

# Sustainable Aviation Fuels Northwest: A Stakeholder Process to Map Biojet Supply Chains



**USDOE Biomass 2011**

**July 27, 2011**

# What is SAFN?



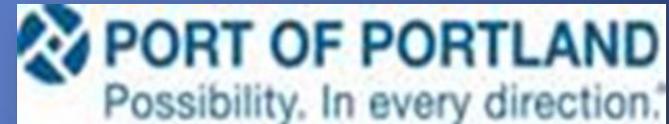
- Mission: Explore opportunities and challenges in production of sustainable aviation fuel using Pacific Northwest feedstocks
- Regional stakeholder process: +40 participants
- Geographical scope (WA, OR, ID, MT)
- Limited Duration: July 2010-July 2011
- First in the U.S.; Australia, Mexico, EU, UAE
- Climate Solutions: facilitator and lead for research and writing

# SAFN 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 and consensus-driven action plan



# Who is SAFN: The Steering Committee



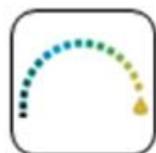
# Who is SAFN: Stakeholders

- State natural resources and energy agencies
- Federal agencies including USDA, USDOE, Defense Logistics Agency
- Biofuels producers, technology providers, industry consultants
- Feedstock growers – farm and forest
- Environmental NGOs including NRDC
- Roundtable on Sustainable Biofuels
- Technology and feedstock researchers

# Sustainable Aviation Fuels Northwest Stakeholders



Honeywell



Imperium



Great Plains



Bioalgene



Biopure Fuels



Steel River



Conservation NW



Weyerhaeuser



OSU



Sun Grant



Alt Air



Spokane Industries



ADAGE



DLA



Duke Energy



Core Fuels



Green Diamond



WA Env. Council



Simpson Investment



ATA



Nature Conservancy



NVV Biodiesel Network



NRDC



OR Environ Council



OR Wheat Growers



Roundtable Sustainable Biofuels



MATRIC



Houghton Cascade



OR Dept of Agriculture



USDA - RD



USDA - ARS



WA Dept of Comm



WA - DNR



W&R



Parametrix



Ruckelshaus Center



USDA



Alaska Air



Spokane



Boeing



Port of SEA



Port of PDX



WSU



Climate Solutions

# Context for Action

- Cost – reliance on foreign petroleum causes wild price swings
- National Security – key driver for developing home-grown sustainable fuel supplies
- Climate – reduce the aviation industry's carbon dioxide emissions with cleaner, fuel efficient planes

# Aviation Priority

- Commercial aviation critical to US economy —\$1.2T, 11 M jobs!
- Average fuel expense = 36% of airline costs
- Industry has been a leader in addressing emissions
- Aviation is unique—unlike most transportation, biofuels provide only near-term low-carbon fuel option



# Aviation Priority

Sustainable biofuels provide only route with existing technology to put aviation on an economic and environmentally sustainability path

- Aviation fuels should receive priority consideration for development of fuels from available sustainable feedstocks.
- This **does not** mean that aviation fuels should be only use of bio-materials.

# Sustainability is Key

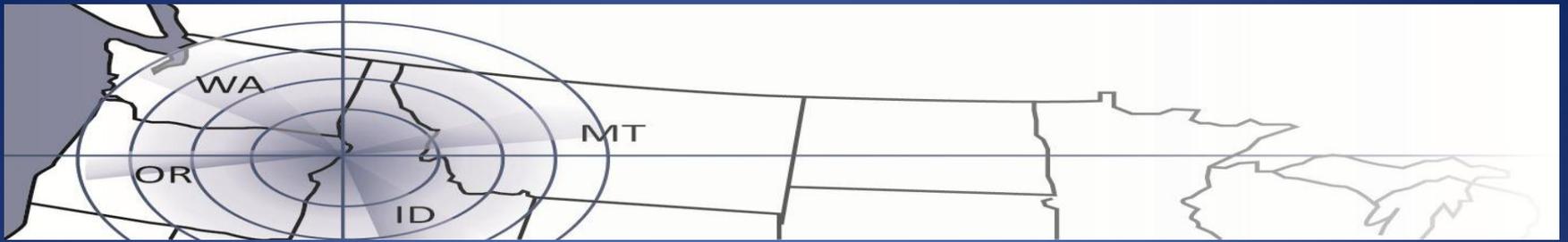


## **Not all bio-energy is sustainable energy**

- Aviation industry needs to prioritize second and third generation biofuels that meet sustainability criteria
- Important to recognize stakeholder concerns and developing scientific information

## **Don't reinvent wheel – use developed sustainability criteria in analysis**

- SAFN using Roundtable on Sustainable Biofuels criteria as screen to evaluate feedstock paths and potential issues

