



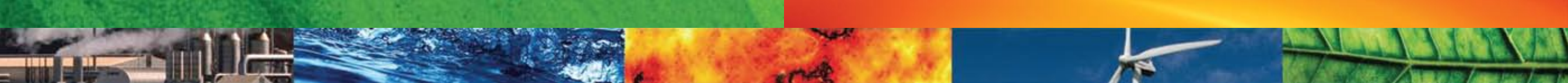
USDA Energy Council



A D V A N C I N G

ReNewable Energy





USDA Energy Council

Advancing Renewable Energy

America's rural, agricultural, and forestry sectors are central to building a sustainable renewable energy future while still providing sufficient supplies of food, feed, and fiber. As energy prices remain volatile, the U.S. Department of Agriculture (USDA) is working to help reduce the Nation's dependence on imported oil and conserve our natural resources as we switch to clean, affordable renewable energy alternatives.

The USDA Energy Council is leading the charge to coordinate effective economic and technological solutions to these challenges, particularly as they relate to rural America and the agricultural community.

USDA Energy Council's mission is three-fold:

- To advance the deployment and commercialization of all forms of renewable energy;
- To advance science and technology, as well as policy options, that enable the adoption and use of renewable energy and encourage energy savings; and
- To educate the public about and create awareness of renewable energy.

In 2007, USDA committed nearly \$75 million toward renewable energy programs, including research and development of cellulosic ethanol—a form of ethanol fuel created from switchgrass, wood chips, and other woody biomass. — USDA





Who We Are

The USDA Energy Council is a multi-agency, multi-disciplinary leadership team working in partnership with the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and others.

The USDA Energy Council draws expertise from a dozen and more USDA agencies and offices, including:

- Rural Development
- Office of the Chief Economist
- Natural Resources Conservation Service
- National Agricultural Statistics Service
- Forest Service
- Foreign Agricultural Service
- Farm Service Agency
- Economic Research Service
- Departmental Administration
- Cooperative State Research, Education and Extension Service
- Agricultural Research Service
- Agricultural Marketing Service

Originally formed as part of USDA's comprehensive energy strategy to support the Energy Policy Act of 2005, the Council plays a key role in achieving the Nation's aggressive energy mandate to increase the use of renewable fuels to 36 billion gallons annually by year 2022. This measure is expected to significantly reduce the Nation's dependency on foreign sources of oil.





The Role of the USDA Energy Council

The Council facilitates the implementation of the U.S. Government's renewable energy strategy. From wind farms and next-generation ethanol plants to biochemical/genomics research and more efficient farming techniques, USDA is deeply committed to the Nation's quest for energy security and the education of the next generation of scientists focusing on energy resources.

As an integral part of this commitment, the USDA Energy Council coordinates a broad range of energy-related activities across USDA and has been specifically tasked with:

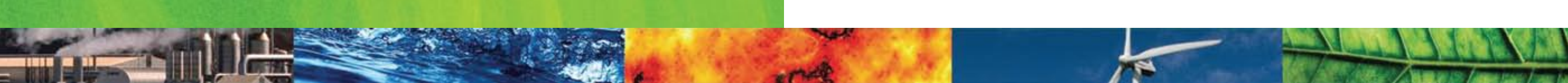
- Ensuring that the agriculture and forestry sectors, and rural America play a key role in achieving the Federal Government's goal to increase the supply and use of renewable and other alternative fuels as directed by the Energy Independence and Security Act (EISA) of 2007;
- Representing the agricultural and forestry communities in national energy discussions and policy development;
- Advancing USDA's energy strategy to alleviate the impact of high energy costs on farmers, ranchers, and rural Americans, as well as others, to develop long-term energy solutions.

About the Energy Independence and Security Act (EISA) of 2007

The Energy Independence and Security Act (EISA) bolsters U.S. energy security by increasing our energy efficiency, cutting our dependence on foreign oil by diversifying the energy supply, and confronting climate change through investments in renewable energy technology.

Specifically, EISA calls for an increase in the use of alternative fuels, like ethanol and biodiesel, as well as reductions in energy consumption on a national scale.

