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USDA and DOE award \$24.4 million in biomass R&D grants

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Acting on the Biomass Research and Development Act of 2000 championed by Sen. Dick Lugar (R-IN), on Nov. 12th the Agriculture and Energy departments issued up to \$24.4 million in grant funding to research and develop biofuels, bioenergy and high-value biobased products.

Lugar pointed out in particular that the advanced biofuels produced through this funding are expected to reduce greenhouse gas emissions by at least 50 percent. He said the overall program focuses on the strategic importance of energy security and the economic burdens created by depending on imported foreign energy sources. (For information on the "Lugar Energy Initiative" to reduce U.S. dependence on imported oil by developing alternative and renewable energy sources, go to: <http://lugar.senate.gov/energy>.)

"Innovation is crucial to the advancement of alternative, renewable energy sources, and these awards will spur the research needed to make significant progress in bioenergy development," Agriculture Secretary Tom Vilsack said in announcing the awards.

"The selected projects will help make bioenergy production from renewable resources more efficient, cost-effective and sustainable," Energy Secretary Steven Chu said. "These advancements will benefit rural economies through creation of new processing plants and profitable crops for U.S. farmers and foresters."

Projects announced must contribute a minimum of 20 percent of matching funds for research and development projects and 50 percent of matching funds for demonstration projects. Funding is provided through NIFA, USDA's new National Institute of Food and Agriculture (\$19.5 million), and DOE's Biomass Program (\$4.9 million). Selected projects are aimed at increasing the availability of alternative fuels and biobased products that are produced from a diverse group of renewable sources of biomass.

The 12 projects selected for the nine NIFA and three DOE grants are listed below.

Biofuels and Biobased Products:

USDA Awards

GE Global Research (Irvine, CA) up to \$1,597,544: to develop detailed and simplified kinetic models of biomass gasification. A fundamental modeling capability will enable the widespread design of feedstock-flexible biomass gasifiers that are cost-effective and scaled to match the regional distribution of biomass feedstocks.

Gevo, Inc. (Englewood, CO) up to \$1,780,862: to develop a yeast fermentation organism that can cost-effectively convert cellulosic-derived sugars into isobutanol, a second generation biofuel/biobased product. As an advanced biofuel, isobutanol strikes a unique balance between high octane content and low vapor pressure, it can be converted into hydrocarbons, and as a biobased product it can be used as a chemical precursor for numerous high-value products such as isobutylene and PET plastic products.

Itaconix (Hampton Falls, NH) up to \$1,861,488: to develop production of polyitaconic acid from northeast hardwood biomass, using an integrated extraction-fermentation-polymerization process. Polyitaconic acid is a water soluble polymer with a 2 million metric ton per year market potential as a replacement for petrochemical dispersants, detergents, and super-absorbents.

Yenkin-Majestic Paint Corporation (Columbus, OH) up to \$1,800,000: to demonstrate, at scale, the operation of a dry fermentation system that uses pre- and post-consumer food wastes from supermarkets and restaurants, waste sawdust, grass, leaves, stumps and other forms of wood waste to produce biogas, heat, and electrical power. Yenkin-Majestic will use these products to demonstrate a distributed stand-alone system for the operation of a large industrial facility.

Velocys, Inc. (Plain City, OH) up to \$2,651,612: to improve biorefinery economics through microchannel hydroprocessing. This project will explore the unique capabilities of heat and mass transfer inherent in microchannel reactor technology with advanced catalysts to intensify chemical processes, resulting in more efficient conversion of cellulosic residues to liquid transportation fuels.

DOE Award

Exelus, Inc. (Livingston, NJ) up to \$1,200,000: to develop a Biomass-to-Gasoline (BTG) technology that represents a fundamental shift in process chemistry and overall approach to creating biofuels. The technology uses unique, engineered catalysts that facilitate new reaction pathways to liquid motor fuels from biomass. The BTG process replaces conventional high-temperature processes like gasification and pyrolysis with a series of mild, low-temperature reactions. The self-contained process uses minimal water and no acids or chemical additives.

Biofuels Development Analysis:

USDA Awards

Purdue University (West Lafayette, IN) up to \$933,883: to develop an analysis of the global impacts of second generation biofuels in the context of other energy technologies and alternative economic and climate change policy options. This project will modify, extend and link established modeling frameworks to capture the strengths of each framework in a hybrid, multidisciplinary system.

University of Minnesota (St. Paul, MN) up to, \$2,715,007: to assess the environmental sustainability and capacity of forest-based biofuel feedstocks within the Lake States region. This project will address key uncertainties about expanding feedstock harvests in the northern Lake States, including environmental impacts, economic feasibility and avoided fossil-fuel CO₂ emissions.

DOE Award

Consortium for Research on Renewable Industrial Materials (Washington, Idaho, North Carolina, Mississippi, and Tennessee) up to \$1,430,535: to compare the life cycle environmental and economic impacts for collecting forest residuals, short rotation crops, mixed waste, and biomass from fire risk reduction activities on federal lands for conversion to fuels via biochemical, pyrolysis and gasification systems. National estimates of biofuel production will be based on stratified biomass collection and processing implementation scenarios that can be evaluated against the Renewable Fuel Standard greenhouse gas emission objectives.

Feedstock Development:

USDA Awards

Agrivida (Medford, MA) up to \$1,953,128: to develop new crop traits that eliminate the need for both expensive pretreatment equipment and enzymes. Transgenic switchgrass will be engineered with cell wall-degrading proenzymes that are dormant when the plant is in the field, but activated after harvest, under processing conditions with specific temperature and pH.

Oklahoma State University (Stillwater, OK) up to \$4,212,845: to develop best practices and technologies necessary to ensure efficient, sustainable and profitable production of cellulosic ethanol feedstocks. Utilizing large-scale feedstock production research, the economic and environmental sustainability of switchgrass, mixed-species perennial grasses and annual biomass cropping systems will be evaluated, and the synergy between bioenergy and livestock production will be explored.

DOE Award

The University of Tennessee (Knoxville, TN) up to \$2,345,290: to compare three varieties of switchgrass using various management practices, harvesting equipment and harvesting timelines in Eastern Tennessee. This 2,000-acre demonstration-scale project will use field plots ranging in size from 10 - 50 acres that incorporate different varieties of switchgrass seed: the current Alamo variety, the Ceres EG 1101 improved Alamo variety, and the Ceres EG 1102 Kanlow variety.