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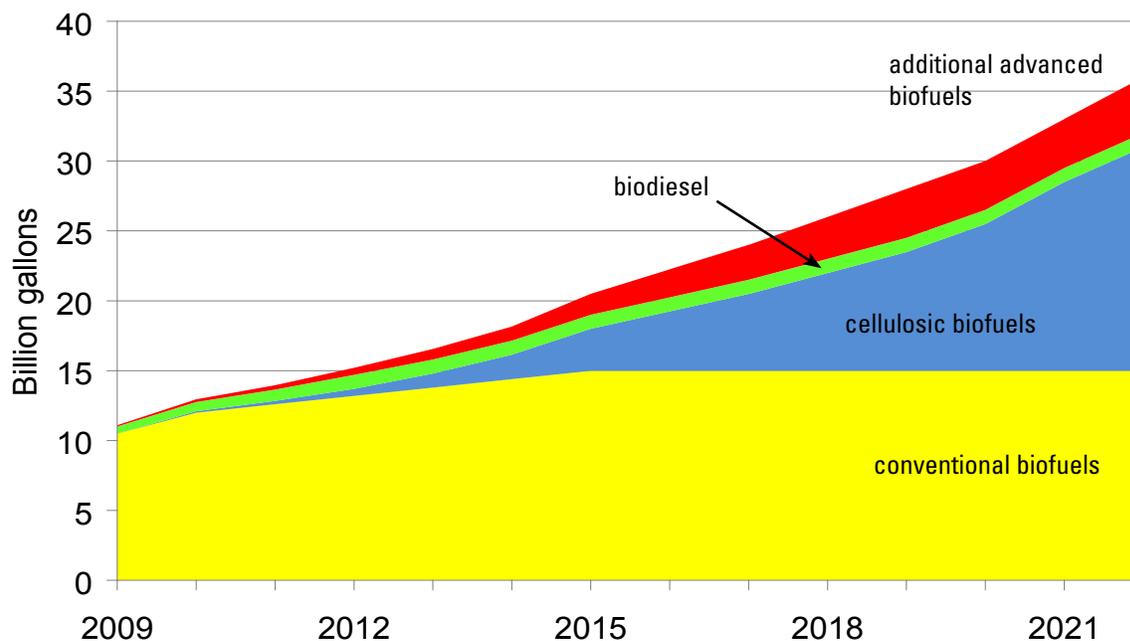
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## Sustainable production and distribution of bioenergy for the Central United States

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Global demand for energy continues to increase as the planet's population grows past 7 billion and incomes rise, especially in developing countries. The increasing demand for energy has spurred many countries to explore alternative energy platforms. Over 50 countries throughout the world have active bioenergy programs. The U.S. has moved to the front of this activity as we have grown to become the largest producer of biofuels and as we alternate between the world's largest importer and exporter of ethanol. In 2007, the federal government provided a blueprint for biofuel development over the next decade with the Renewable Fuels Standard (RFS). Figure 1 shows the RFS and details targets for various types of renewable fuels. Looking forward over the next decade, the government is seeking significant expansion of cellulosic biofuels. The target for cellulosic biofuels expands from 250 million gallons in 2011 to 16 billion gallons in 2022.



**Figure 1.** Renewable Fuels Standard

As part of the government's efforts to meet the RFS targets, USDA has funded several efforts to investigate the development of sustainable bioenergy platforms. Iowa State University and collaborators from several other states have been awarded funds for a project that is:

- 1) exploring the feasibility of producing advanced transportation fuels derived from perennial grasses grown on land that is unsuitable or marginal for row crop production and
- 2) improving the sustainability of existing corn/soybean systems by reducing agricultural runoff of nutrients and soil and increasing carbon sequestration.

The project, known as CenUSA, is a multi-state and multi-disciplinary effort being led by Iowa State University. Project activities will take place in Iowa, Indiana, Wisconsin, Minnesota, Nebraska, Illinois, Vermont and Idaho by researchers from Iowa State University, Purdue University, University of Illinois, University of Minnesota, University of Nebraska, University of Wisconsin, University of Vermont, Idaho National Laboratory and from USDA Agricultural Research Service offices in Wisconsin, Nebraska, Illinois, Pennsylvania, and Iowa.

CenUSA has 9 broad platforms within the project:

- 1) Feedstock Development,
- 2) Sustainable Production Systems,
- 3) Feedstock Logistics,
- 4) System Performance,
- 5) Feedstock Conversion,
- 6) Markets and Distribution,
- 7) Health and Safety,
- 8) Education, and
- 9) Extension and Outreach.

Each platform has specific goals. Three of these platforms will have presentations at the 2012 ICM conference. Dr. Rob Mitchell is presenting information on the establishment and management of perennial grasses for bioenergy use. Dr. David Laird is presenting on biochar development and use. And Dr. Keri Jacobs is presenting on the current understanding of the economic considerations for perennial grass production in bioenergy markets.