- *The Renewable Fuels Mandate* will increase the use of renewable fuels by 500 percent to 36 billion gallons annually by year 2022.
- *The Federal Government Operations Mandate* calls for a 30-percent reduction in energy consumption by Federal Government facilities by 2015. By 2030, all new Federal buildings will be "carbon neutral."



USDA's Comprehensive Energy Strategy



USDA recognizes that renewable energy is a historic opportunity for economic growth and prosperity in rural America, where much of our domestic renewable energy potential resides. USDA further acknowledges that energy conservation in the production of food and other consumable products is important to both market costs and reduction of greenhouse gas emissions.

USDA supports research and development, market adoption, conservation, and education initiatives across a wide range of energy technologies:

Research and Development

USDA is a major conductor and sponsor of energy-related research both through its own labs and through partnerships with the Nation's land-grant universities and the agriculture and forestry industries. This includes efforts to increase sustainable energy production and yield of "energy crops" (e.g., corn, soybeans, and poplar), pioneer the cultivation of new energy crops, and improve the production and use of woody biomass.

The USDA Research, Education and Economics (REE) mission's Strategic Energy Plan facilitates interagency, university, and private sector coordination and cooperation in energy research, education, and extension. It also builds the partnerships needed to pursue reliable and sustainable sources of agriculture-based energy and biobased products. To download an online copy of REE's Strategic Energy Plan, please visit: www.ree.usda.gov/news/bead/USDA_REE_strat_plan.pdf.

Energy Efficiency and Conservation

Increasing the energy efficiency of our Nation's rural small businesses and farms is a key priority for USDA. This involves reducing the consumption of fuel, fertilizers, and herbicides and assisting farmers in using renewable energy in daily operations.

An integral component of this efficiency initiative is to increase the sequestration of carbon dioxide (CO₂) that has been released into the atmosphere through innovative farming and forest management techniques.



Commercialization and Market Adoption

Through its Rural Development grant and loan programs, USDA implements commercialization strategies and supports agriculture producers and forest landowners, rural small businesses, electric cooperatives, and other rural investors in deploying renewable technologies, such as ethanol, biodiesel, methane gas recovery, and wind, solar, and geothermal power.

Moreover, USDA is firmly committed to the market adoption of renewable energy technologies as part of the mainstream energy grid.

Outreach and Education

The USDA Energy Council assists the Department in its efforts to reach all audiences to inform them about USDA energy programs and regulations. The Council ensures that these audiences not only are aware of the Department's comprehensive energy program but also understand how it fits into the Nation's overall energy policy.

In addition, USDA's Cooperative State Research, Education, and Extension Service (CSREES), in cooperation with public institutions, private sector partners, and the Land-Grant University System, provides national leadership and a host of initiatives to address critical educational issues, such as the use of biofuels to reduce dependence on fossil fuels. More information about CSREES programs can be found at: www.csrees.usda.gov.

USDA's BioPreferred Program promotes the awareness and use of more than 10,800 biobased commercial and industrial products (made from renewable plant and animal sources) for non-renewable goods and materials. For more information, visit www.biopreferred.gov.



USDA Is Enhancing the Nation's Energy Security

USDA has implemented several innovative programs aimed at advancing the Nation's renewable energy strategy by fostering a domestic biofuels industry in rural America and reducing the energy-cost burden on farmers, ranchers, and other agricultural partners:

Renewable Energy and Energy Efficiency Improvements Program

In 2007 alone, USDA Rural Development provided more than \$67 million of support to agriculture producers and rural small businesses to purchase and install renewable energy systems and to become more energy efficient. For more information and instructions on how to apply for funding, **visit www.rurdev.usda.gov/rd/energy**.

Research, loan, and grant programs to support development, production, and use of renewable fuels and alternative energy sources

USDA is investing in several types of renewable fuel technologies for mainstream market adoption, most notably:

Biofuels

Biofuels like ethanol, biodiesel, and methane are produced from certain grain crops. There is also a significant opportunity to produce biofuels from biomass (the leftover organic material from crop and animal production processes).



