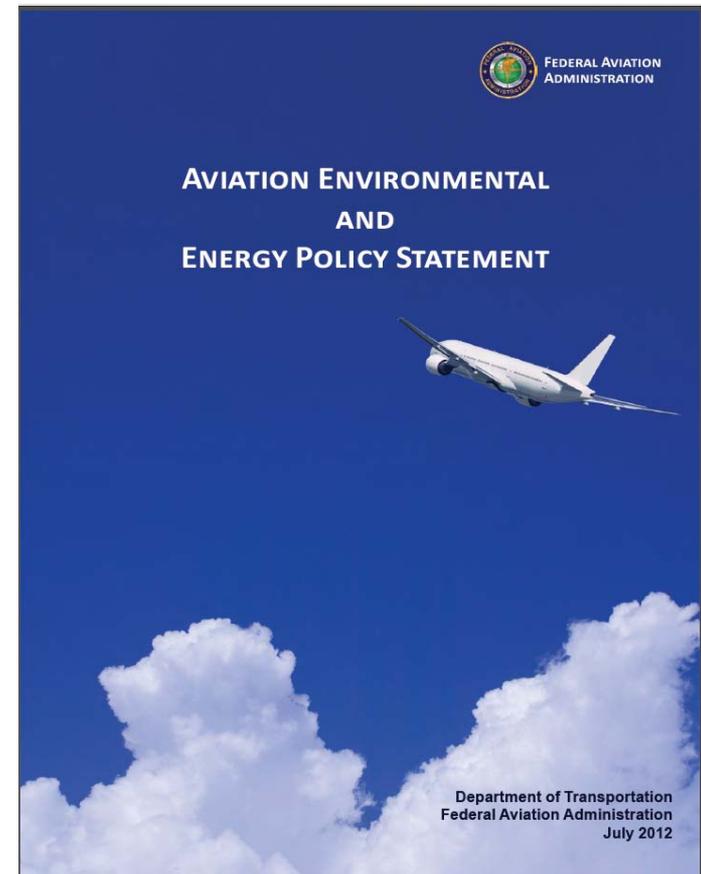
*Environmental protection that allows sustained aviation growth*

## Guiding Principles:

1. Limit and reduce future aviation environmental impacts to levels that protect public health and welfare.
2. Ensure energy availability and sustainability.

## Alternative Fuels key contributor to FAA Environmental and Energy Goals:

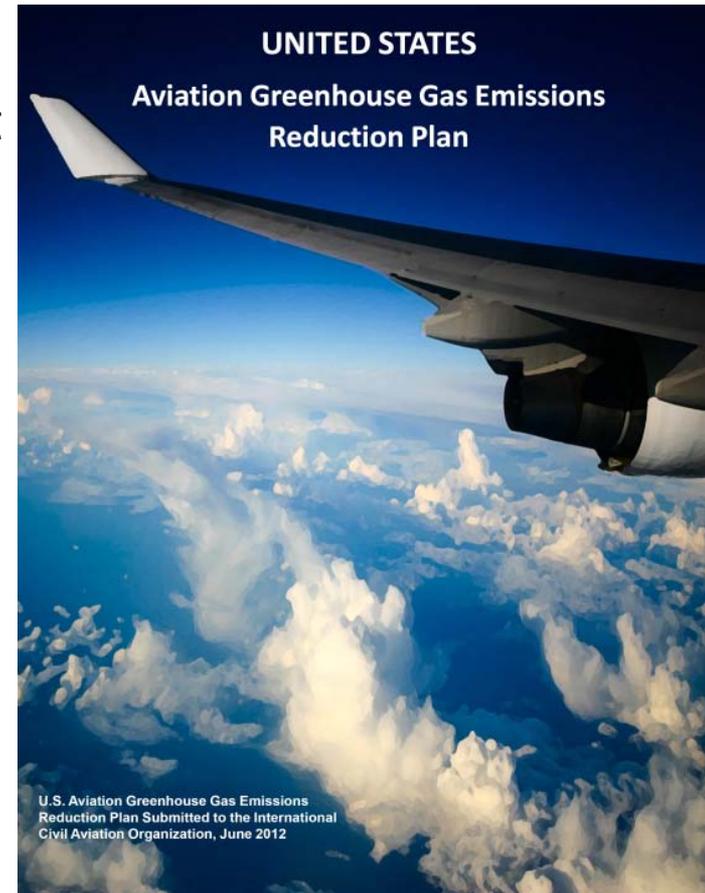
- Carbon neutral growth by 2020 compared to 2005
- Absolute reduction of significant air quality impacts, notwithstanding aviation growth
- 1 billion gallons of renewable jet fuel in use by aviation by 2018



