

BETO's Role in Growing the Bioeconomy and the Importance of Context-Specific Opportunities

Southeast U.S. Bioenergy Meeting
and Study Tour
April 11, 2016



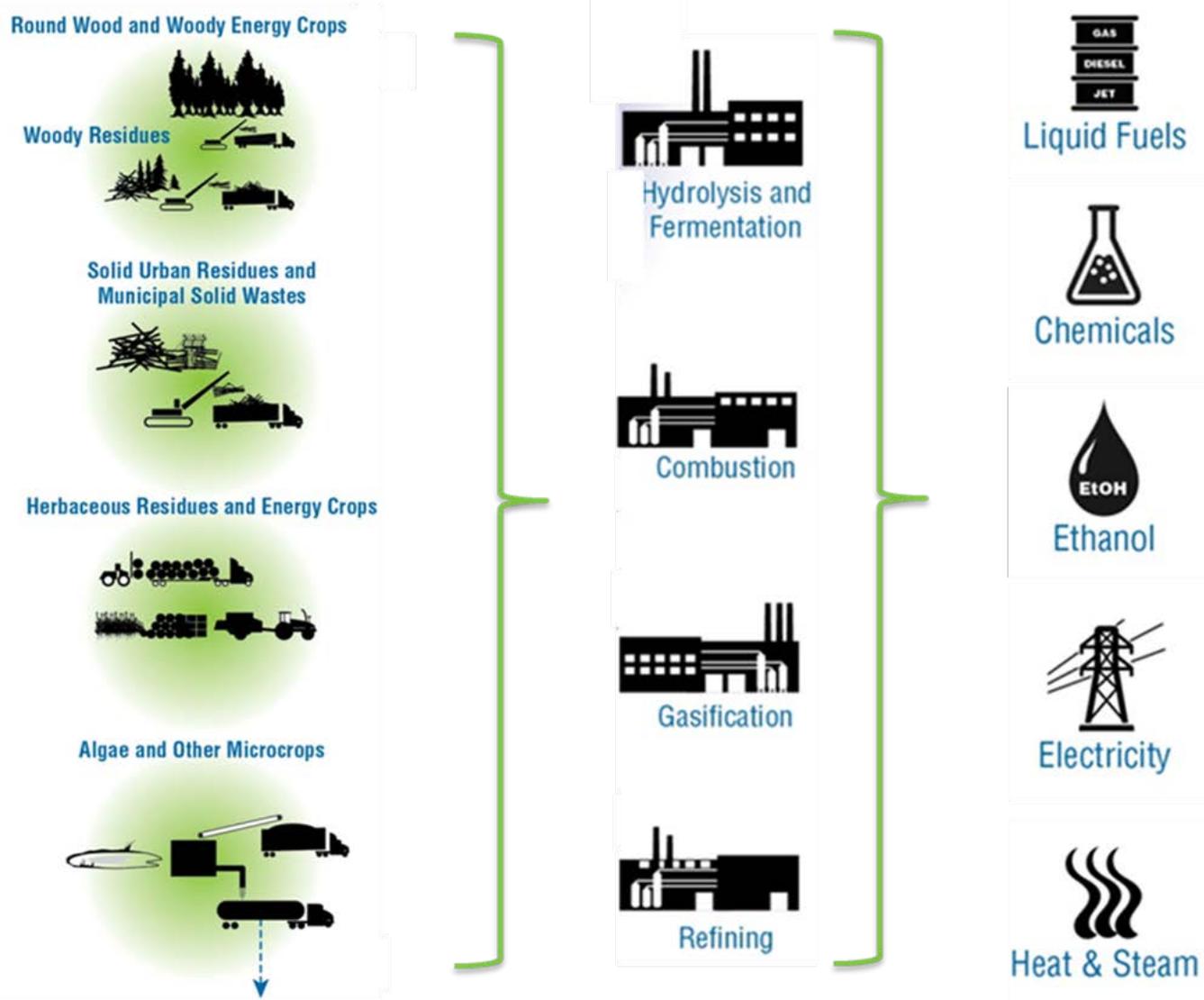
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Key Points