Biofuels have gained popularity because they burn far cleaner than fossil fuels and produce considerably less CO₂ emissions. Excessive CO₂ in the atmosphere has been linked to air pollution, harmful greenhouse gases, and climate change.

Ethanol is a fuel additive usually made from corn, sugarcane, or cellulosic material found in switchgrass, wood, and other biomass from our Nation's forests and farmlands.

Ethanol is added to gasoline in various percentages to replace petroleum with renewable fuel. In the United States, ethanol fuel blends are compatible with vehicles configured to run on either "E10" (10 percent ethanol with 90 percent gasoline) or "E85" (85 percent ethanol with 15 percent gasoline).

Biodiesel is produced from vegetable oils, fats, or greases and is usually blended with petroleum diesel. Soybeans, castor beans, and rapeseed are types of energy crops commonly harvested to produce biodiesel.

Solar Energy

Solar energy represents an exciting area of renewable energy alternatives—the Sun is an abundant and truly regenerating energy source. Technological advances have made it possible to use solar power to heat homes, buildings, and water without producing harmful CO₂ emissions.



Solar energy can be converted into electricity through solar panels or "photovoltaic" systems. Solar thermal energy uses the Sun's rays to create steam, which is used to power a generator.



Wind Energy



People have been harvesting wind power since 200 B.C.

Whether in the form of simple windmills used to pump water and grind food grains, or as more sophisticated rotating turbines that produce electricity, wind power is the fastest growing source of renewable energy worldwide. Like solar energy, wind energy is not dependent on finite natural resources and does not produce CO2 emissions.

Other Critical Areas of Energy Research and Development

USDA is also committed to a diverse portfolio of alternative energy research areas including geothermal power (energy harnessed from heat radiating from the Earth's core) and hydro power (electricity created from water flow), methane gas recovery, thermal conversion, and solid fuel production.

Methane gas recovery is a method whereby anaerobic microbes digest manure and release methane gas. The gas is then captured and used as a viable energy source.



Thermal conversion technology creates light crude oil from organic materials (biomass and plastics) through the use of pressure and superheated water.



Solid fuel production captures energy and heat from the combustion of solid organic materials like wood, charcoal, and peat.

“We have a vision that in 5 years the United States will have: agriculture- and natural resource-based energy that enhances stewardship of our environment; sustainable, secure, renewable energy sources; and vibrant and energy-efficient rural communities.”

—USDA Research, Education, and Extension (REE)



Energy Conservation Tools

To help individual farmers, ranchers, and agricultural suppliers easily identify areas for energy reductions and potential cost savings, USDA's Natural Resources Conservation Service created four easy-to-use online Energy Estimators for Animal Housing, Irrigation, Nitrogen, and Tillage.

All four Energy Estimators can be found by visiting the "Energy Tools" Web page at <http://energytools.sc.egov.usda.gov>. Additional consumer tools can be found on the "Save Energy, Save Money" Web page at www.nrcs.usda.gov/technical/energy.

More on Bioenergy Research: ARS

USDA's Agricultural Research Service (ARS) revised its Bioenergy Research Strategy and 5-year Bioenergy Research Action Plan to address the changing needs posed by this growing industry. The new strategy and action plan integrate the research needs for feedstock development, feedstock production, and biorefining—including biorefinery coproducts—into a single program designed to maximize the positive impacts (and minimize negative impacts) of bioenergy on agriculture. For detailed information about ARS Bioenergy Research Strategy and Action Plans, please visit: www.ars.usda.gov/biofuels.



BioPreferred Program

As mandated by the Farm Security and Rural Investment Act of 2002, USDA launched a comprehensive program to officially designate and encourage the use of "preferred" biobased products by all Federal agencies.

Biobased products are environmentally friendly commercial or industrial goods (excluding food or feed) comprised wholly or in part of renewable plant and animal material. BioPreferred products, which range from building and industrial supplies to furniture and housewares, are usually biodegradable or recyclable.