# U.S. Climate Action Plan for Aviation

*The U.S. is pursuing a multipronged approach to address green house gas emissions from aviation and alternative jet fuels are a key component*

- Aircraft and engine technology improvement
- Operational improvements
- **Alternative fuels development and deployment**
- Policies, environmental standards, and market based measures
- Scientific understanding through research, modeling and analysis



# FAA Alternative Jet Fuel Activities

- **Testing**

- Support Cert/Qual testing
- Improve Cert/Qual process (NJFCP)
- Emissions measurements

- **Analysis**

- Environmental sustainability
- Techno-economic analysis
- Future supply

- **Coordination**

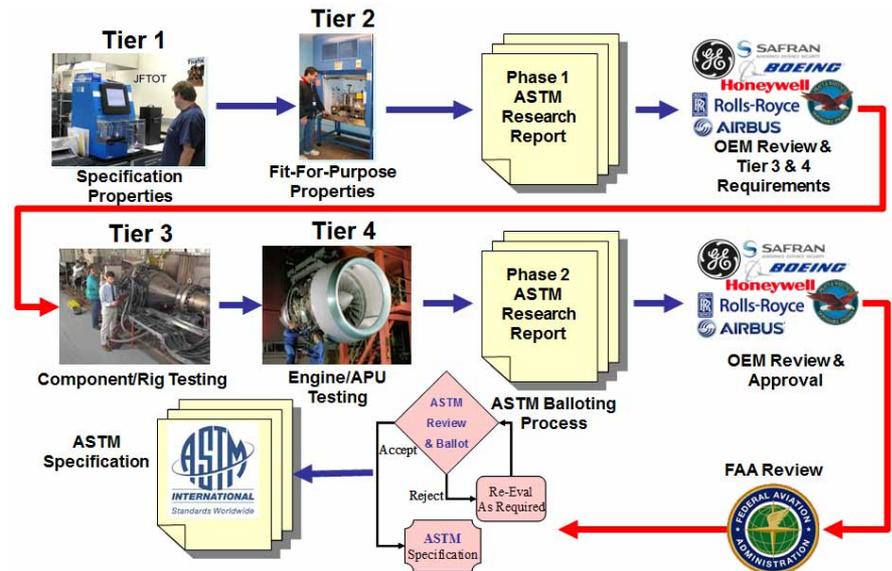
- Interagency
- Public-Private
- State & Regional
- International



# Alternative Jet Fuel Testing

## Support ASTM Intl evaluation of alternative jet fuels

- **Support ASTM D4054 testing activities to develop data for approvals**  
(CLEEN; Volpe BAA; SEMRS; ASCENT A31; CLEEN II)
- **Research Report Review**  
(CLEEN; A31)
- **Data Gathering**  
(ASCENT A33, SEMRS)
- **Streamline approval process via the National Jet Fuels Combustion Program**  
(ASCENT A25-30, 34)



# Commercial Aviation Alternative Fuels Initiative (CAAFI)

- Public-Private coalition for commercial aviation to engage the emerging alternative fuels industry
- Enable development of alt jet fuels:
  - Equivalent safety/performance (drop-in)
  - Comparable cost
  - Environmental improvement
  - Security of Energy supply
- Four teams for key issues:
  - Environment Team
  - Certification-Qualification Team
  - R&D Team
  - Business Team
- State and Regional Support
- International Cooperation