- To accelerate growth of a sustainable bioeconomy nationwide, BETO supports innovative RD&D across the bioenergy supply chain.
- This event aims to reach new audiences and highlight BETO-supported innovation in bioenergy sustainability.
- BETO's sustainability framework seeks to understand and promote the positive effects and mitigate the potential negative impacts of advanced bioenergy.
 - creating tools and analyses that quantify and communicate sustainability
 - developing landscape design approaches
 - advancing the business case for sustainability
- Although BETO's mission is national, for the future bioeconomy to be realized, it is important to consider local and regional issues and opportunities. This event will explore many of the context-specific factors of the U.S. Southeast region and its role in contributing to the current and future bioeconomy. Many of the themes are applicable to other locations, nationally and internationally.

The Bioeconomy Concept



BETO: Supporting Innovation across the Supply Chain

Research, Development, Demonstration, & Market Transformation

Feedstock Supply & Logistics R&D

- Terrestrial
- Algae
- Preprocessing
- Logistics



Conversion R&D

- Biochemical
- Thermochemical
- Deconstruction
- Upgrading



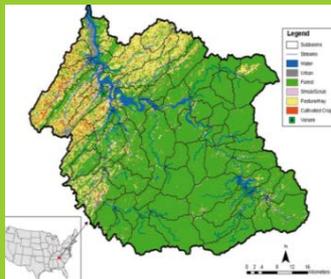
Demonstration & Market Transformation

- Integrated Biorefineries
- Biofuels Distribution Infrastructure

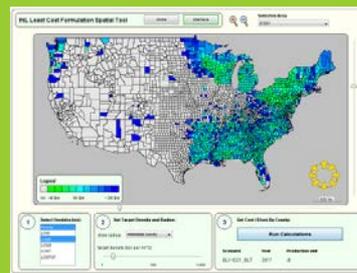


Cross Cutting

Sustainability



Strategic Analysis



Strategic Communications



DOE Tech-to-Market Program: Bioenergy Lab Innovation Showcase

Objectives

- Improve and expand awareness of laboratory research capabilities and advancements in critical bioenergy technology areas.
- Demonstrate innovative bioenergy technologies developed by DOE National Laboratories in order to attract new research or commercialization partners.

