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Developing Biofuels Across the West

California Energy Commission
Sacramento, CA
January 13, 2009

Alex Schroeder

Program Director, Western Governors' Association



The Western Governors' Association

- Mission



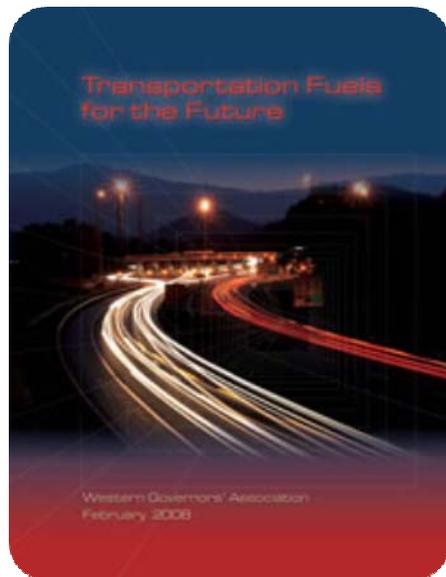
- WGA addresses important policy and governance issues in the West, advances the role of the Western states in the federal system, and strengthens the social and economic fabric of the region.
- WGA develops policy and carries out programs in the areas of natural resources, the environment, human services, economic development, international relations and state governance.
- WGA acts as a center of innovation and promotes shared development of solutions to regional issues



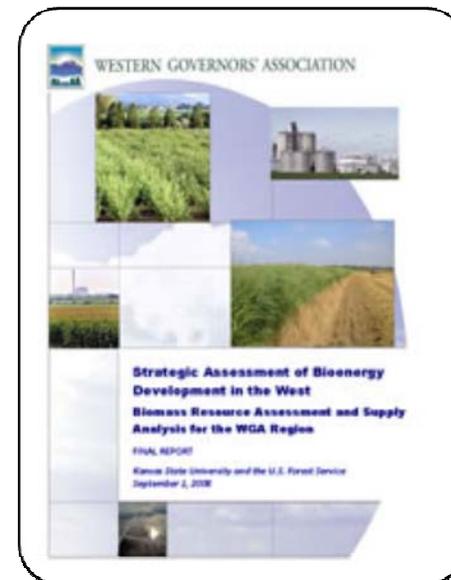
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- Highlighted Initiatives

“An enormous national commitment is necessary to transform our energy infrastructure and our economy as we shift to low-carbon-emission energy sources” – WGA letter to President-elect Obama



**Transportation Fuels
for the Future**



**Western Strategic
Bioenergy Assessment**



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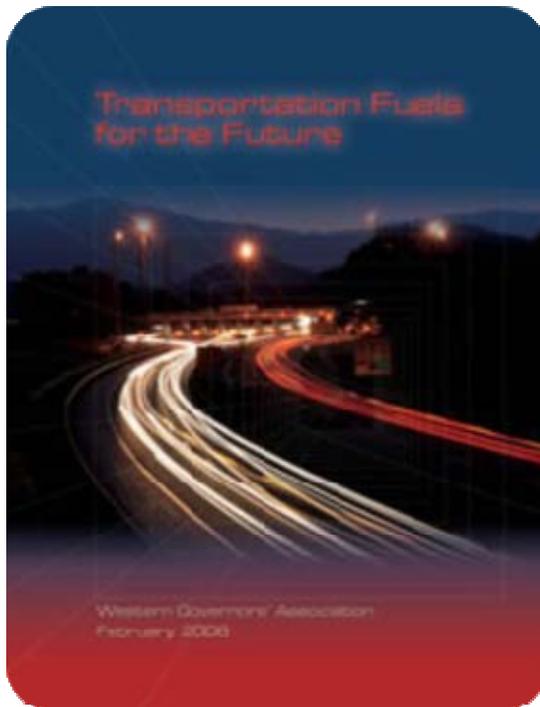
- Transportation Fuels for the Future