# U.S. Agency alternative jet fuels R&D activities



	Feedstock Development & Production	Feedstock Logistics	Fuel Conversion	Fuel Conversion Scale-up	Fuel Testing & Evaluation	Integrated Challenges
DOC	✓					✓
DoD				✓	✓	
DOE	✓	✓		✓		✓
DOT					✓	✓
EPA						✓
NASA					✓	
NSF	✓	✓		✓		
USDA	✓	✓		✓		✓

FAA Testing

FAA Analysis & Coordination



Federal Aviation Administration

# Federal Alternative Jet Fuels (AJF) R&D Strategy

(release date TBD)

## Intended Purpose

Identify opportunities and strategically address challenges associated with Research, Development, Demonstration, and Deployment (RD3) along the development path of alternative jet fuels.

## R&D Goals & Objectives

- Feedstock Development, Production, and Logistics
- Fuel Conversion and Scale-Up
- Fuel Testing and Evaluation
- Integrated Challenges

**An undertaking by Aeronautical Science and Technology Subcommittee of the OSTP/NSTC with input from stakeholder community.**

**8 participating Departments & Agencies: USDA, DOC, DOD, NASA, FAA, DOE, EPA, NSF, DOS**

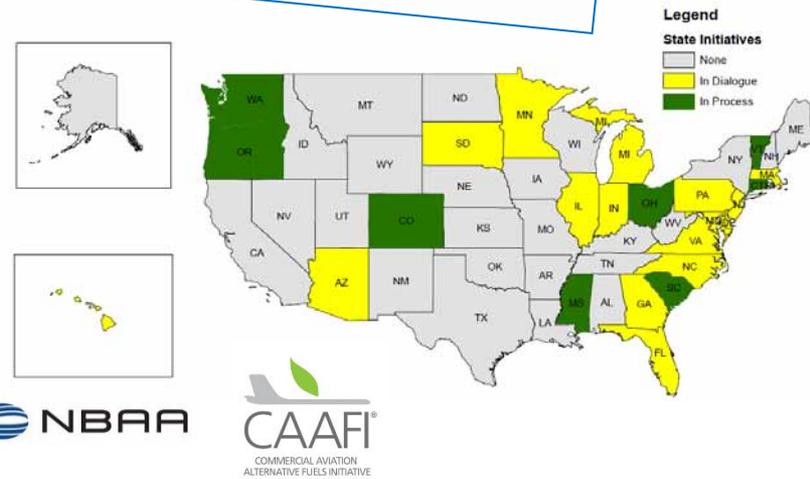


# Farm to Fly 2.0 (F2F2) Agreement

... “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”



*Subsequently signed by DOE Secretary Moniz*



# ASCENT

## FAA CENTER OF EXCELLENCE FOR ALTERNATIVE JET FUELS & ENVIRONMENT

### Lead Universities:

- Washington State University (WSU)\*
- Massachusetts Institute of Technology (MIT)

### Core Universities:

- Boston University (BU)
- Georgia Institute of Technology (Ga Tech)
- Missouri University of Science and Technology (MS&T)
- Oregon State University (OSU)\*
- Pennsylvania State University (PSU)\*
- Purdue University (PU)\*
- Stanford University (SU)
- University of Dayton (UD)
- University of Hawaii (UH)\*
- University of Illinois at Urbana-Champaign (UIUC)\*
- University of North Carolina at Chapel Hill (UNC)
- University of Pennsylvania (UPenn)
- University of Tennessee (UT)\*
- University of Washington (UW)\*