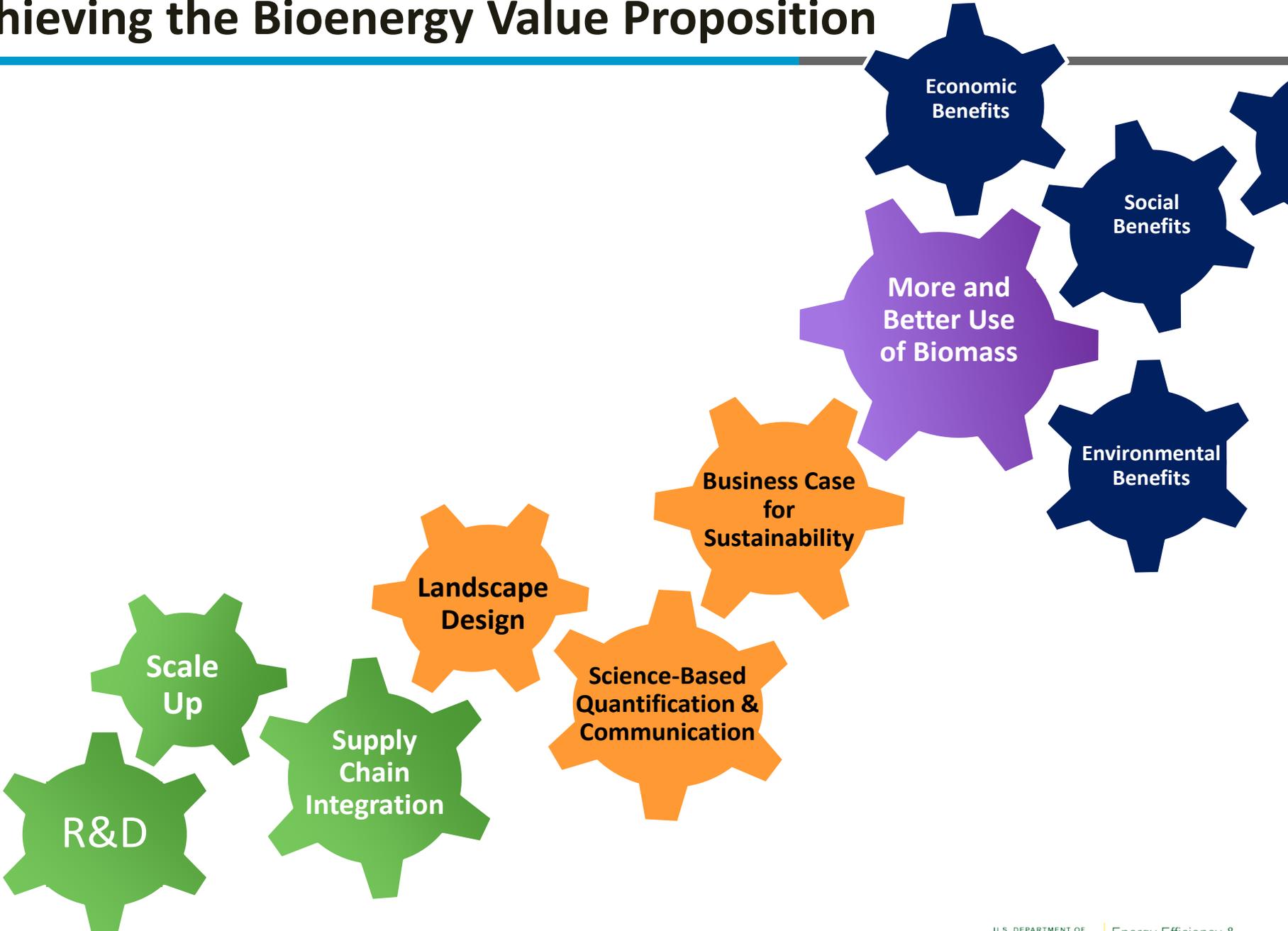


Considerations for Bioenergy Sustainability

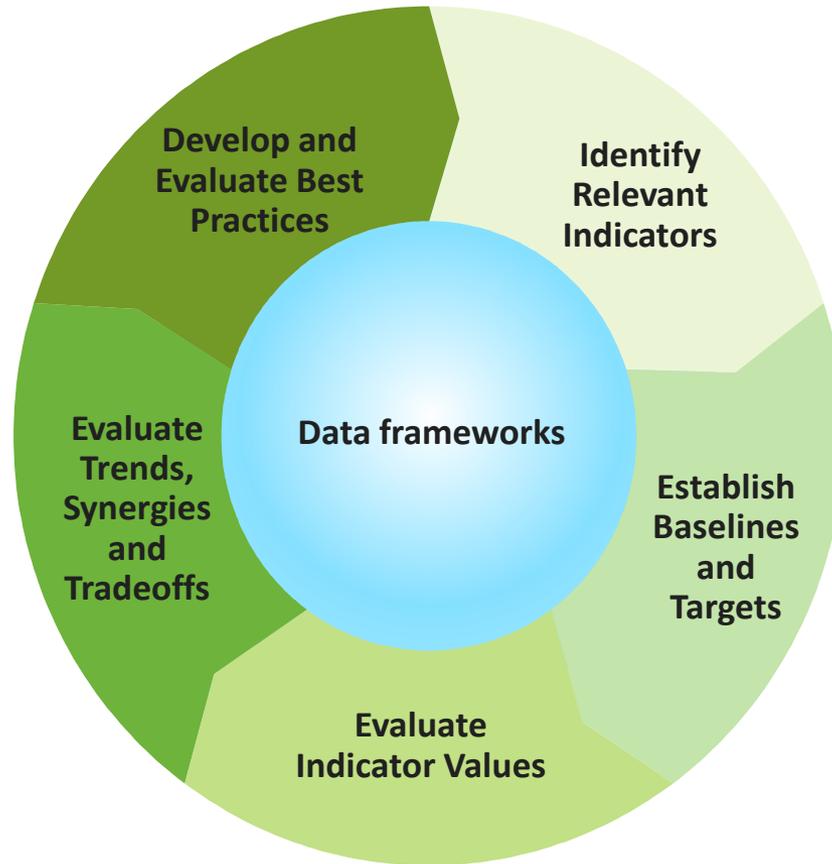


BETO Sustainability Strategic Goal: to understand and promote the positive economic, social, and environmental effects and reduce the potential negative impacts of bioenergy production activities.

