



Aviation and Sustainable Biofuel- Global Collaboration

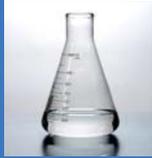
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Boeing - Sustainable Aviation Biofuel Strategy



Feedstock Pathways



Fuels Approval



Airport Infrastructure



Commercial Production



Support and Advocacy

- Oilseeds
- Waste products
- Cellulosic
- Algae

- BTL – Biomass to Liquid
- HRJ – Hydrotreated Renewable Jet
- Alcohols to Jet
- Others...

- Drop-In Fuel

- Dynamic Fuels
- AltAir Fuels
- Neste Oil
- Others in-work...

- SAFUG Airlines
- Regional Assessments
- Policy Asks

First revenue flights/announcements have begun...



Act in catalyst role to accelerate commercialization



Sustainable Aviation Fuel Users Group

Members:



Affiliates:



Strong and Growing Group of Early Adopters

Sustainable Aviation Biofuel Projects Around the World

SAFUG-Europe
Member Projects



Working Together MOUs
with CAAC, Air China,
PetroChina



Sustainable
Aviation Fuels
Northwest



Farm to Fly



Project
Flight Path



Latin America
Jatropha
Sustainability
Study



Life
Cycle
Analysis



Aviation Biofuel
Road Map



Masdar
Research
Project



Farm to Fly

- Initiative between aviation industry and US government agencies to accelerate biofuels commercialization
- Address challenges of cost, feedstock availability
 - Identify and advocate policy initiatives to launch end-to-end supply chain

Examples:

- Coordinate and integrate government policies
- Incorporate new feedstocks into existing laws



SAFN (Sustainable Aviation Fuels Northwest) Objectives

- Convene regional stakeholders with expertise across the aviation biofuel supply chain
- Assess the opportunities and challenges across multiple biomass feedstock supply chains
- Identify sustainability principles and practices
- Produce collaborative & consensus-driven action plan



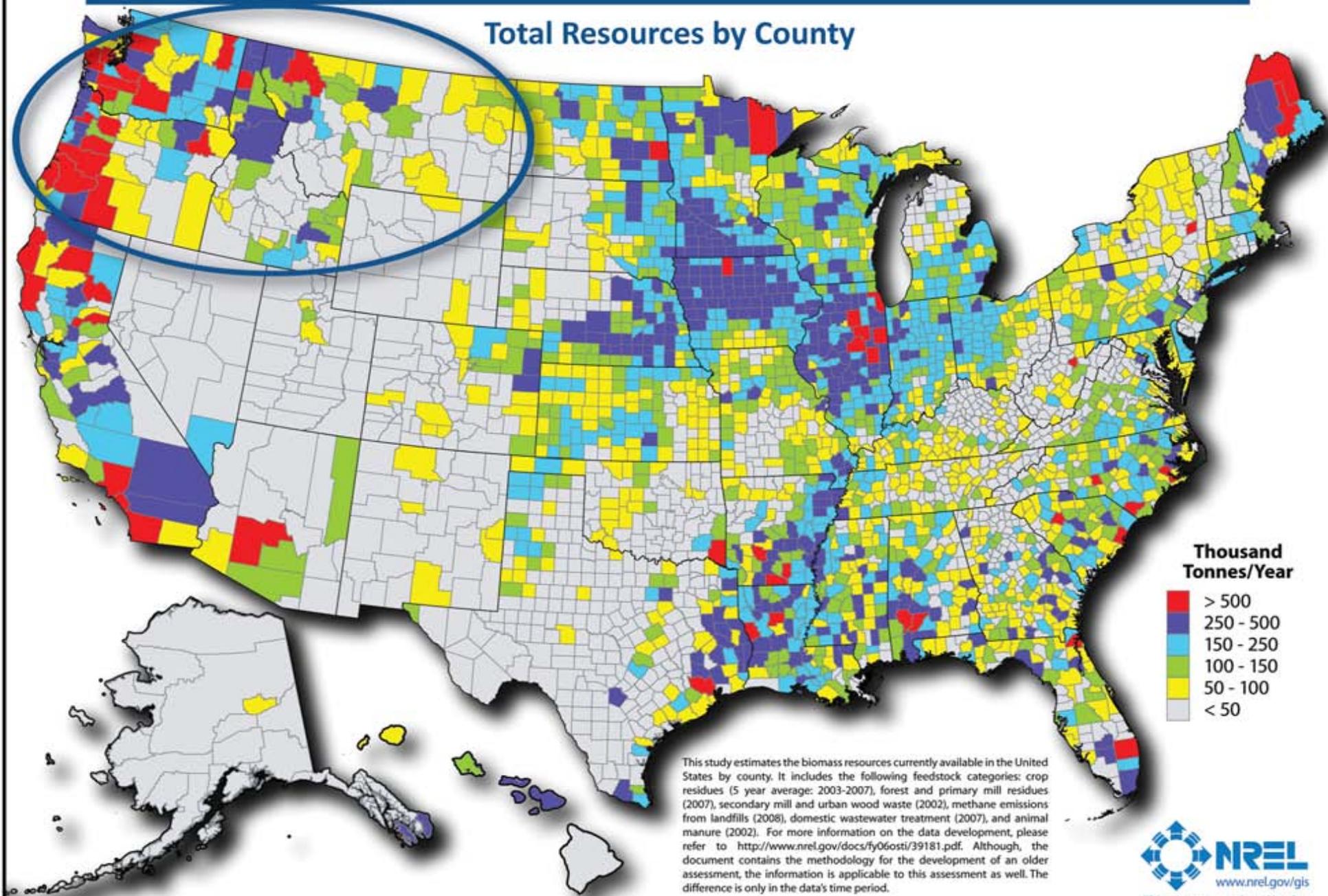
Sustainable Aviation Fuels Northwest Stakeholders