WGA Resolution 06-20 Regional Task Force

- Increase the Region's Supply and Technical Capacity for Alternative Fuels
- Develop Adequate Infrastructure
- Position the Western States as both leaders and key producers in the emerging alternative fuels economy

Cross-Cutting Recommendations from Report

- Leadership
- Environmental Stewardship
- Financial and Economic Support
- Infrastructure
- Feedstock Development
- Workforce Development





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- Biofuels, Biodiesel, and Renewable Diesel

Priority Recommendations



- Increase the demand floor for biofuels
- Coordination of RD&D between state and federal agencies
- Next generation biofuels are essential (feedstock and conversion technology)
- The development of infrastructure to support higher blend biofuels



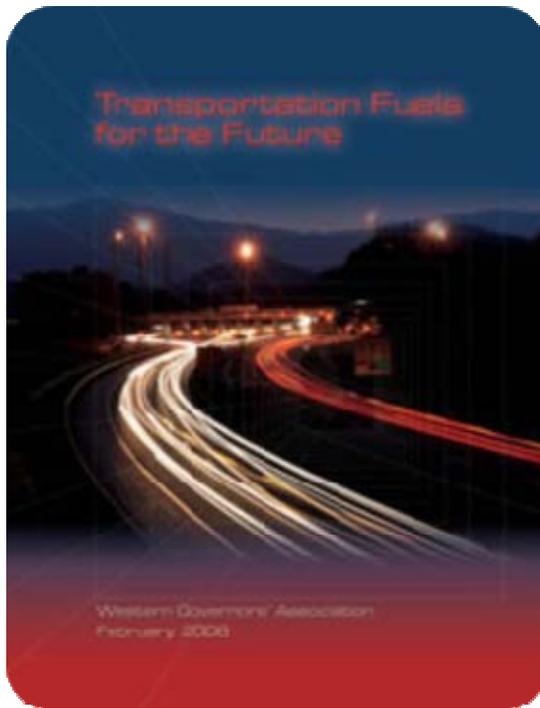
Regional Challenges

- Development of Infrastructure
- Coordinating Fuel Standards
- Environmental Impacts



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- Transportation Fuels for the Future



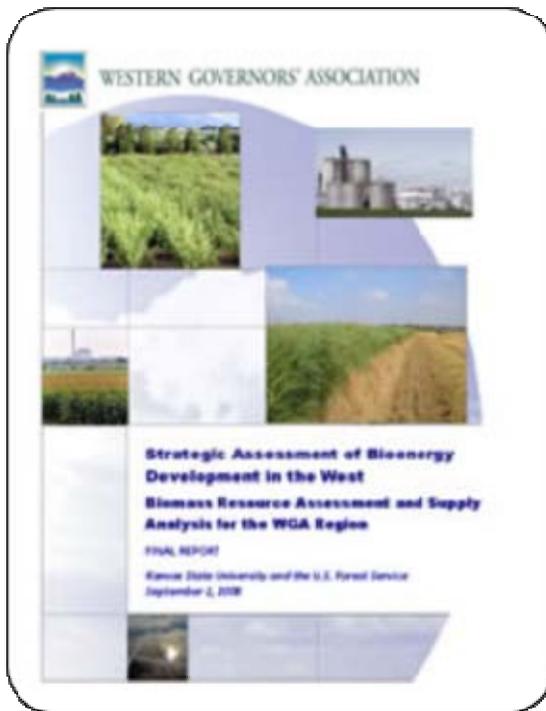
- **08-02 Transportation Fuels for the West: A Roadmap for Energy Security and Improving the Environment and the Economy (February 2008)**

- **Western Governors established a Council of their representatives to oversee the implementation of the resolution**
 - Council will develop an implementation plan and report progress back to the Western Governors in 2009
 - The Council's activities are focused on education, outreach, and coordination among states and with the federal government



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- Western Strategic Bioenergy Assessment



