



**Biomass 2009:
A DOE Perspective on
Sustainability**

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Serious About Sustainability



- **Land Use Change** (\$1.8 million in FY08/09). Refining models to help study international land use change issues due to growth of biofuels.
 - Working with Purdue University to refine GTAP model to account for cellulosic ethanol
 - Updating GREET model to account for land use change impacts
 - Initial results at <http://www.agecon.purdue.edu/directory/details.asp?username=wtynier> (click on papers and on presentations)
- **Water** (\$1.3 million in FY08/09). Conducting LCA of consumptive water demand for biofuel production (compares corn ethanol, sugar cane ethanol, and competing petroleum fuels).
 - Report recently published (January 2009)
http://www.transportation.anl.gov/modeling_simulation/GREET/publications.html
- **Feedstock production** (\$6.5 million in FY08/09). Regional Biomass Energy Feedstock Partnerships are conducting in-field studies to determine best location for energy crops to take advantage of climatic conditions, soil types, water quality, and land use

Current Cross-Cutting Efforts



- **National Bioenergy GIS** (\$2.2 million in FY08/09)
 - ORNL, ANL, INL, UC-Davis and others are developing a national scale GIS-based framework to assist in the analyzing the economic and environmental impacts of feedstock, biorefinery, and infrastructure development options.
- **Great Lakes Bioenergy Research Center Sustainability Efforts** (Office of Science -- \$2.7 million)
 - Field-based research on novel feedstock production systems
 - Lab-based research on microbial-plant interactions
 - Evaluation of biogeochemical, biodiversity, and socioeconomic responses to expansion and intensification of agriculture
 - Analysis of biomass cropping in reference to land use requirements, environmental consequences and competing energy technologies
- **Biomass R&D Board Interagency Sustainability Working Group.**
Engaged in US Government partnership to identify indicators of sustainable biofuel production for measuring environmental impacts and benefits

The National Biofuels Action Plan: An Integrated Federal Approach



The Biomass Research and Development Board (Board) was created to coordinate federal research and development activities relating to biobased fuels, power, and products. The Board recently focused on addressing challenges and offering solutions on the biofuels aspects of the Energy Independence and Security Act (EISA), specifically Section 202.

On October 7, 2008, Secretary of Energy Samuel Bodman and Secretary of Agriculture Edward Schafer released the National Biofuels Action Plan (Action Plan) developed by the Biomass Research and Development Board.

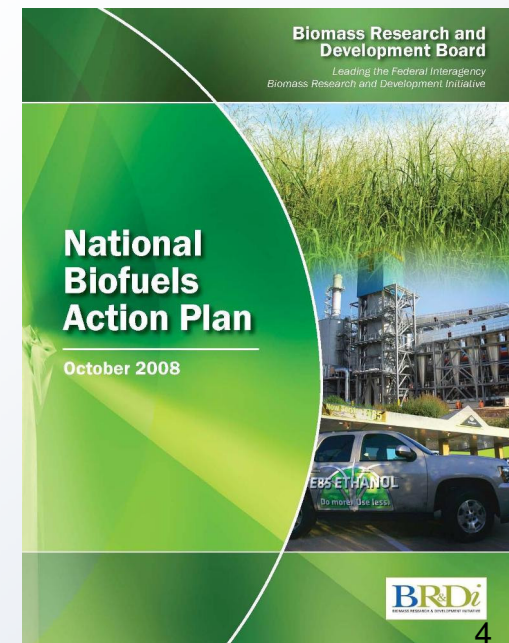
The Action Plan was created in response to meet the Renewable Fuel Standard (RFS) as outlined in the Energy Independence and Security Act of 2007. To read the NBAP, go to

<http://www1.eere.energy.gov/biomass/pdfs/nbap.pdf>

Interagency groups have formed to address crosscutting challenges.

Members of the Biomass Research & Development Board:

- U.S. Department of Agriculture
- Department of Energy
- National Science Foundation
- Environmental Protection Agency
- Department of the Interior
- Office of Science and Technology Policy
- Office of the Federal Environmental Executive
- Department of Transportation
- Department of Commerce
- Department of the Treasury
- Department of Defense



Successive Generations of Biofuels



Corn Ethanol

- Commercially available (no DOE research ongoing)
- Reduced GHG emissions
- Capacity constrained



Cellulosic Ethanol

- Focus of current DOE research
- Potential to lower GHG emissions >85%
- Uses biomass from waste and non-agricultural land



Advanced Biofuels

- DOE scoping studies in progress
- Potential to displace diesel
- Energy content and fuel economy similar to petroleum-based fuels