Achieving the Bioenergy Value Proposition

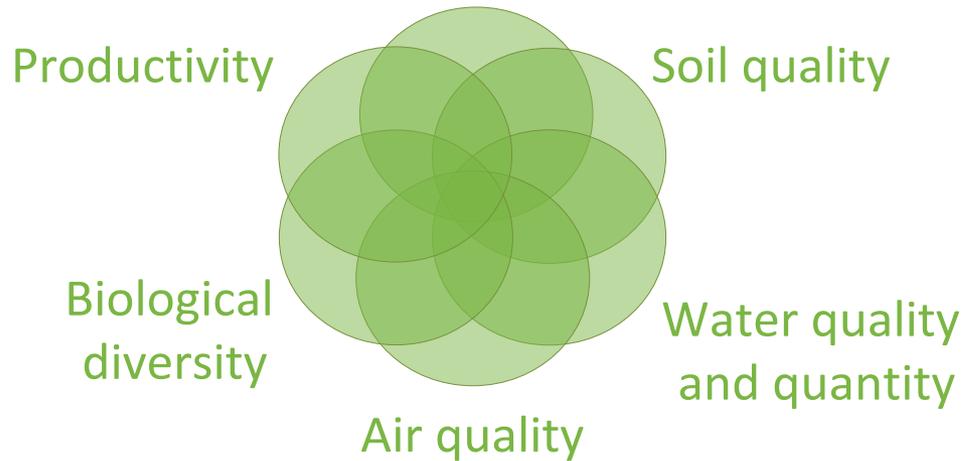


Overall Approach: From Indicators to Best Practices



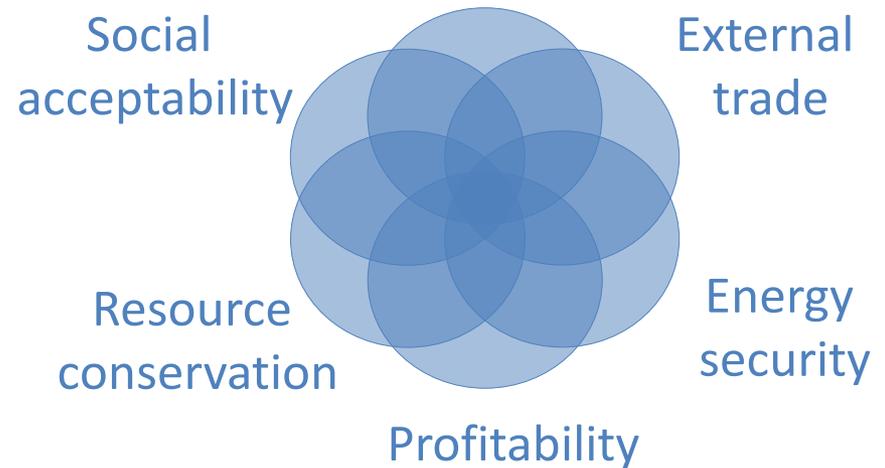
Categories for Sustainability Indicators

Greenhouse gas emissions



McBride et al. (2011) *Ecological Indicators* 11:1277-1289.