Goal: To develop a biomass supply and optimization model for the Western United

- Biomass Resources in the Western United States
- Biofuel Conversion Technologies
- Spatial Analysis and Supply Curve Development
- Analyses of Deployment Scenarios and Policy Interactions

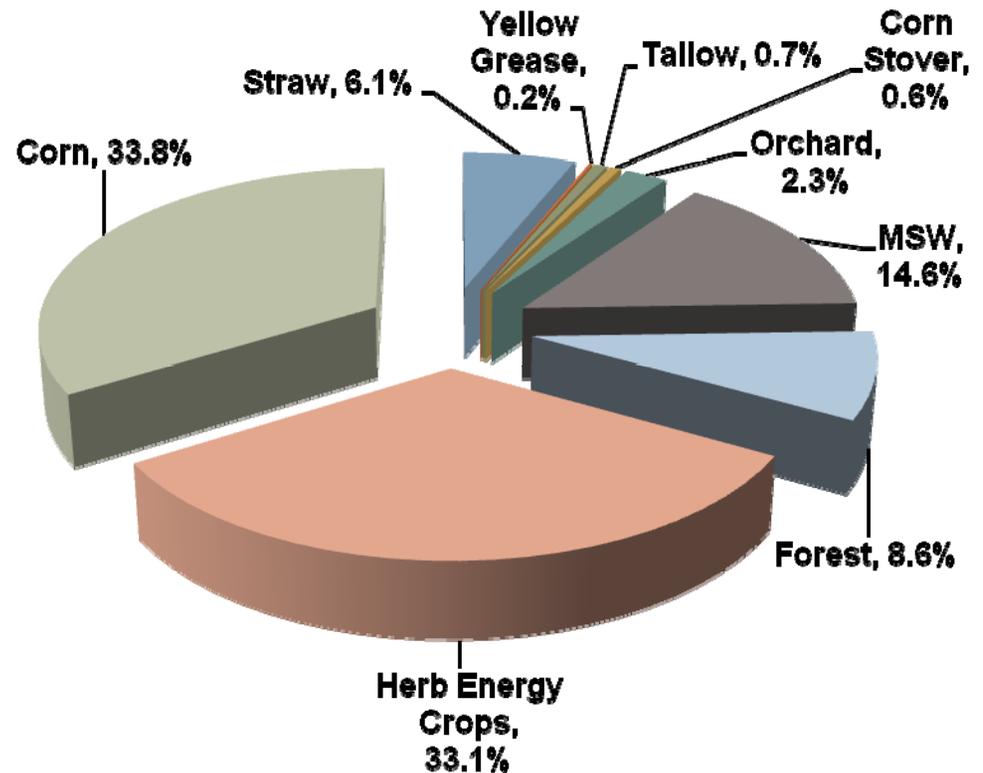


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- Western Strategic Bioenergy Assessment

Potential Growth Projections (2015)

- 11 billion gallons of biodiesel and biofuels per year (a four fold increase from 2006)
- \$18 Billion into the Western Rural Economy for fuels, or \$6 Billion for power (not including byproducts)
- About \$23 Billion Investment in technology and infrastructure in the West



