

# Alternative Jet Fuel Supply Chain Analysis

## ASCENT 1

### ASCENT-1 Overview

Project manager: J. Hileman, FAA; Nate Brown, FAA; Dan Williams, FAA  
Lead investigator: Michael Wolcott, WSU

April 18, 2017

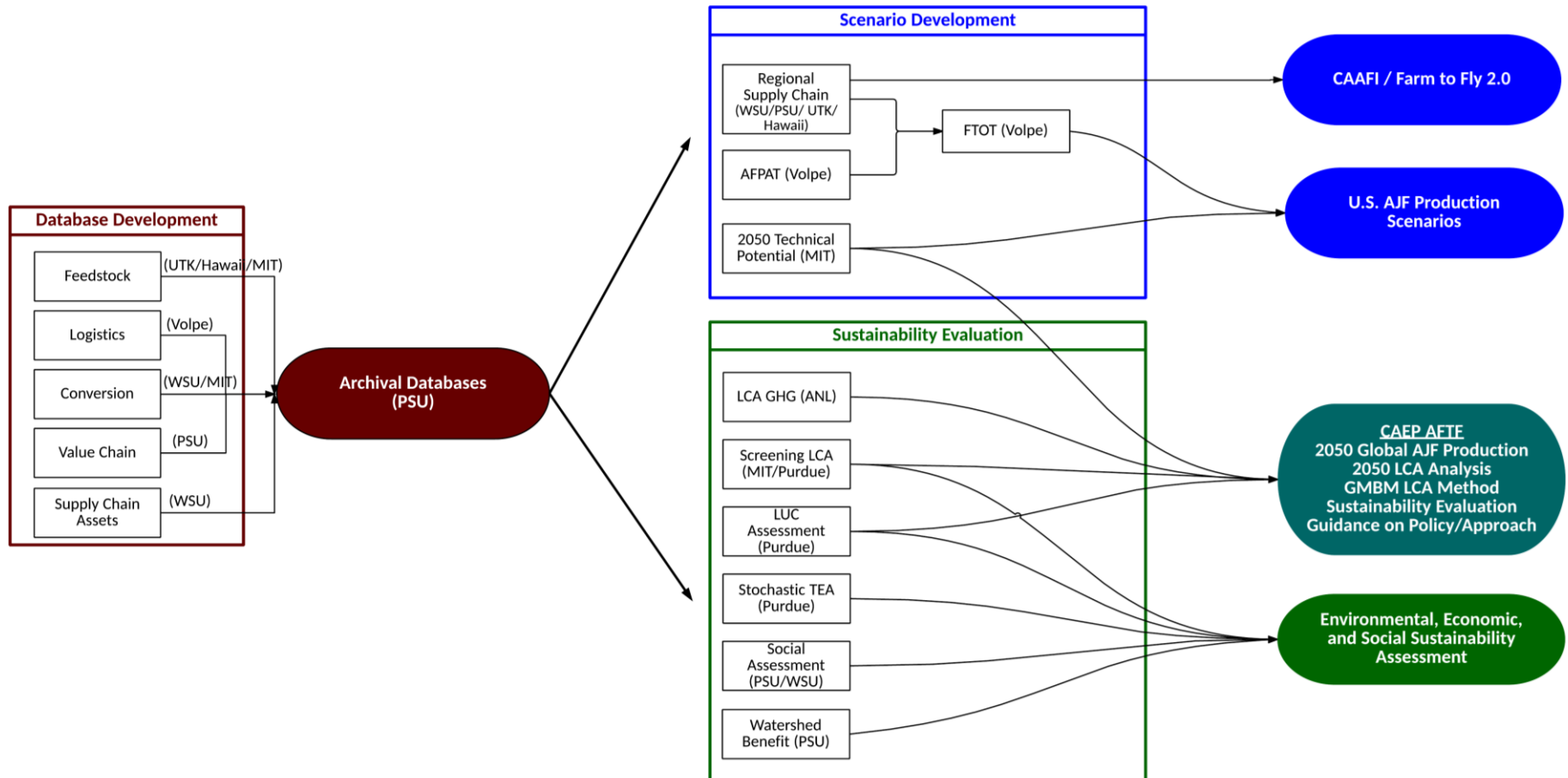
Opinions, findings, conclusions and recommendations expressed in this material are those of the author(s)  
and do not necessarily reflect the views of ASCENT sponsor organizations.



# Project Organization

## Database Development and Archive

## Scenario and Sustainability Analysis



Project Outputs are in Color

## 1. U.N. International Civil Aviation Organization (ICAO) Alternative Fuels Task Force Support

- Greenhouse gas life cycle analysis
- Induced land use change modeling
- Policy task support
- Sustainability task support

## 2. Production Analyses

- Hawaii / tropical AJF
- Future U.S. production potential

### MBM Background information

As of 23 August 2017, **72 States**, representing **87.7%** of international aviation activity, intend to voluntarily participate in the global MBM scheme from its outset.