Social well being



Dale et al. (2013) *Ecological Indicators* 26:87-102.

Recognize that measures and interpretations are context specific

[Efroymson et al. (2013) *Environmental Management* 52:291-306]

Applying Landscape Design Principles to Bioenergy

In essence, landscape design is a plan for resource allocation.

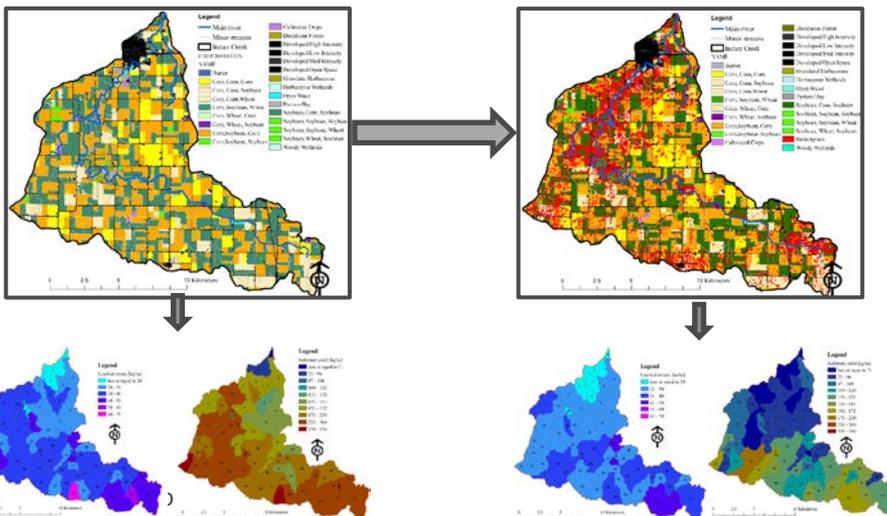
It is a tool and a science that can be used for developing bioenergy systems that optimize available resources so that multiple benefits are achieved and detriments are minimized.



See DOE Workshop Report “Incorporating Bioenergy in Sustainable Landscape Designs” and Dale et al. (2016) *Renewable & Sustainable Energy Reviews* 56:1158-1171.

On-the-Ground Landscape Design Leadership

- Testing at the field scale the biomass production and nitrogen removal & reuse potential of a deep-rooted willow buffer intercepting subsurface flow from a corn field.
- Developing a framework for the design of landscapes that achieve production of food, feed, and fiber while providing ecosystem services.
- Interacting with farmers to get real-world perspective on how bioenergy crops can be integrated in the landscape and enhance their business models.



Models predict a decrease compared to business-as-usual in leached nitrate and sediment losses from an integrated landscape incorporating bioenergy in vulnerable and underproductive land (SWAT). Modeling also suggests that the integrated landscape has the potential to increase the pollinator nesting index in the watershed (INVEST).

First-of-its Kind Landscape Design Project

“Enabling Sustainable Landscape Design for Continual Improvement of Operating Bioenergy Supply Systems”



