Objectives

• **Feedstock Development**—Develop improved perennial grass cultivars and hybrids that can be used on marginal cropland in the Central United States for the production of biomass for bioenergy.

• **Sustainable Production Systems**—Conduct comparative analyses of the productivity potential and the environmental impacts of promising bioenergy crops and management systems using a network of 14 fields strategically located across the Central United States.

• **Feedstock Logistics**—Develop systems and strategies to enable sustainable and economic harvest, transportation, and storage of feedstocks to meet industrial needs.

• **System Performance**—Provide detailed analyses of feedstock production options and an accompanying set of spatial models to enhance the ability of policymakers, farmers, and the bioenergy industry to make informed decisions about which bioenergy feedstocks to grow, where to produce them, what environmental impacts they will have, and how biomass production systems are likely to respond to and contribute to climate change or other environmental shifts.

• **Feedstock Conversion**—Perform a detailed economic analysis on the performance of a refinery based on pyrolytic processing of biomass into liquid fuels and provide biochar to other researchers on the project.

• **Markets and Distribution**—Study farm-level adoption decisions, exploring the effectiveness of policy, market, and contract mechanisms that facilitate broad-scale voluntary adoption by farmers. Evaluate impacts of an expanded advanced biofuel system on regional and global food, feed, energy, and fiber markets.

• **Health and Safety**—Conduct a detailed analysis of all tasks associated with biofeedstock production for hazard targets of personnel, equipment, environment, downtime, and product. Determine potentially hazardous respiratory exposure limits associated with the production of biofeedstocks.

• **Education**—Provide rich interdisciplinary training and engagement opportunities for undergraduate and graduate students in all areas of the bioenergy value chain to meet the workforce challenges of the bioeconomy.

• **Extension and Outreach**—Deliver science-based information and informal educational programs linked to CenUSA project goals to agricultural and rural economy stakeholders.
The Challenge
Dependence on foreign oil. Greenhouse gas emissions. Energy security. Interference with food crops. Loss of soil fertility and productivity. These are serious challenges to the nation and to agriculture.

One approach to addressing these challenges is to produce advanced transportation fuels from perennial energy crops. The question is: How can midwestern agriculture produce these fuels without further harm to the environment while maintaining food production?

CenUSA addresses these challenges by promoting the development of a midwestern system for producing advanced transportation fuels using perennial grasses grown on land unsuitable or marginal for row crops. By using native perennial grasses as biofeedstock, the sustainability of existing agricultural systems can be improved through reduced soil erosion, reduced agricultural runoff, and increased carbon sequestration.

Research on the possibility of using perennial grass biofeedstocks and producers willingness to take on the challenge of these new energy crops is needed to see if this midwestern resource can help the nation to address its energy and land use challenges.

Why Focus on Perennial Grasses?
- Yields high biomass
- Utilizes native species
- Reduces soil erosion
- Improves soil quality
- Increases carbon sequestration
- Reduces water runoff
- Increases water infiltration
- Provides wildlife habitat

The CenUSA Vision: Our vision is to create a regional system for producing advanced transportation fuels derived from perennial grasses grown on land that is either unsuitable or marginal for row crop production. In addition to producing advanced biofuels, the proposed system will improve the sustainability of existing cropping systems by reducing agricultural runoff of nutrients and soil and increasing carbon sequestration.

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