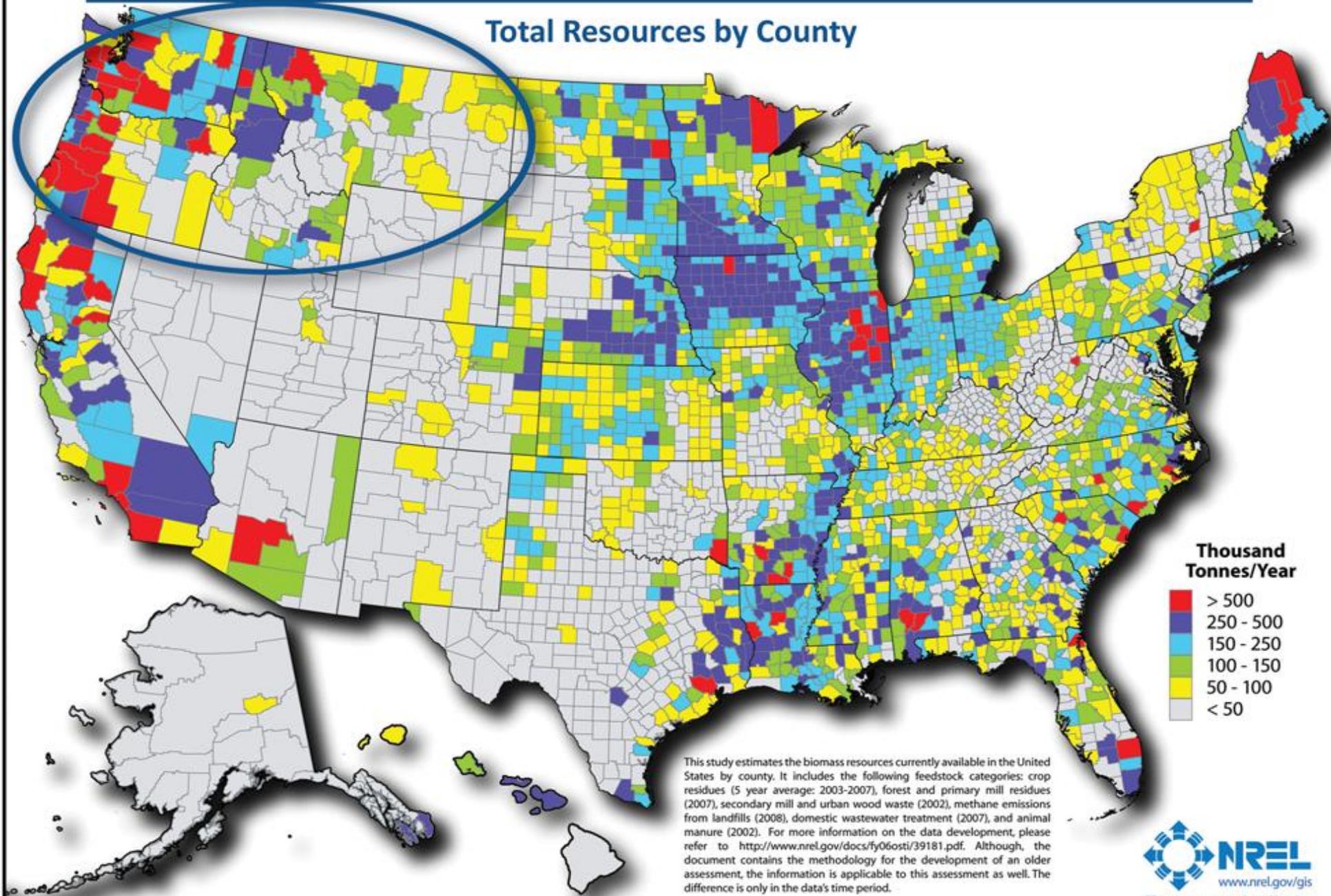


# Northwest Prime Location

- Rich and diversified biomass resources – farm, forest, municipal
- Policy and business leadership
  - ✓ RFS in MT, OR, WA
  - ✓ Climate framework in OR, WA
  - ✓ Major bioenergy focus at universities, federal labs
  - ✓ Interest by established players plus numerous business start-ups

# BIOMASS RESOURCES OF THE UNITED STATES

## Total Resources by County



# Existing Aviation Fuel Delivery System



# Criteria for selecting pathways



- Has potential to scale
- Has potential to supply product economically in 20-year timeframe
- Has potential to not be outcompeted by other markets
- Significant carbon reductions
- Sustainability concerns manageable