★ Steering Team

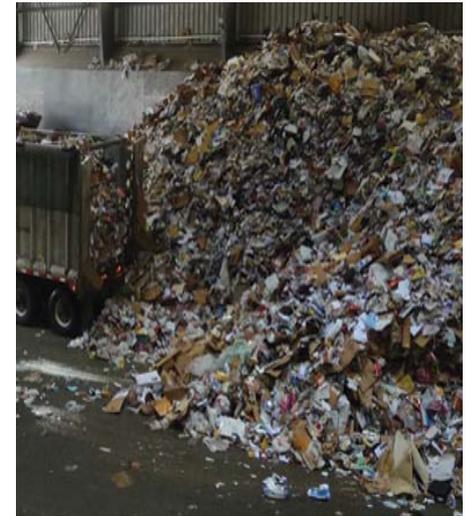
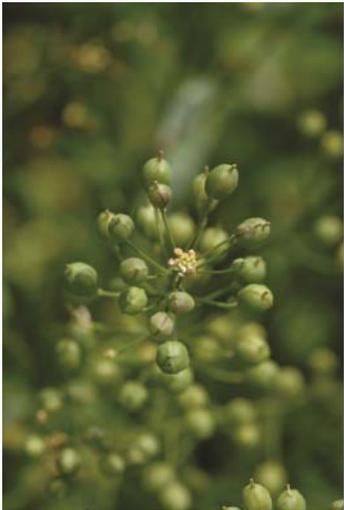
BIOMASS RESOURCES OF THE UNITED STATES

Total Resources by County



Key Feedstock Pathways

- Oilseeds
- Algae
- Forest Residuals/Thinnings
- Municipal Solid Waste



Top Six SAFN Recommendations

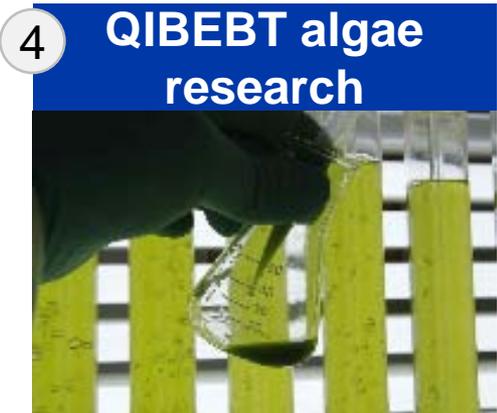
1. Strategic focus on sustainable fuels for aviation
2. Stable, long-term policy to attract investment
3. Support for aviation fuels under RFS2
4. State and local support of infrastructure and training
5. Target regional R&D
6. Incorporate sustainability criteria

China Biofuels Collaboration

1 Evaluation study



The image displays three logos: the Boeing logo in blue and black, the National Energy Administration (NEA) logo featuring a red and yellow sunburst with the acronym 'NEA' below it, and the PetroChina logo, a red and yellow sunburst with the name 'PetroChina' below it.



Strategy and development study

Description

US-China bilateral level study sponsored by NEA and USTDA/DOE

Study on China sustainable aviation biofuel commercialization current status, technology, economic and policy

Leverages both Chinese and US biofuels experts

Scope

Critical biofuel feedstock strains, growth technology and distribution analysis

Processing technology fuel pathways and opportunities

Biofuel demand and economics in aviation

Sustainability study and regional macroeconomic impact

Life cycle analysis

Participants

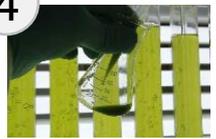


Additional Chinese ministries

Key Chinese Biofuel Research Institutes

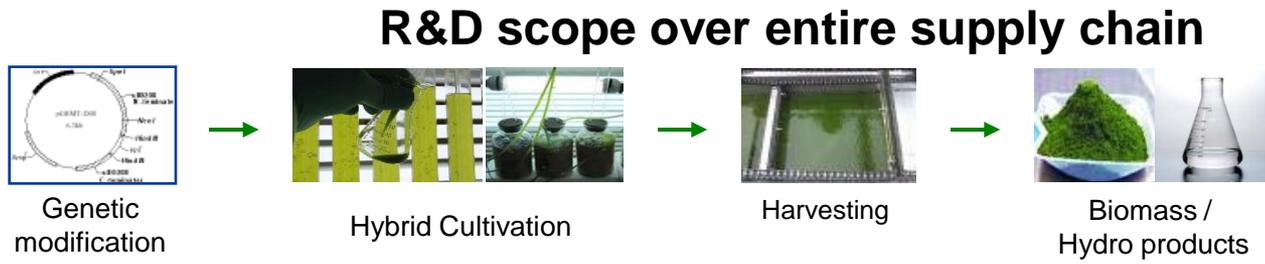
US experts from biofuel companies and universities

Study to be used as roadmap for aviation biofuels development in China



QIBEBT micro-algae research

Topics research ed



Program status

- May 2010 – Center established
- R&D proceeding ahead of expectations
- One of the largest micro algae research group in China
- Pilot I commenced in May 2011 and expanding

Strategic Impact

- Next generation biofuel feedstock
- Research drives down long-term costs, build scale on supply chain
- Co-creating technology with China

Sustainable Aviation Biofuel Progress Report



Progress

- Flight tests – met / exceeded expectations
- Regional assessments
- Military platforms qualified
- ASTM HRJ SPK approval
- Commercial flights begun

Next Steps

- Continued emphasis on sustainability
- Research - expanded feedstocks/pathways
- Commercial production scale-up
- Stretch goal: First 1% by 2015 (~600 MGY)

Great progress. Superior fuel. Early in the journey.

We Are Committed to a Better Future



For more info: www.boeing.com/commercial/environment

