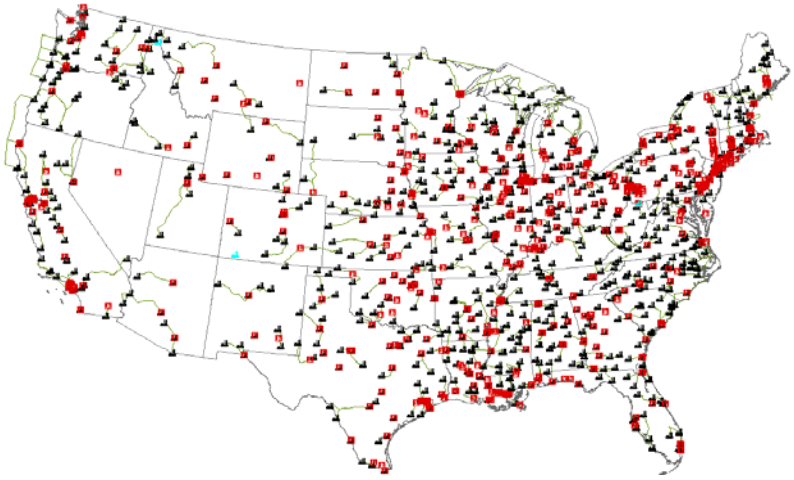
National Biorefinery Siting Model

The Western Governors' Association, in association with USDA and working with technical partners at the University of California, Davis (UCD), Kansas State University, US Forest Service (USFS), Antares Group Inc., and the National Renewable Energy Laboratory, has supported the development of a spatially resolved biomass supply and biorefinery optimization model for the western United States. The siting model combines a GIS resource and infrastructure database and network analysis with a mixed integer linear optimization program to select facility sites and sizes. This model has been developed as both a policy and technical analysis tool to support sustainable development of biomass resources and bioenergy systems in the region.



The National Biorefinery Siting Model seeks to expand coverage to the entire United States. The overall objective of this project is to develop a flexible, integrated GIS-based model framework providing automated spatial optimization for bioenergy facility siting as well as user-selected site assessment to assist in the analysis, planning, and development of the nation's feedstock resources and biofuels infrastructure.

Specific objectives of this work are to:

1. Develop biomass resource databases initially at county-level spatial resolutions for use in identifying optimal site locations for biorefineries and other bioenergy facilities.
2. Build and evaluate the transportation network for biofuels using road, rail, and marine transport route information, including inter-modal transfer facilities, and develop associated cost models.
3. Develop a tool to forecast fuel demand at the micro-spatial level, optimize efficiency of supply chain(s) and simulate impacts of strategic and policy scenarios.
4. Evaluate conversion technology options and develop performance and cost information for use in the model framework.
5. Develop a site optimization model with input from feedstock, transportation and other infrastructure networks, and fuel demands.
6. Revise agricultural crop residue and dedicated energy crop supply estimates to the sub-county level while accounting for selected sustainability attributes.
7. Evaluate expansion of model framework computational capabilities to allow rapid visualization and evaluation of higher resolution data being developed. Evaluate needed internet-based tools allowing appropriate public access to data and results.

The work will serve to provide a more integrated modeling framework than previously achieved, and will further inform the potential future development of a comprehensive framework to better assess environmental, technical, and socioeconomic impacts associated with national, state, and regional bioenergy and biomass management policies.

Applications of the National Biorefinery Siting Model

The National Biorefinery Siting Model is already being used in a number of state and regional efforts. Examples include:

- Western Renewable Energy Zones Initiative (WGA and U.S. DOE)
- California Low Carbon Fuel Standard Development (CARB)
- New York Bioenergy Roadmap (NYSERDA)
- Feedstock data and mapping requests by Western states