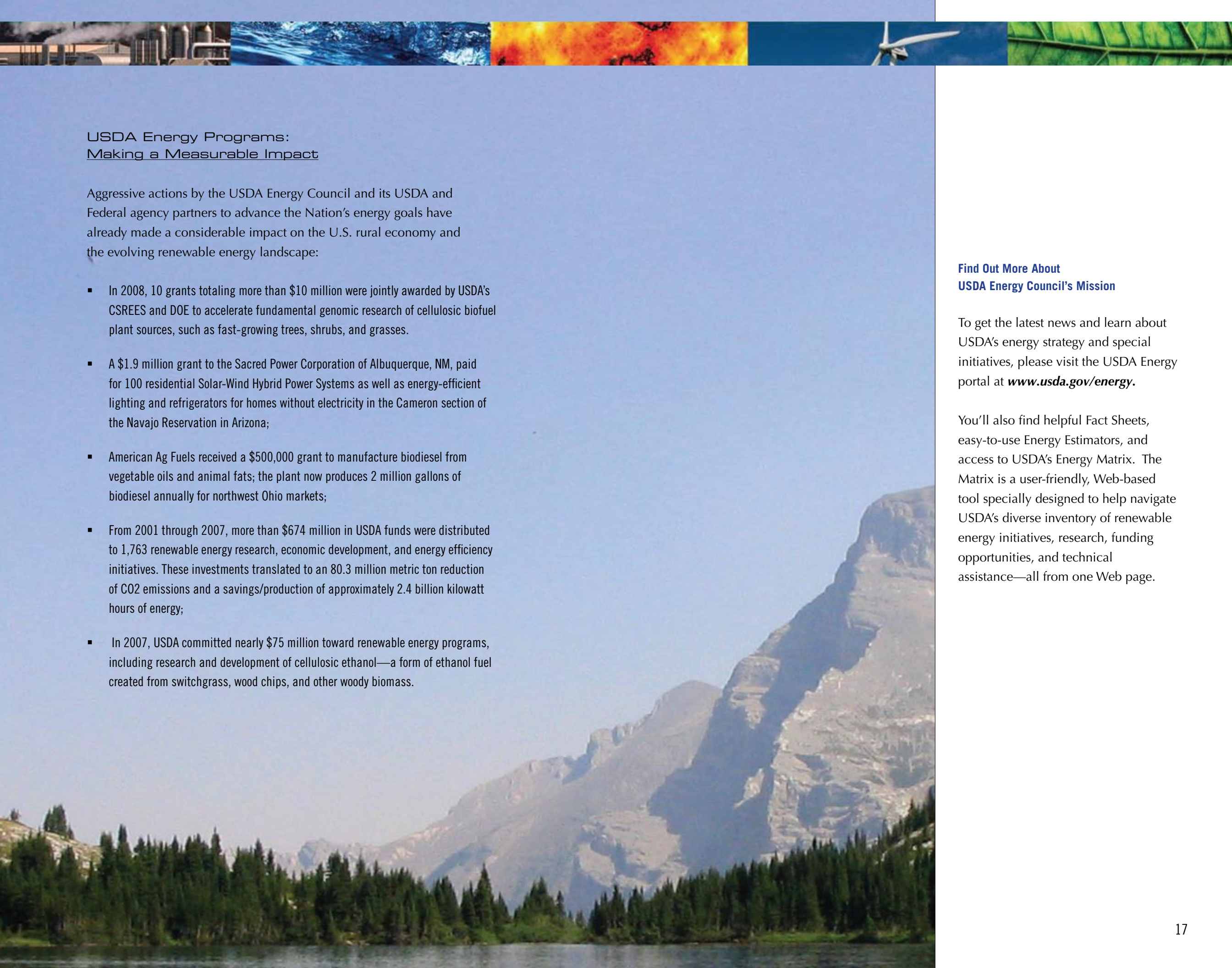
The Federal Government's use of biobased products will achieve four major goals:

- Create new jobs for rural communities;
- Provide new markets for farm commodities;
- Increase national security by lessening our dependence on foreign oil; and
- Improve the environment through the use of non-toxic, renewable resources.

To search USDA's catalog of more than 10,800 BioPreferred products, visit www.biopreferred.gov.