Figure 2 shows the grand vision for the project, the integration of perennial grasses on marginal lands within our traditional crop production system. We are in the first stages of the project. Feedstock development has concentrated on the establishment of new breeding and evaluation trials for switchgrass, big bluestem, and indiangrass. These trials were planted at 12 locations across the upper Midwest. The trials include examinations of mixed feedstocks, fertilizer applications, and soil conditions. Over the years, these trials should provide information on the potential production from perennial grasses.

Preliminary studies have been done to examine the cost and energy requirements of harvesting grasses with various types of equipment. This data is being analyzed to inform the environmental and economic modeling efforts within the project. Early grass biomass samples have been processed by pyrolysis to explore the possible range of bioenergy and other products that could be developed. Educational modules have been developed on perennial grass establishment and management, harvesting and storage systems for bioenergy grasses, and logistical modeling of feedstock production systems. Biochar applications have been setup within the Master Gardeners' program.

This session will provide a general overview of the CenUSA project and highlight recent accomplishments within the project.

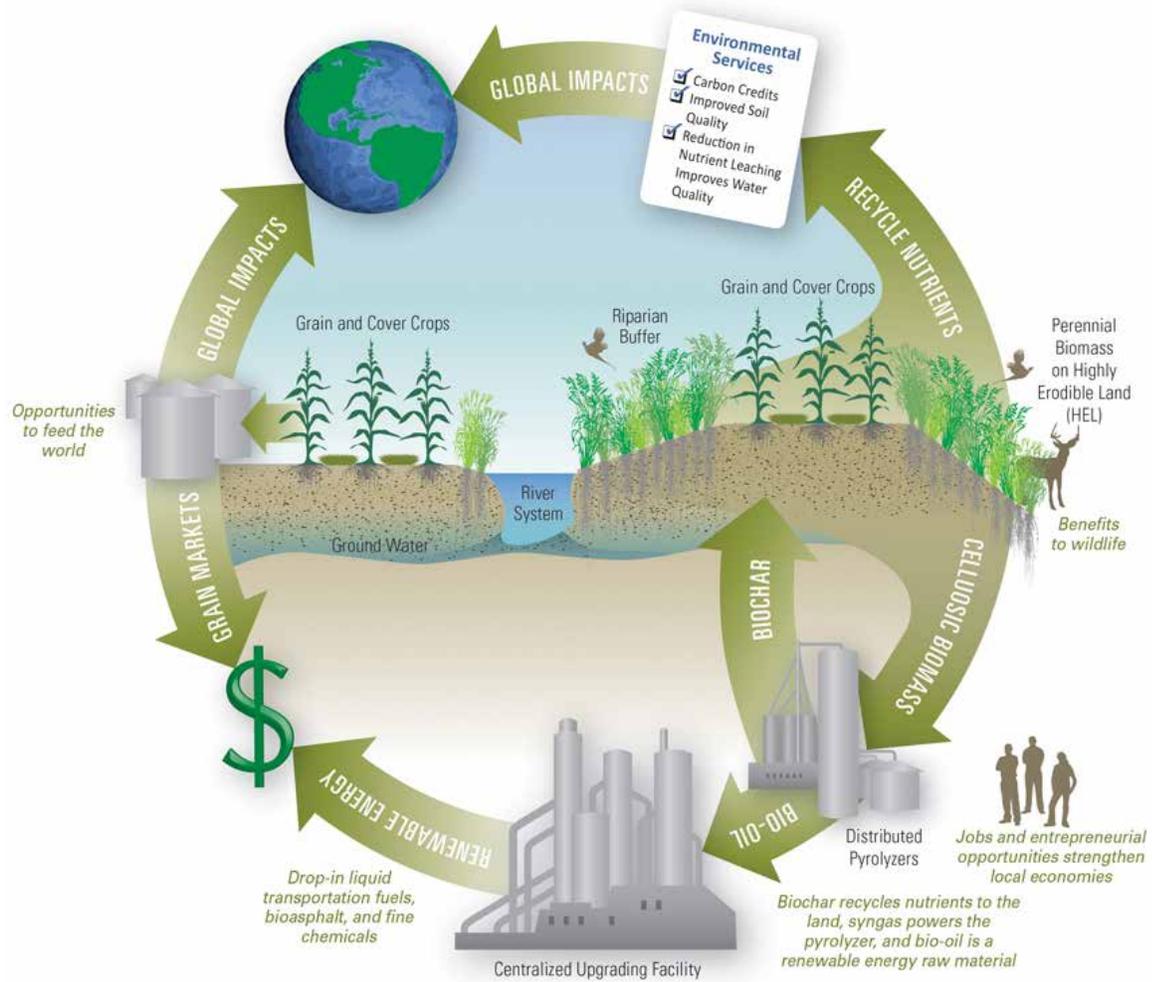


Figure 2. CenUSA Grand Vision