Feedstock Distribution in Potential Growth Case

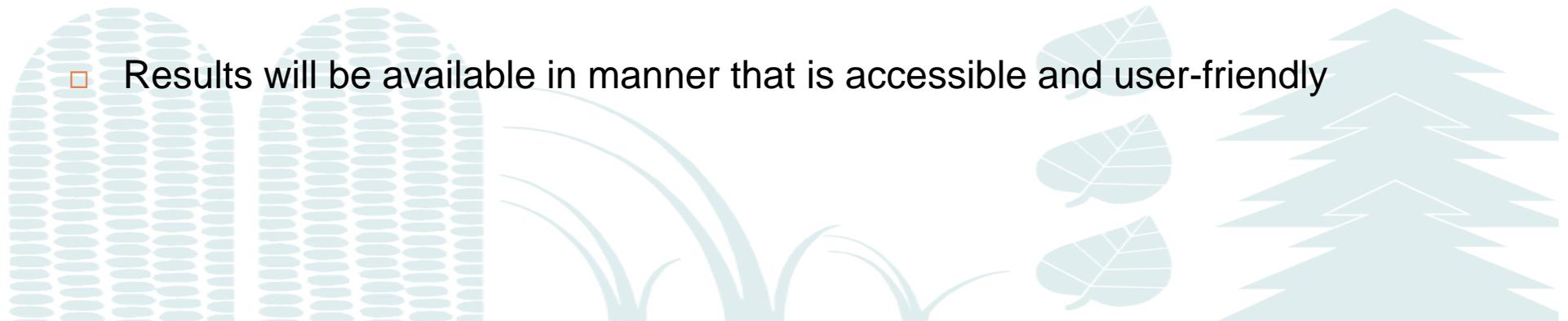


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- National Bioenergy Siting Model

New and Improved

- Will cover the entire U.S. and be a key input to the DOE/USDA Billion Ton Study Update
- More detailed look at environmental impacts
- Modeling of potential national policies and infrastructure scenarios
- Economic assumptions will be updated
- Results will be available in manner that is accessible and user-friendly





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- What's Next?

- **National Bioenergy Assessment**
- **Regional Biofuels Workshops**
- **National Biomass Partnership Activities**
- **WGA Transportation Fuels Council Progress Report**
- **Follow-up on Governors' Letter to President-elect Obama**
- **WGA Annual Meeting - June 14-16, 2009**



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For more information, please visit

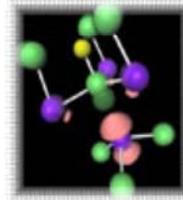
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- Transportation Fuels for the Future