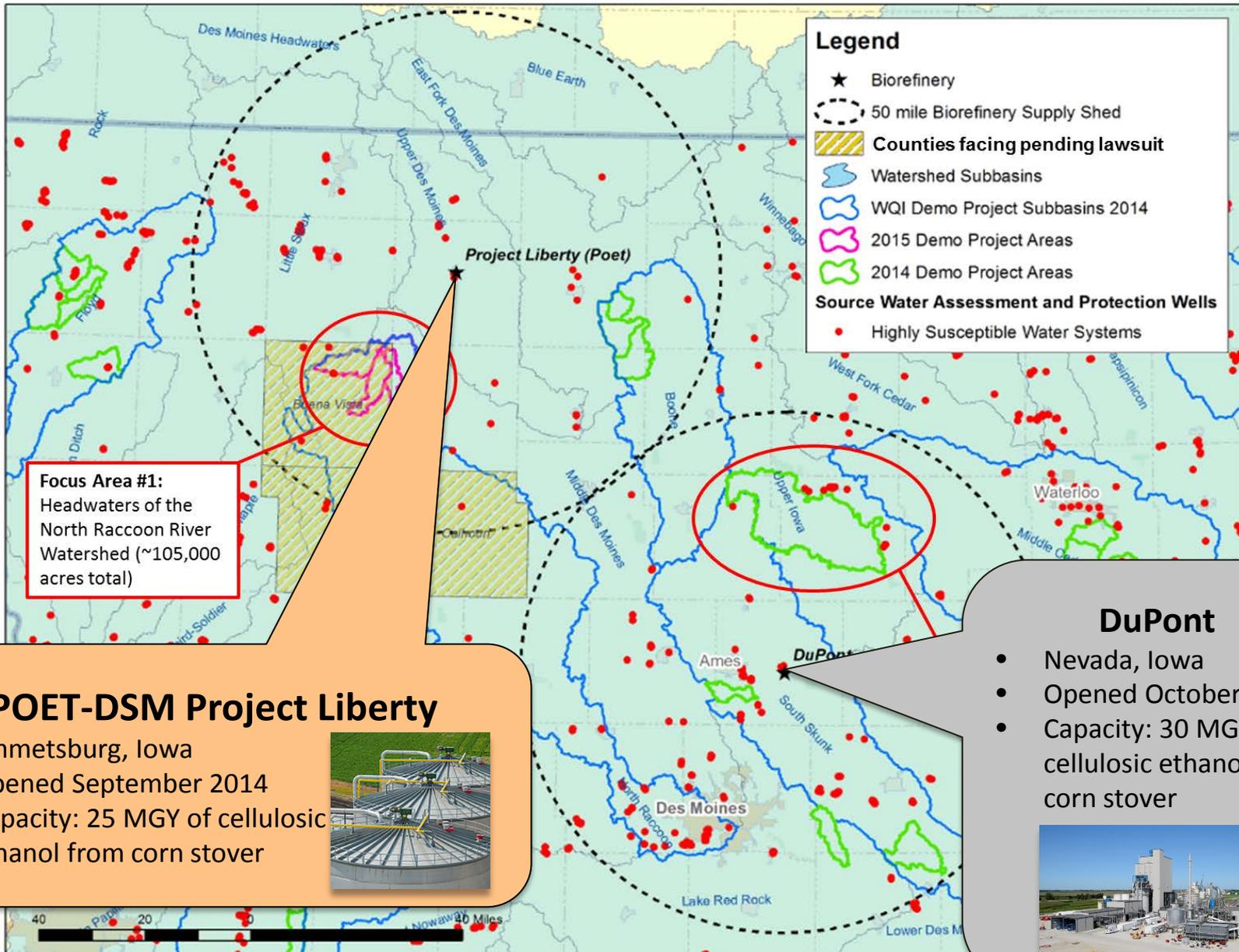
First-of-its Kind Landscape Design Project

Key Components

1. Multi-Stakeholder Landscape Design Process
2. Assessment of Environmental and Socio-economic Sustainability Indicators
3. Assessment of Feedstock Supply and Logistics



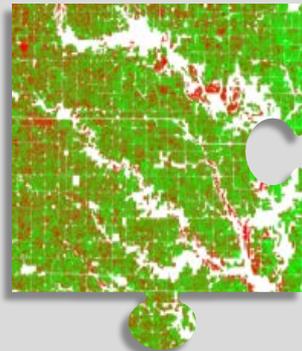
Targeted Watershed & Supply Areas



Assembling Key Pieces of the Puzzle

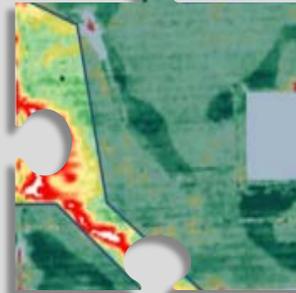
Advanced Harvest & Logistics, 2nd Pass

Regional
Impact
Modeling &
Monitoring



Perennial
Grass for
Conservation
& Biomass
Supply

Implementation of
Conservation
Practices (Cover
Crops, Buffer
Strips, etc.)



