



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Designing Advanced Bioenergy for Multiple Benefits

Reshaping Landscapes: Bioenergy and Biodiversity II

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The Value Proposition of Bioenergy

THE CHALLENGE

- **\$1 Billion** is spent each day on U.S. crude oil imports
- Transportation accounts for **2/3rd** of petroleum consumption and **1/3rd** of GHG emissions in the U.S.



THE OPPORTUNITY

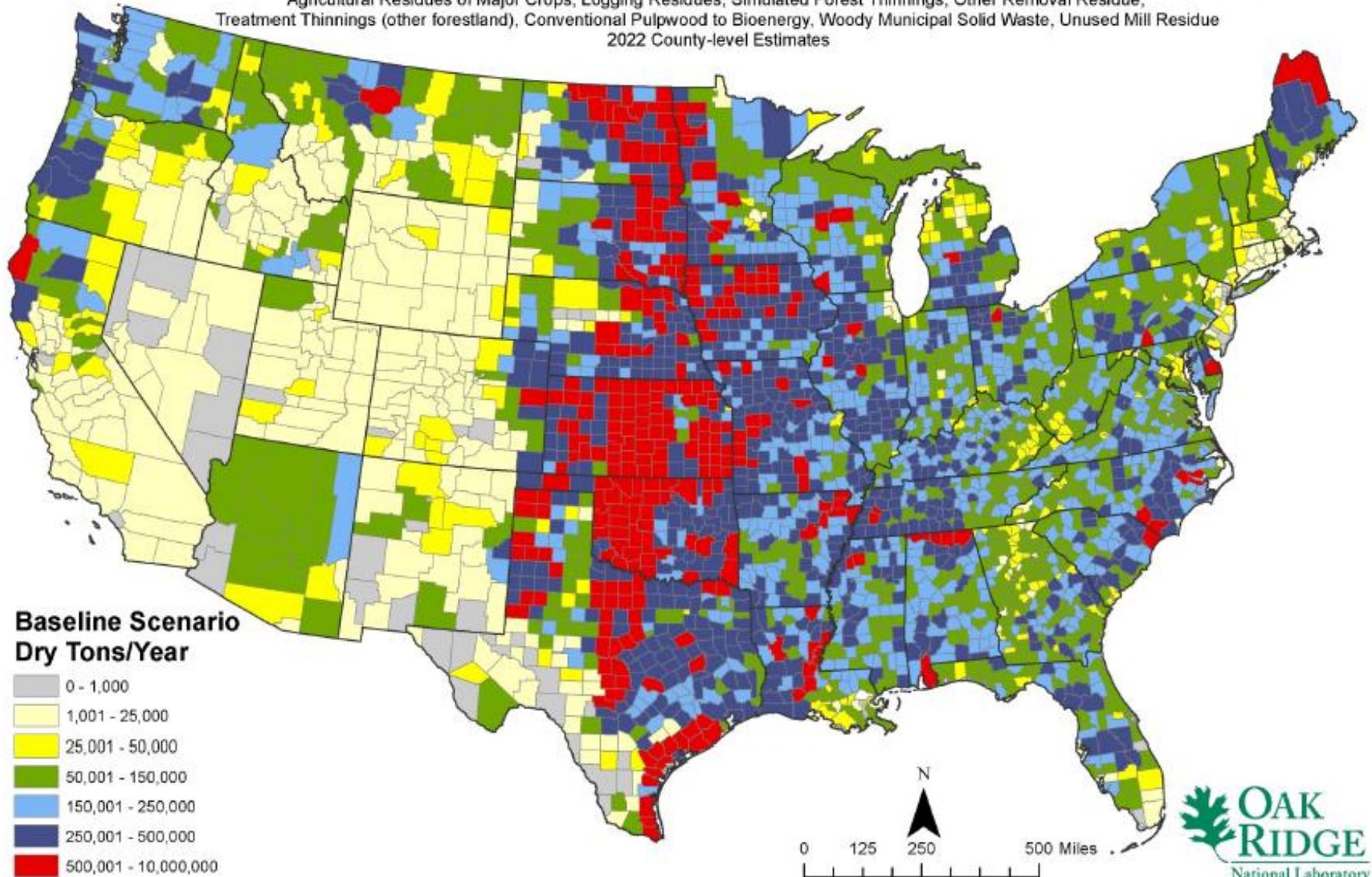
- More than **1 Billion tons** of biomass could be sustainably produced in the U.S.
- **1 Billion tons** of biomass could displace 30% of U.S. petroleum use by 2030



U.S. biomass resources can help mitigate petroleum dependence

Potentially Available Biomass Resources

Includes all potential primary agricultural resources and primary and secondary forestry resources excluding Federal Lands (when available) at \$80 per dry ton or less:
Agricultural Residues of Major Crops, Logging Residues, Simulated Forest Thinnings, Other Removal Residue,
Treatment Thinnings (other forestland), Conventional Pulpwood to Bioenergy, Woody Municipal Solid Waste, Unused Mill Residue
2022 County-level Estimates



Source: U.S. Department of Energy 2011, U.S. Billion-Ton Update: Biomass Supply for a Bioenergy and Bioproducts Industry. R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p. Data Accessed from the Bioenergy Knowledge Discovery Framework, www.bioenergykdf.net. [December 4, 2012].

Author: Laurence Eaton (eatonlm@ornl.gov) - December 4, 2012.

Considerations for Bioenergy Sustainability



BETO Sustainability Strategic Goal: to understand and promote the positive economic, social, and environmental effects and reduce the potential negative impacts of bioenergy production activities.

Understanding and Enhancing Environmental Sustainability

Climate Change and Air Quality



Analyzing biofuel pathways to quantify progress towards reducing [lifecycle greenhouse gases, regulated emissions, and fossil energy use](#).

Soil Quality



[Developing strategies and tools](#) for producing biomass feedstocks while maintaining or enhancing soil quality.

Water Quantity and Quality



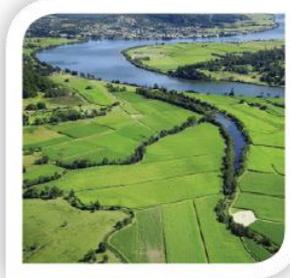
Assessing the [water resource use and water quality](#) of bioenergy production, and investigating opportunities for bioenergy crops [to improve water quality](#).

Biological Diversity



Investigating relationships between [bioenergy crops and biodiversity](#), and engaging with experts to understand and promote practices that conserve wildlife and biodiversity.

Land Use and Productivity



[Advancing landscape design approaches](#) that increase biomass production while maintaining or enhancing ecosystem services and food, feed, and fiber production.

Key Need: Actionable Information

For example...

- Scientific understanding of effects at decision-relevant scales
- Recognition of what's feasible and economical for landowners
- Practical mechanisms for beneficial practices to be implemented and replicated

