



National Institute of Food and Agriculture
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National Institute of Food and Agriculture Initiatives to Support Bioenergy

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New Directions for Research

- **What is sustainability?**
 - **Satisfying America's need for food, fiber, feed (and fuel) while maintaining or enhancing environmental quality, rural economic viability, and quality of life**
 - **Environment- generate life-cycle environmental data**
 - **Economy- consider feasibility in early stages of R&D**
 - **Society- largely neglected, but increasingly important**



New Directions for Research

- **What is a systems-based approach?**
 - Expand project boundaries to include **Social, Environmental, and Economic** feasibility of innovation, **AND...**
 - link feedstock development, production, logistics, conversion, product development and markets
 - Transdisciplinary - no research “silos”
 - Compatible with existing agricultural systems
 - Integrate research, education, Extension
- **Focus on Outcomes and Impacts**



NIFA Bioenergy Portfolio

- **Joint USDA/DOE Biomass Research and Development Initiative**
- **Agriculture and Food Research Initiative**
 - **Sustainable Bioenergy Challenge**
- **Small Business Innovation Research Program**
- **Joint DOE/USDA Feedstock Genomics Program**
- **Education Challenge Grants; National Needs Fellowships**
- **Biodiesel Fuel Education Program**
- **Special Grants, Formula Funds**



Biomass Research and Development Initiative

- Supports technologies and processes necessary for abundant commercial production of biofuels at prices competitive with fossil fuels
- High-value biobased products-
 - to enhance the economic viability of biofuels and biopower;
 - to serve as substitutes for petroleum-based feedstocks and products;
 - to enhance the value of coproducts
- Diversity of biomass produced sustainably for conversion to biofuels, bioenergy and biobased products



Biomass Research and Development Initiative

3 technical areas defined in 2008 Farm Bill

(A) Feedstocks development, harvest, handling, preprocessing, transportation, storage

(B) Biofuels and biobased product development including cellulosic biomass in production of biofuels and biobased products, and coproducts from a biorefinery



Biomass Research and Development Initiative

(C) Biofuels development analysis to improve environmental quality, cost effectiveness and rural economic development

- systematic evaluations of the impact of expanded biofuel production on the environment, food/feed supply**
- improvement and development of life cycle analysis tools**
- assessment of Federal land for production of feedstocks consistent with the integrity of soil and water resources and other environmental considerations**



Biomass Research and Development Initiative

- **FY 2010 \$28 M, FY 2011 \$30 M, FY 2012 \$40 M**
- **Required integration of 3 technical areas**
- **Focus on advanced biofuels**
- **Interest in small scale processing**
- **Interest in rural-based processing and manufacturing**
- **Interest in biobased industrial products as primary products**
- **\$3M minimum funding request**



Biomass Research and Development Initiative

- DOE Office of Biomass and Golden Field Office administer pre-application process
- Approximately 300 pre-applications for 2010
- 79 pre-applications invited
- USDA-NIFA administers the invited full application process
- 62 full applications under review
- Awards not later than April 30, 2011
- FY 2011 solicitation under construction



Biomass Research and Development Initiative

FY 2009 Awards

(A) Feedstock Development

- Sustainable Feedstock Supply Systems (OK State Univ.)
- Conditionally Activated Proenzymes (Agrivida, inc)

(B) Biofuels and Biobased Products

- Food and Yard Waste into Biogas and Bioproducts (Yenkin-Majestic Paint Corp.)
- Cellulosic Isobutanol Fermentation Biocatalyst (Gevo, Inc.)
- Kinetic Models of Biomass Gasification (GE Global Research)
- Production of Polyitaconic Acid from Northeast Hardwood Biomass (Itaconix, LLC)
- Improving Biorefinery Economics through Microchannel Hydroprocessing (Velocys, Inc.)



Biomass Research and Development Initiative

FY 2009 (continued)

(C) Biofuels Development Analysis

- **Environmental Sustainability and Capacity of Forest-based Biofuel (University of Minnesota)**
- **Analysis of the Global Impacts of Second Generation Biofuels (Purdue University)**



Biomass Research and Development Initiative and Agriculture and Food Research Initiative are Complementary:

- Focus on advanced biofuels
- Sustainability is the overarch theme
- Consortia of experts/comprehensive approach
- Not region specific **vs** region specific
- Integration of the 3 technical areas **vs** integration of functions (research, education, extension for CAPs)
- Broad feedstock options **vs** 5 feedstocks
- Focus on feedstocks and conversion technologies **vs** focus on feedstocks
- Support for cellulosic ETOH **vs** no support for ETOH



Conclusion

- **Systems-based approach requires collaboration along the R&D continuum and value-chain**
- **Sustainability concepts should guide research**
- **Research gaps addressed more efficiently**
- **Impacts/public benefit can be clearly defined**
- **Agricultural research plays a major role in reducing reliance on petroleum and moves us closer to the goal of meeting RFS2**



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