Subfield
Precision
Business
Planning

Advanced
Harvest &
Logistics,
First Pass



Sustainable
Residue
Harvest

Multi-stakeholder Outreach

Growing a National Bioeconomy

...by considering local and regional opportunities.





Thank You

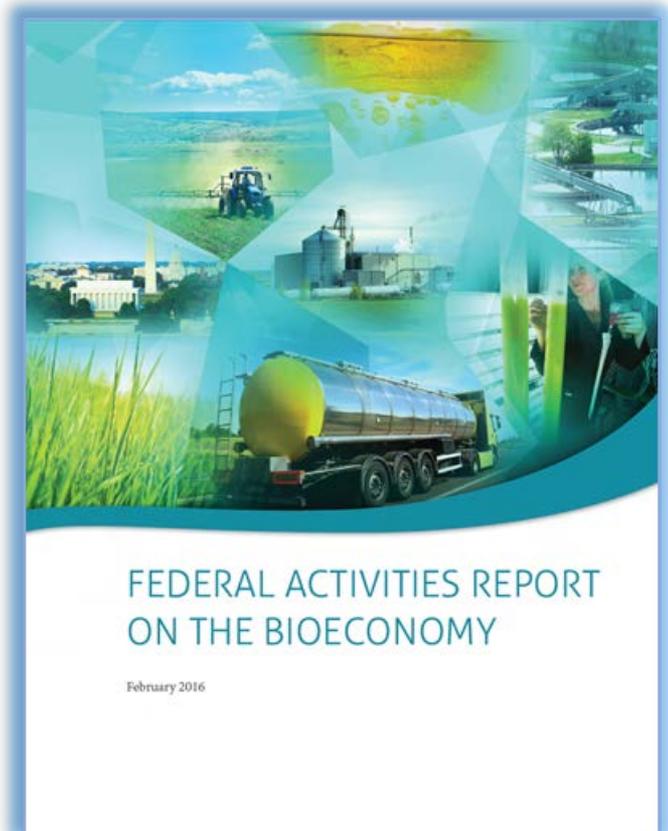
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Federal Activities Report on the Bioeconomy

- On February 18th, the Biomass R&D Board released the [Federal Activities Report on the Bioeconomy](#) (FARB).
- This report aims to educate the public on the wide-ranging, federally funded activities that are helping to bolster the bioeconomy.
- The FARB details a vision for a Billion Ton Bioeconomy—tripling the size of today’s bioeconomy by 2030.
- Achieving this vision would provide economic, environmental, and social benefits, including a considerable reduction in GHG emissions.



Bioenergy 2016 and Sustainable Transportation Day

Bioenergy 2016

Dates:

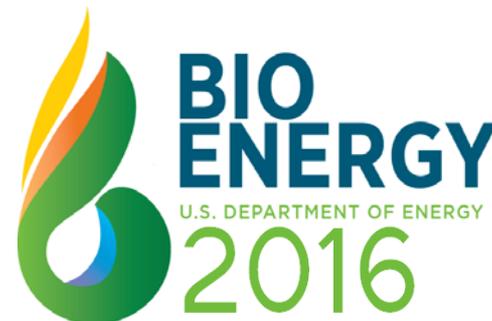
July 12, 2016, Tuesday afternoon –
July 14, 2016, until Thursday noon

Location:

Walter E. Washington Convention Center
801 Mount Vernon Place, NW
Washington, DC 20001

Partnered with:

Clean Energy Research & Education Foundation



Sustainable Transportation Day

Dates:

July 11, 2016, Monday afternoon –
July 12, 2016, until Tuesday noon

Location:

Walter E. Washington Convention Center