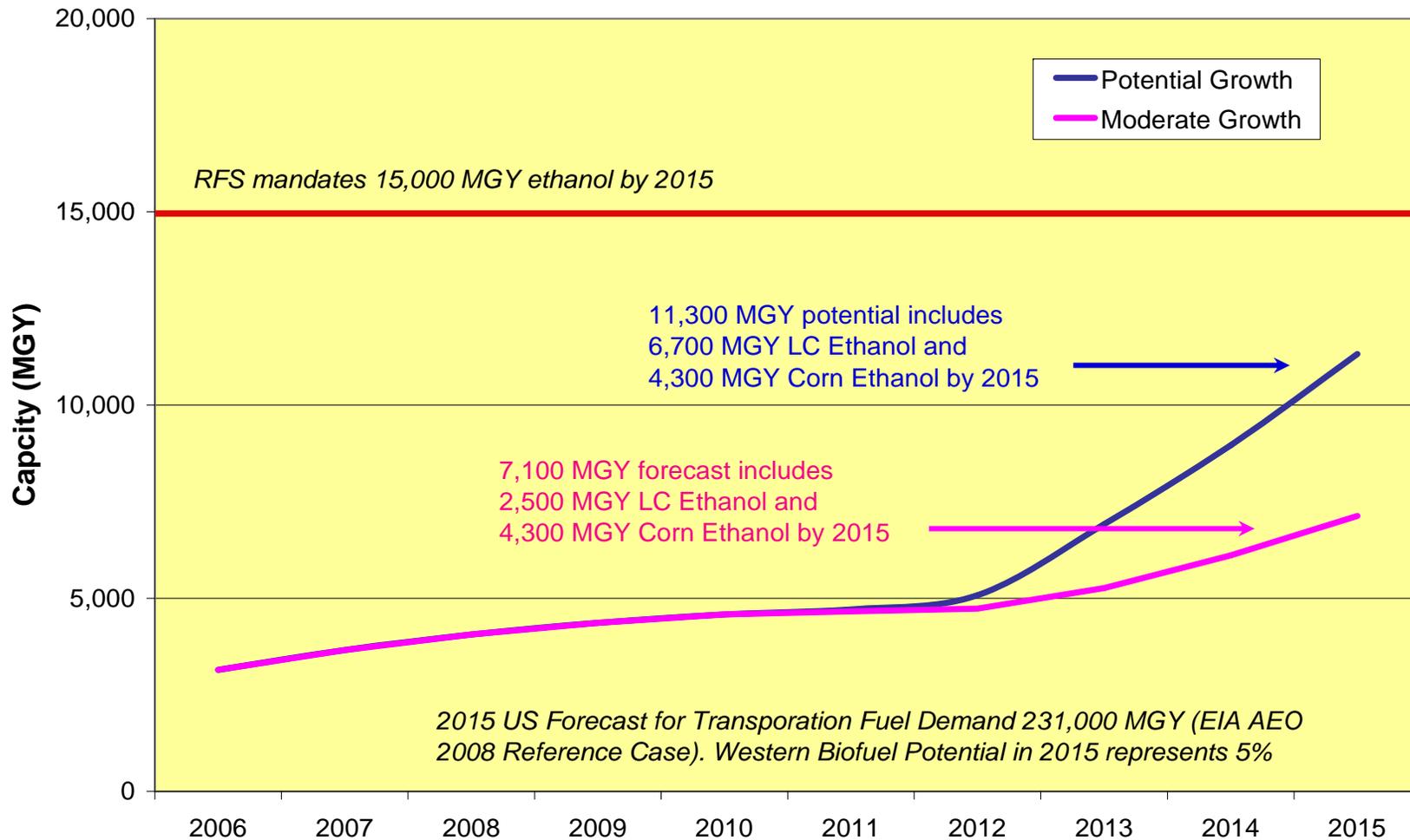
Technical Working Groups

- Biodiesel and Renewable Diesel
- Biofuels
- Coal to Liquids (Fischer Tropsch)
- Electric
- Hydrogen
- Natural Gas, Propane and Non-Conventional Fuels
- Vehicle Fuel Efficiency



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- Western Strategic Bioenergy Assessment





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- Western Strategic Bioenergy Assessment

Bioenergy Resources

- Agricultural crop residues (corn stover, wheat straw)
- Tallow and yellow grease
- Orchard and vineyard trimmings
- Forest thinnings
- Energy crops (SRWC and herbaceous)
- Corn and select oilseeds (soy and canola)
- Municipal Solid Waste

Current Conversion Technologies

- Grain to Ethanol - Dry Mill
- Grain to Ethanol - Wet Mill
- Fatty Acid to Methyl Ester

Technologies Projected by 2015

- Lignocellulosics to Ethanol - Hydrolysis/Fermentation
- Lignocellulosics to Gasoline - Upgrading/Pyrolysis
- Lignocellulosics to Middle Distillates - Fischer Tropsch

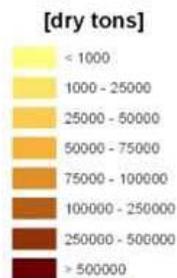
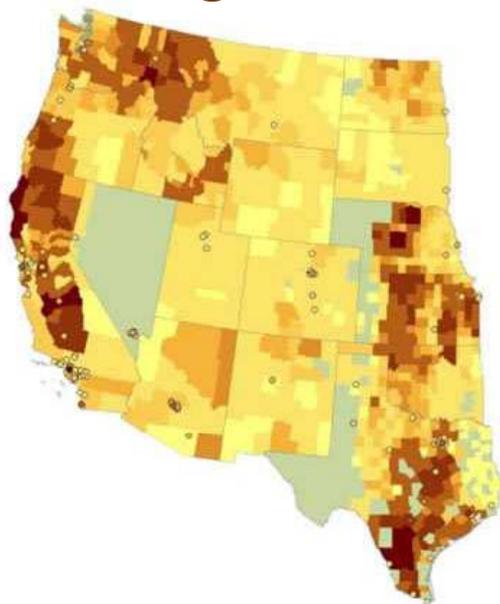
Gasoline Substitutes
Diesel Substitutes



