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Biomass Program

ORNL supports the Department of Energy Biomass Program by bringing together teams from across laboratory disciplines and the country to research feedstocks, feedstock logistics, biorefineries, product delivery, and the sustainability of the supply chain. Its goal is to enable the US national vision of large-scale sustainable production of biofuels, bio-products, and biopower to enhance energy security, reduce greenhouse gas emissions, and promote the rural economy. ORNL also supports national agencies and decision makers by supplying timely, extensive information on all aspects of bioenergy.

Resource Assessment & Economics

ORNL's expertise in resource assessment and economics led to the production of DOE's first Billion Ton Study for the Department of Agriculture in 2005. It played a pivotal role in the development of the Energy Independence and Security Act of 2007, confirming the technical feasibility of US lands supplying a billion tons of biomass annually. ORNL completed a second report for DOE in 2011 that expands on the first to include a spatial, county-by-county inventory of potentially available primary feedstocks, price, and available quantities for the individual feedstocks, and a more rigorous treatment and modeling of resource sustainability. In an evolving industry, ORNL contributions will continue to enable up-to-date assessment of biofuels quantities as well as price projections.

Geospatial Visualization & Analysis

Through a variety of formats and technologies, ORNL provides relevant, easily accessible information essential to effective policy development and support of the national bioenergy industry. Using a geospatial-based framework based on advanced computer and data science technology, ORNL's Bioenergy Knowledge Discovery Framework facilitates informed decision making through the synthesis, analysis, and visualization of vast amounts of information related to the economic and environmental impact of biomass feedstocks, biorefineries, and infrastructure development options. ORNL also produces the Biomass Energy Data Book, integrating biomass data from diverse sources and providing that information on the web in a familiar book-like format for quick look-ups or more detailed analyses.

Sustainability Metrics & Analysis

Drawing on ORNL's historic environmental studies on bioenergy crops, the Center for BioEnergy Sustainability was opened in 2009. The Center uses science and analysis to support ORNL understanding and promotion of the sustainability (environmental, economic, and social) of bioenergy production and distribution, and serves as an independent source of the highest quality data and analysis for bioenergy stakeholders and decision makers.

Materials Science & Technology

Before any new biofuel is introduced (including increasing the ethanol concentration in gasoline), their effects on the fueling infrastructure need to be determined. ORNL, in collaboration with National Renewable Energy Laboratory and Underwriters Laboratories, has uncovered valuable answers through an ongoing study of mid-level ethanol blends compatibility with metals, elastomers, sealants, cork, and plastics that are used in both aboveground and underground components. ORNL materials and vehicle technologies expertise is enabling these types of compatibility studies of biofuels in a variety of environments. With expertise and facilities for laboratory and field corrosion studies, researchers are helping mitigate materials compatibility issues with biofuels that will lead to reduced materials costs in infrastructure and facility construction.

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