# Develop Full Supply Chains

Feedstocks → Processing → Biorefining → Distribution/Utilization



Oilseeds



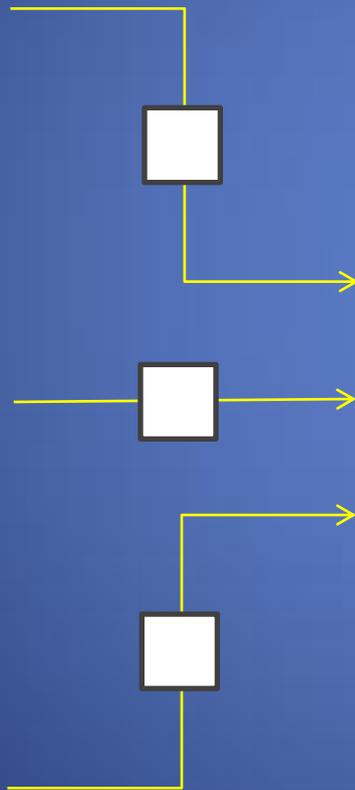
Biomass



MSW



Algae



Aviation

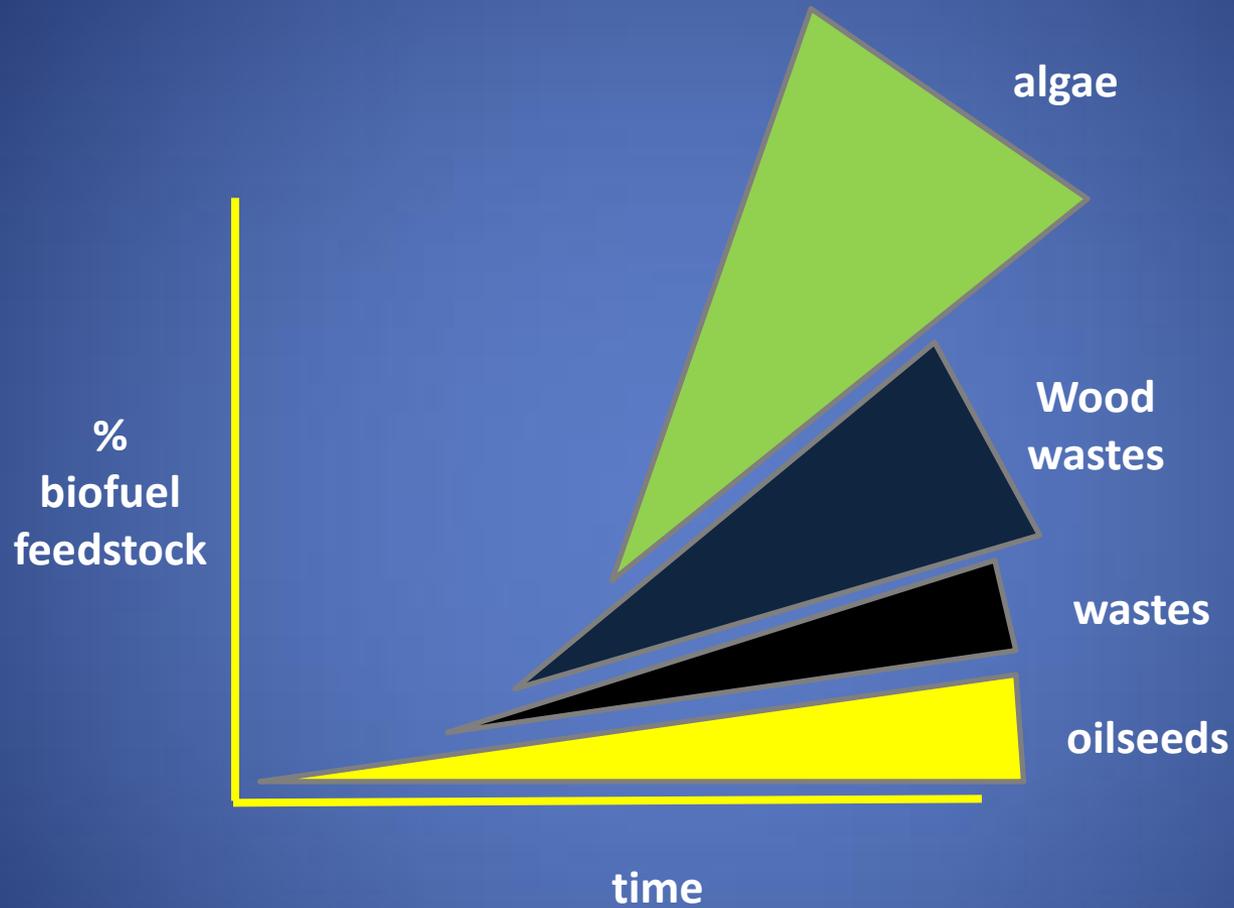


Trucking



Marine

# Create Scalable Supply



No Single Feedstock or Process Will Meet Objectives

# Conversion Technologies

- Hydroprocessing - Originally used in oil refineries can produce aviation fuels from natural oils
- Lignocellulosic Biomass Processing – process biomass into bioenergy and bioproducts
- ASTM approval by process technology – FT (cellulose) and HEFA (lipids)