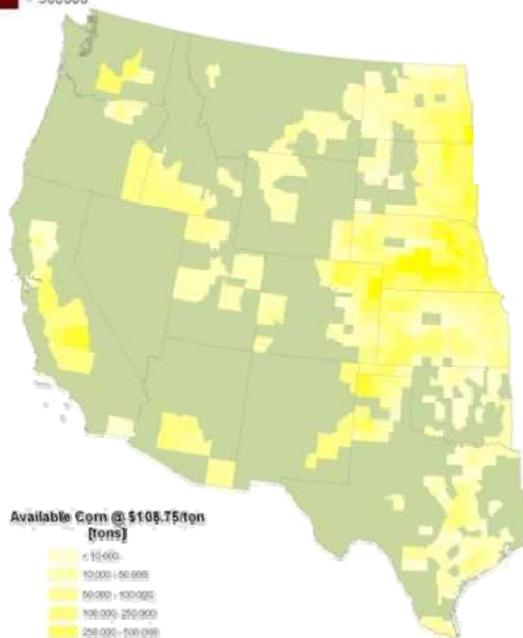
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- Western Strategic Bioenergy Assessment

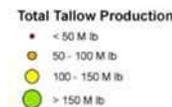
Lignocellulosics



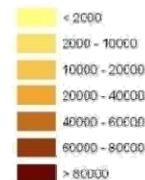
Corn



Beef Tallow

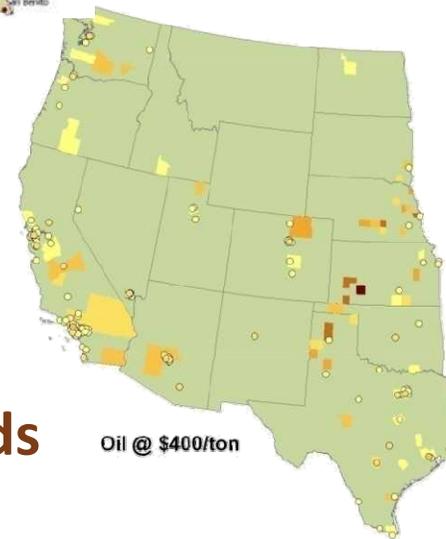


Lipids



Oil @ \$400/ton

Lipids





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- WGA Biomass Grants in California