The USDA Biobased Products and Bioenergy Coordination Council (BBCC) is an interagency working group that steers programs related to biobased (renewable) products and/or bioenergy. For more information about the BBCC, please visit www.ars.usda.gov/bbcc.

USDA also co-chairs the Biomass Research and Development Board, which coordinates the Governmentwide research initiative furthering biobased products and biofuels (BRDi). To learn more about BRDi, please visit: www.brdisolutions.com/initiative/pages/board.aspx.



USDA Energy Programs: Making a Measurable Impact

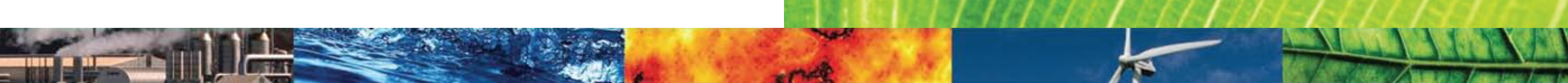
Aggressive actions by the USDA Energy Council and its USDA and Federal agency partners to advance the Nation's energy goals have already made a considerable impact on the U.S. rural economy and the evolving renewable energy landscape:

- In 2008, 10 grants totaling more than \$10 million were jointly awarded by USDA's CSREES and DOE to accelerate fundamental genomic research of cellulosic biofuel plant sources, such as fast-growing trees, shrubs, and grasses.
- A \$1.9 million grant to the Sacred Power Corporation of Albuquerque, NM, paid for 100 residential Solar-Wind Hybrid Power Systems as well as energy-efficient lighting and refrigerators for homes without electricity in the Cameron section of the Navajo Reservation in Arizona;
- American Ag Fuels received a \$500,000 grant to manufacture biodiesel from vegetable oils and animal fats; the plant now produces 2 million gallons of biodiesel annually for northwest Ohio markets;
- From 2001 through 2007, more than \$674 million in USDA funds were distributed to 1,763 renewable energy research, economic development, and energy efficiency initiatives. These investments translated to an 80.3 million metric ton reduction of CO₂ emissions and a savings/production of approximately 2.4 billion kilowatt hours of energy;
- In 2007, USDA committed nearly \$75 million toward renewable energy programs, including research and development of cellulosic ethanol—a form of ethanol fuel created from switchgrass, wood chips, and other woody biomass.

Find Out More About USDA Energy Council's Mission

To get the latest news and learn about USDA's energy strategy and special initiatives, please visit the USDA Energy portal at www.usda.gov/energy.

You'll also find helpful Fact Sheets, easy-to-use Energy Estimators, and access to USDA's Energy Matrix. The Matrix is a user-friendly, Web-based tool specially designed to help navigate USDA's diverse inventory of renewable energy initiatives, research, funding opportunities, and technical assistance—all from one Web page.



The Farm Bill and Its Energy Title— What It Means for USDA and Our Energy Future

The Food, Conservation, and Energy Act of 2008 Act (Farm Bill) (P.L. 110-234) provides over \$1 billion of mandatory funding over the 5-year life of the Farm Bill to support energy efficiency and renewable energy development that will contribute to the reduction of America's dependency on foreign oil.

Renewable energies, such as ethanol (from corn or cellulosic sources), biodiesel, wind power, and solar power, are among the most promising new sources of energy. Renewable energies are beneficial because their supplies can be replenished and their use is considered more environmentally friendly ("clean") than traditional energy sources like fossil fuels.

Specifically, the Farm Bill provides programs that support the production, conversion and distribution of advanced biofuels from renewable biomass sources; federal procurement of biobased products; replacement of fossil fuel energy sources with renewable energy sources for heat and power of existing biorefineries; energy efficiency and renewable energy development; and research and development/demonstration of biofuels and biobased products. Over \$1 billion of mandatory funding has been identified to support these programs over the 5-year life of the Farm Bill.

"Our farms and forest lands can supply enough cellulosic feedstock to displace 30 percent of current U.S. petroleum consumption with biofuels by 2030, while meeting the Nation's food, feed and export demands." — USDA





The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

August 2008