\* Denotes USDA NIFA AFRI-CAP Leads and Participants & Sun Grant Schools

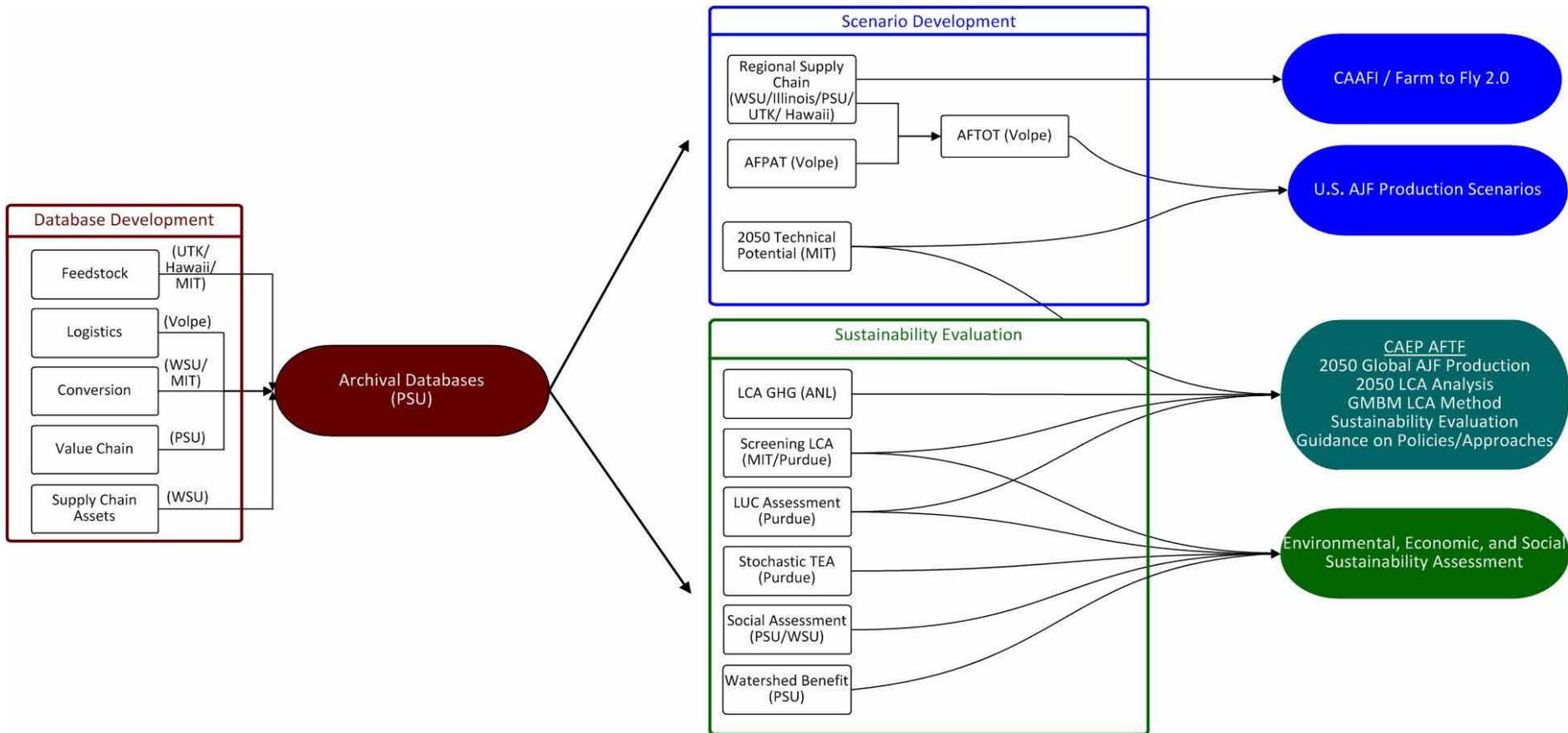
ASCENT Website: <http://ascent.aero>

# ASCENT 01 Supply Chain Analysis

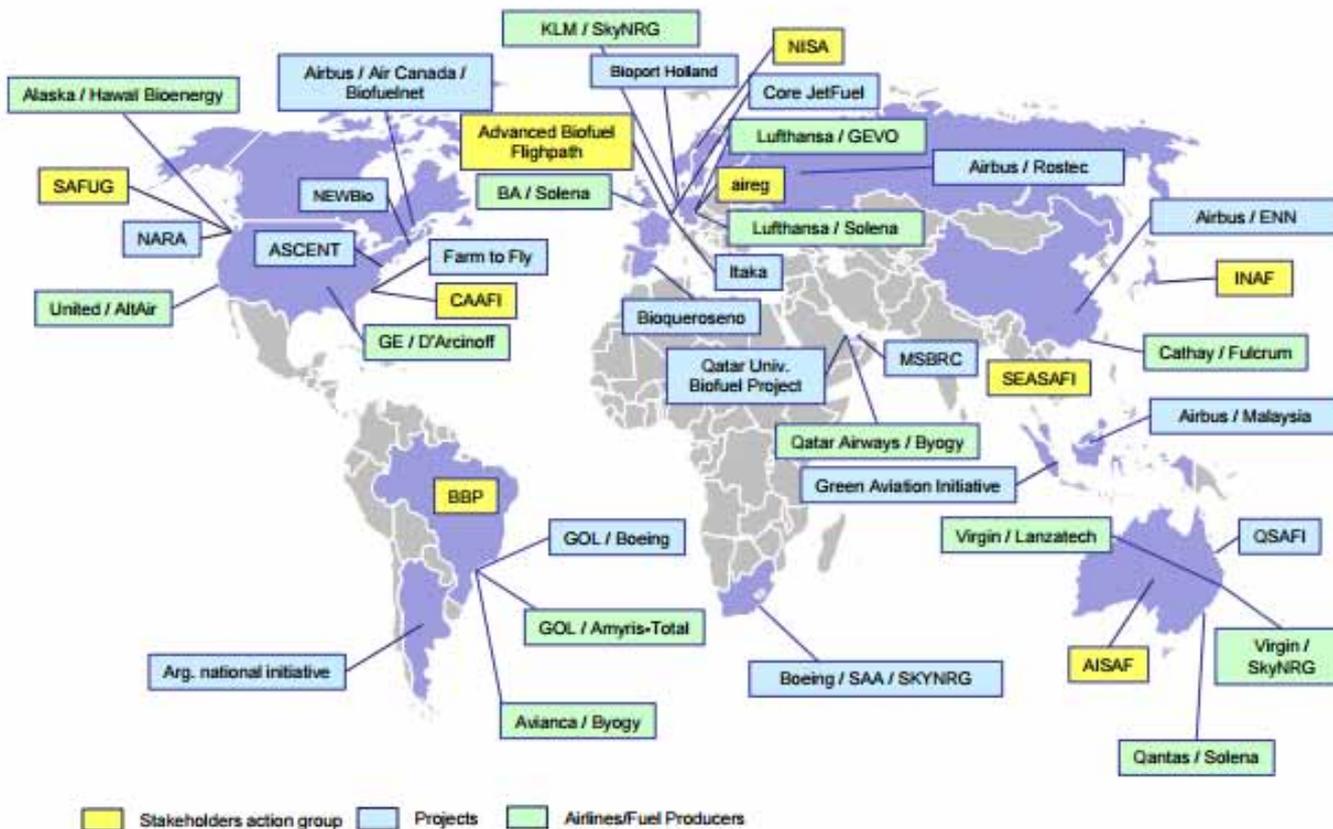
## Database Development and Archive

## Scenario and Sustainability Analysis

## Project Outputs



# Coordinating with International Efforts



Credit: IATA Alternative Fuels Roadmap



# International Civil Aviation Organization (ICAO)

## Alternative Fuels Task Force

- 2050 Global AJF Production Potential Analysis
  - Effort is complete – used for CAEP Trends Assessment
  - MIT conducted fuel production analysis
  - MIT/ANL compiled life cycle GHG emissions factors
- LCA Methodology for the Global MBM
  - MIT/Purdue/ANL/Volpe all instrumental to method development
  - MIT will compile core LCA default values
  - Purdue will calculate induced land use change emissions
- Sustainability Criteria for AJF recognition under Global MBM
- Guidance on Potential Policies and Coordinated Approaches for Sustainable AJF Deployment
- Feasibility of ICAO Climate Goals / Carbon Budget





**Nate Brown**

**Federal Aviation Administration  
Office of Environment and Energy**

**Email: [nathan.brown@faa.gov](mailto:nathan.brown@faa.gov)**