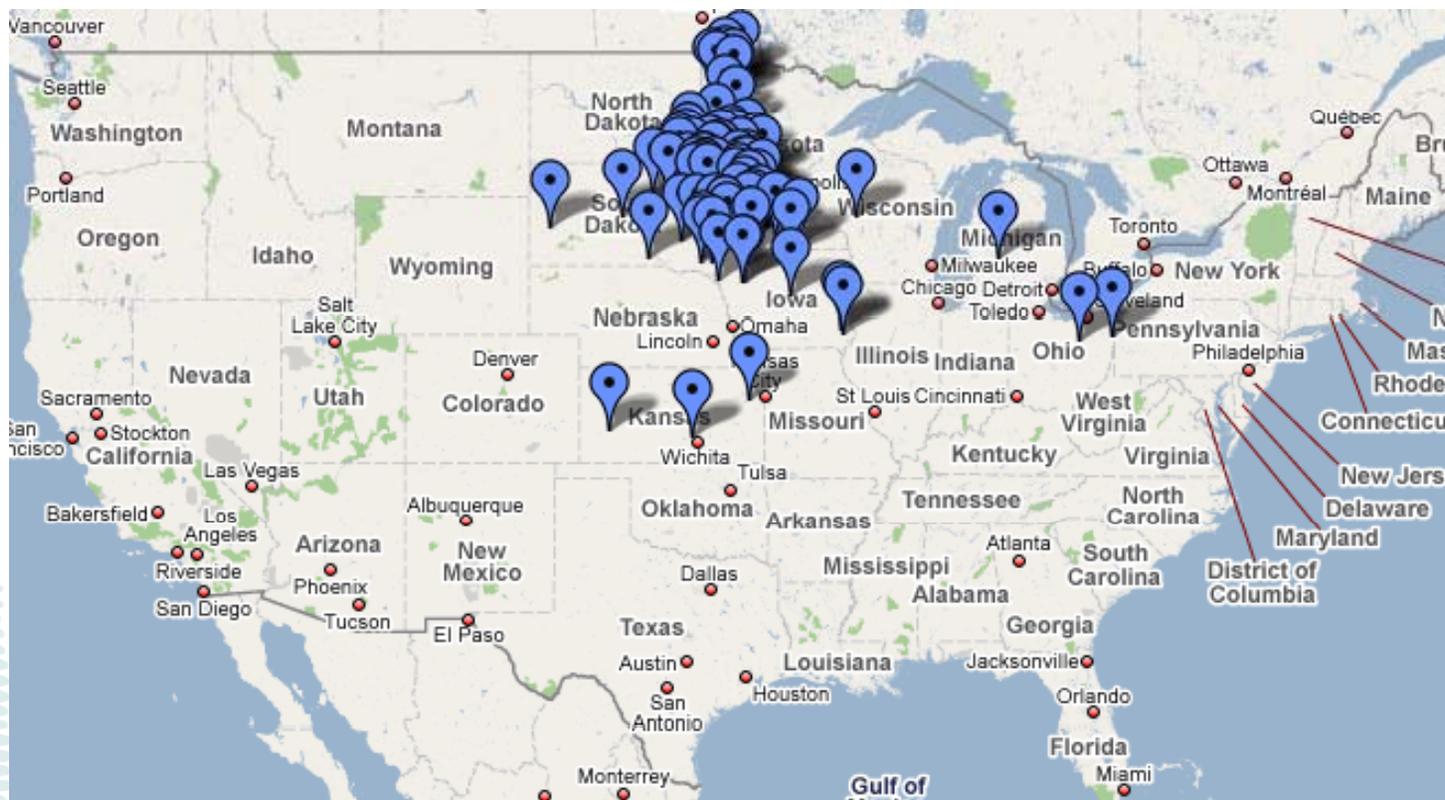
- **California** – Evaluated current biofuels in the state, identified future candidate technologies, and developed an effective course for future development. A feasibility study of biomass energy production to support local water self-sufficiency.
- **California and Nevada** –The project addressed the barriers/constraints to “utility” scale and locally owned biomass power development and will lead to increased bioenergy awareness through outreach.



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- National Bioenergy Siting Model

Local Distribution – Current Locations of Blending Pumps





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- National Bioenergy Siting Model

