Biomass and Bioenergy Growth Platform
Forest Service
Research and Development Mission Area

January 2009

VISION

America's forest resources significantly contribute to energy security and independence while reducing greenhouse gases.

Through sustainable forest management and cost-effective harvesting and collection, America's forests are a strategic asset in meeting U.S. energy security, environmental quality, and economic development needs. They will effectively contribute to displacing 30 percent of U.S. petroleum consumption by 2030.

Sustainable forest management on public and private lands generates excess woody material that can be used to help meet the Nation's renewable energy needs. Biomass management also supports efforts to provide economic opportunities, improve ecosystem health, decrease catastrophic wildfires, enhance wildlife habitat, and protect watersheds. Sustainable woody biomass management also mitigates, in part, the impacts of climate change and provides an alternative fuel and chemical source.

In coordinate with other federal and state agencies, academia, businesses, environmental interests, and non-governmental organizations, Forest Service Research and Development (R&D) will continue to improve and deploy technologies and underlying science for biofuels production while applying and supporting sustainable forest management practices on the Nation's forests.

CAPABILITIES

Forest Service Research and Development has:

- An integrated platform of innovative field and laboratory research that provides a unique opportunity for advancing biofuels feedstock production and conversion technology.
- A cadre of wood scientists, biologists, chemists and engineers who have already developed partnerships with universities and industrial partners in cooperative biofuels R&D ventures.
- Extensive experience with business case analysis for biorefineries with expanding work relevant to today's questions about net energy and net greenhouse gas emissions for wood-based biofuels and chemicals.
- A track record of providing leading-edge science and technology that has formed the basis for new products and improved efficiency from woody materials in a manner that is consistent with sustainable forest management.
- A full spectrum of data and models to help reduce financial risk.

DELIVERABLES

Following are some of the advances in forest biomass to energy science and technology that Forest Service R&D will accomplish and deploy with an expanded emphasis in biofuels in the Research and Development mission area:

- **Sustainable forest bioenergy production systems and new wood energy crops**
  - Best management practices for forestry with expanded biomass removal, while providing important wildlife habitat, water quality, fuels reduction, and nutrient management.
  - New varieties of perennial woody crops that are resistant to disease, fast growing, nutrient and water efficient, and optimized for bioenergy.
  - Strategies to integrate woody plants with agricultural production of biofuels, so that environmental performance and synergistic outcomes are improved.
  - Experimental deployment and evaluation of woody bioenergy feedstock that will provide improved understanding of plantation silvicultural practices, soil nutrient management, and economics.

- **Competitive biofuels conversion technologies that reduce fossil fuel use greenhouse gas emissions**
  - New chemical and biochemical technologies for extracting, modifying, and fermenting carbohydrates and lignin from woody biomass feedstocks.
  - New cost-effective thermoconversion (pyrolysis and gasification)
  - Demonstration and evaluation of various forest feedstock used with emerging technology such as small-scale gasification, pilot biochemical conversion and thermochemical conversion technologies.
  - Feedstock selection, sorting, and preprocessing technology optimized to meet quality standards for various biofuels and biochemical conversion technology platforms.
  - Improved microbes for extracting and converting woody biomass to fermentable materials.
- **Efficient and environmentally friendly woody biomass harvesting systems**
  - Improved harvesting and transportation systems for forest biomass, cost and equipment information, and options for field processing to improve efficiency and mitigate impacts
- **Life-Cycle and sustainability analysis for wood bioenergy systems**

BENEFITS

A science program in forest-based biofuels will provide benefits to a wide range of constituents, including:

- Increasing national energy security and independence as a result of a technically, financially, and ecologically sound biofuels systems replacing some fossil fuel usage.
- Improving forest health and reduction of fire risk as excess forest biomass is used for biofuels production.
- Reducing greenhouse gas emissions and increased financial benefits to non-industrial private forest landowners as they receive credit for carbon sequestration, emission offsets, and biofuels production.
- Economic development of $120 billion from a new forest biomass to biofuels industry.
- Reducing or eliminating the need for Federal biomass to bioenergy subsides.