✓	State	Response to SL ENV 6/1-16/87*	Other Sources
1	Albania		Bratislava Declaration; ICAO A39- WP/414
2	Armenia		Bratislava Declaration; ICAO A39- WP/414
3	Australia	27/09/2016	
4	Austria		Bratislava Declaration; ICAO A39- WP/414; High Ambition Coalition
5	Azerbaijan		Bratislava Declaration; ICAO A39- WP/414
6	Belgium		Bratislava Declaration; ICAO A39- WP/414; High Ambition Coalition
7	Bosnia and Herzegovina		Bratislava Declaration; ICAO A39- WP/414
8	Botswana		Government of Botswana
9	Bulgaria		Bratislava Declaration; ICAO A39- WP/414; High Ambition Coalition
10	Burkina Faso		Statement at ICAO 39th Assembly
11	Canada	16/09/2016	Canada, Mexico & U.S. Leaders' Joint Statement; G7 Transport Minister's Joint Statement
12	China		China & U.S. Leaders' Joint Statement (ch); China & U.S. Leaders' Joint Statement; U.S.-China Climate Change Cooperation

## **3. Economic Viability Analyses**

- Communication framework for risk and reward sharing across supply chains (PSU)
- Supply chain risk analyses for grower adoption (PSU/UTK)
- Hub-and-spoke supply chain analyses to better understand opportunities and challenges (WSU)
- Ecosystem services programs and farmer revenue options (PSU)

## **4. Lipid-focused Analyses**

- Technoeconomic analyses (5 lipid-based technologies)
- National lipid supply availability and anticipated demand/competition for resources
- Additional feedstock production analyses

## 5. Deployment / Tactical Projects

- Collaborative projects leverage strengths across A01 team
- Achieve supply chain development and move toward commercial production
- Initial projects:
  - Inland Northwest lipid-based alternative jet fuel
  - Hawaii lignocellulosic alternative jet fuel
  - Southeastern U.S. alternative jet fuel

# ASCENT P1 Regional Approach



Project Groundwork (G)	Regional Deployment Project (D)
G1 - Analysis of feedstock-conversion pathway efficiency, product slate (including co-products), maturation	D1 - Develop detailed supply chain scenarios (feedstock, products/co-products, infrastructure, logistics, conversion method) for analysis/deployment
G2 - Scoping of Techno Economic Analysis (TEA) issues	D2- Stochastic TEA of pathway
G3 -Screening level GHG Life Cycle Analysis (LCA)	D3- Evaluate sustainability and GHG LCA
G4 - Identification of supply chain participants/partners	D4 -Farmer revenue, rural development, economics
G5- Develop appropriate stakeholder engagement plan	D5 - Evaluate social capital/acceptability
G6 - Identify and engage stakeholders	D6 - Evaluate environmental services revenue options
G7 - Acquire transportation network and other regional data for Freight and fuel Transportation Optimization Tool (FTOT) and other modeling	D7 - Evaluate potential economic benefit of project
G8 - Evaluate infrastructure availability	D8- Supply chain risk assessment for business adoption
G9 -Evaluate feedstock availability	D9 - Incorporate regional data into FTOT for geospatial analysis
G10 - Develop specific regional proposal	

# Inland NW Lipid-based SAJF (WSU Lead)



- Facilitate efficient, revenue-enhancing supply chains for oilseed HEFA production
- Engage SG Preston, Port of Seattle, Alaska Airlines, Boeing
- Groundwork mostly complete

- Deployment aspects to be undertaken
  - Develop oilseed and FOG supply chain scenarios
    - hydroprocessed esters and fatty acids (HEFA)
    - catalytic hydrothermolysis (CH)
  - Evaluate social capital metrics via WSU Community Asset Assessment Model (CAAM) and Refinery to Wing assessment
  - Coordinate with PSU on evaluating availability of environmental services revenue options
  - Coordinate with PSU on supply chain risk model development
  - Coordinate with Volpe on FTOT regional deployment geospatial analyses



# Hawai'i C&D Waste SAJF (UH Lead)

- Construction & Demolition (C&D) wood waste-based FT on Oahu
- Possible expansion to eucalyptus from other islands
- Potential facility site and supply chain partners identified
  - Refinery at Campbell Industrial Park
  - End users at Inouye International Airport and Joint Base Pearl Harbor/Hickam
- Some groundwork complete



- Groundwork activities to be undertaken
  - Assess feedstock suitability
  - Evaluate co-products potential throughout supply chain
  - Technoeconomic issue identification
  - Screening level GHG LCA
  - Expand analysis of supply chain participants
  - Develop appropriate stakeholder engagement plan and engage stakeholders
  - Evaluate infrastructure availability (interisland shipping, transport/conveyance options)
  - Evaluate feedstock availability
  - Develop detailed regional proposal

- Significant resources available for SAJF production in the Southeast
- Near term goal is to identify two potentially viable SAJF supply chains and execute groundwork tasks
- Groundwork activities to be undertaken:
  - Determine lipid and cellulosic feedstock availability and potential conversion locations
  - Identify supply chain opportunities, potential partners, and risks
  - Convene promising stakeholders
  - Assess potential environmental implications
  - Identify social capital parameteris influencing supply chain development and feasibility
  - Develop specific regional proposal