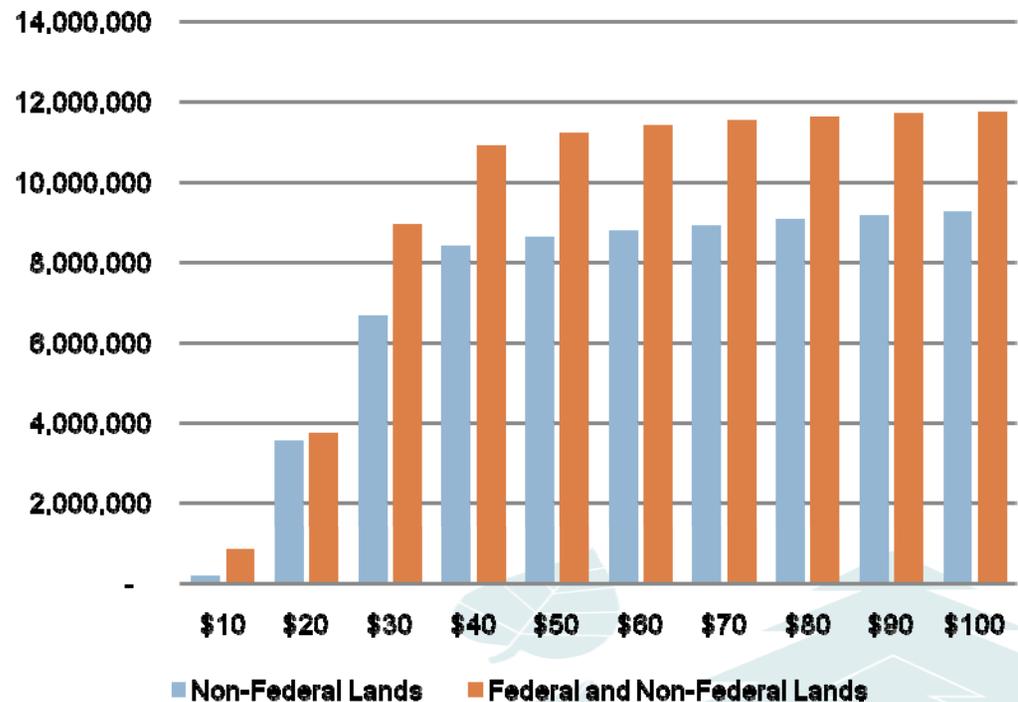
The Definition of Renewable Biomass

Non-federal lands:

8.4 million tons of biomass
(\$40/ton)

Non-federal and federal lands:
10.9 million tons of biomass
(\$40/ton)

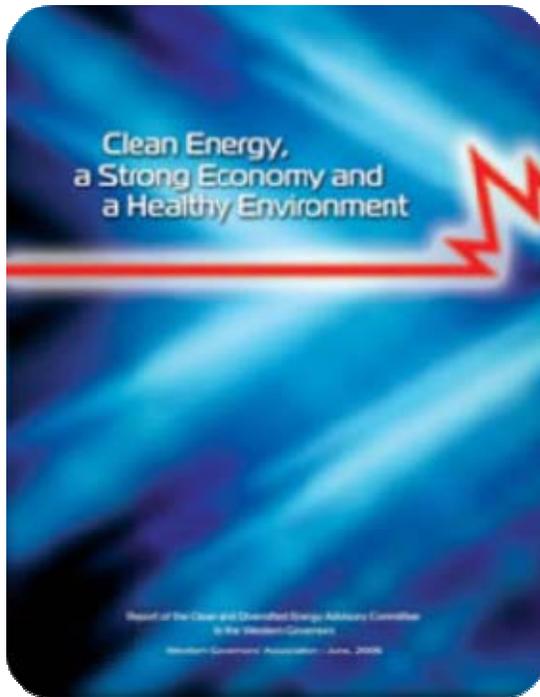
Forest Biomass Supply – WGA Region



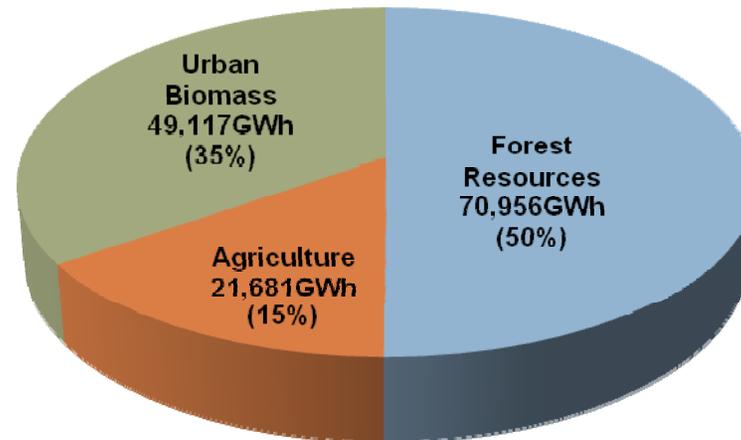


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- Clean and Diversified Energy Initiative



- 30,000 MW of Clean and Diverse Energy Generation by 2015
- 20% Increase in Energy Efficiency by 2020
- Adequate Transmission



10,000 MW of Potential Electric Generation from Biomass