# Northwest Key Feedstock Pathways & Challenges



## ■ Oilseeds

- Build economics and agronomics for new crops
- Validate LCA, sustainability

## ■ Algae

- Develop technologies – grow, collect, de-water
- Validate LCA, sustainability

## ■ Forest Residuals/Thinnings

- Improve economics, technologies for collection, delivery, processing
- Validate sustainability of biomass removal

## ■ Municipal Solid Waste

- Build consensus on place of energy in waste management

# Recommendations for specific feedstocks

- Oilseeds – reduce growers risk with a crop insurance program and improve incentives
- Forest residue – state policies must balance use of limited biomass sources
- MSW – improve knowledge base and insure clarity regarding use of wastes for fuel
- Algae - validate its sustainability and build clear regulatory roadmaps for its production

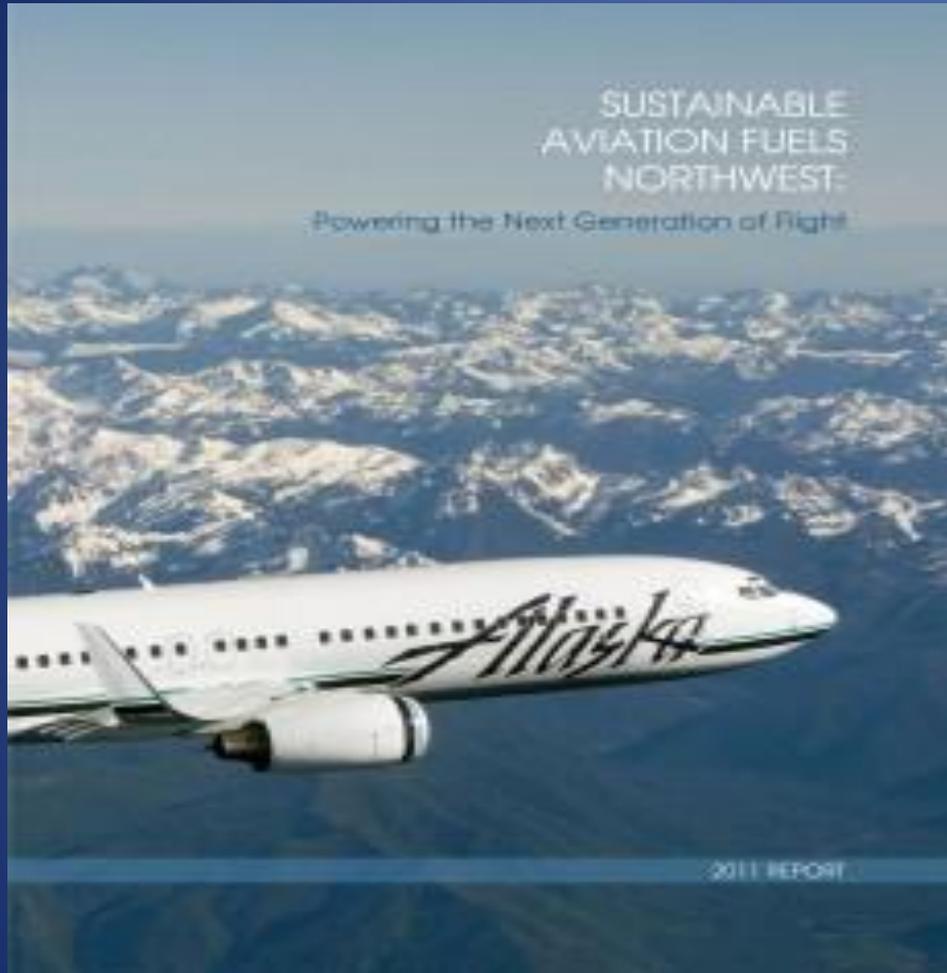
# Other Feedstocks

- Hybrid poplar
- Agricultural residues
- Wood Mill residues
- Perennial grasses



# Top 6 Recommendations

- 1) Create a strategic focus on sustainable fuels for aviation
- 2) Promote stable, long-term policy to attract investment
- 3) Ensure support for aviation fuels & promising feedstocks under RFS2 Program
- 4) Provide strong backing for the industry
- 5) Target R&D on regional efforts critical to commercializing aviation fuel projects
- 6) Incorporate sustainability considerations to create an advanced biofuels industry



Thank You!

Patrick Mazza

Climate Solutions

[www.climatesolutions.org](http://www.climatesolutions.org)

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