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# National Institute of Food and Agriculture Initiatives to Support Bioenergy

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## **Institute of Bioenergy, Climate, and Environment**

- ensuring energy independence through clean, biobased energy systems.
- ensuring sustainable and adaptive agro-ecosystems in response to climate change

## **Institute of Food Production and Sustainability**

- enhancing global food security through productive and sustainable agricultural systems

## **Institute of Food Safety and Nutrition**

- ensuring a safe food supply, improving citizens' health through nutrition, reducing childhood obesity, improving food quality

## **Institute of Youth and Community Development**

- enabling vibrant and resilient communities, preparing the next generation of scientists, enhancing science capacity in minority serving institutions, enhancing youth development



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## NIFA Bioenergy Portfolio

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



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## New Directions

- **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
- **Sustainable Bioenergy?**
  - Environment- generate life-cycle environmental data
  - Economy- consider feasibility in early stages of R&D
  - Society- largely neglected, but increasingly important



## New Directions

- **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**
  - Rural Development and Sustainability





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## Biomass Research and Development Initiative FY 2010

- Focus on advanced biofuels
- Interest in small scale processing
- Interest in rural-based processing and manufacturing
- Interest in biobased industrial products
- Funding range \$3M - \$7M
- Required integration of:
  - feedstock development/production, feedstock logistics,
  - feedstock conversion, product development
  - system analysis, e.g. life cycle analysis, impacts on food/feed supply



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## Biomass Research and Development Initiative

- USDA contribution - FY 2009 \$20M, FY 2010 \$28 M, FY 2011 \$30 M, FY 2012 \$40 M
- DOE contribution - FY 2009 \$5M, FY 2010 \$5M
- 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



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# 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.)





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# 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)



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# Agriculture and Food Research Initiative

## **Sustainable Bioenergy Challenge**

- Regional Approaches to Sustainable Bioenergy – Coordinated Agriculture Projects (CAPs)
  - Large awards to stimulate biofuels production in a multi-state region
  - Perennial grasses, sorghum, woody biomass, energycane, oil seed crops, algae
- Standard research grants
  - Co-products, crop protection, carbon sequestration, impacts of policy, scalable conversion technologies, impacts on pollinators and wildlife, land-use changes, socioeconomic impacts, feedstock logistics
- Stimulating a New Era of Students and Faculty in Bioenergy
- National Loblolly Pine Genome Sequencing



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# Agriculture and Food Research Initiative

## **Sustainable Bioenergy Challenge FY 2010**

### National Loblolly Pine Genome Sequencing Project

- 1 award \$3 M/year for 5 years

### Standard Research grants

- 37 awards \$200 K/year for 5 years
- Co-Products, Feedstock Crop Protection, Carbon Sequestration

### Stimulating a New Era of Students and Faculty in Bioenergy

- 2 awards \$1 M/year

### Regional Approaches to Bioenergy Systems

- 3 awards \$9M/year for 5 years (awards this Spring)



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

- Focus on advanced biofuels
- Sustainability is the overarching theme
- Consortia of experts/systems-based approach
- Not region specific **vs** regional approach
- 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