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Policy Report

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The 2002 Farm Bill: Revitalizing the Farm Economy Through Renewable Energy Development

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The Environmental and Energy Study Institute (EESI) is a non-profit, non-partisan organization with the mission of promoting the development of public policy options that will sustain people, the environment and natural resources. EESI was founded in 1984 by a bipartisan group of Members of Congress.

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Introduction

As the 107th Congress debates the policies that will be part of the new Farm Bill, the U.S. agricultural sector faces many of the same challenges common throughout most of the last century, and a few new ones as well. As our nation has changed, so has agriculture. The 20th century was marked by an increasing urbanization of the U.S. population; over 60 percent of Americans lived in rural areas at the turn of the last century, at the beginning of the 21st less than a quarter do.[1] Yet our nation still relies on domestic agriculture to provide the majority of its food and fiber.

Reduced profit margins and low commodity prices have forced many to leave farming in the past decade, or rely increasingly on off-farm income, while more attractive opportunities in less volatile industries have deterred many young people from entering the farming profession. Currently, less than half of American farmers list farming as their primary source of income and the average American farmer is now 54.3 years old.[2] The agricultural economy has always been volatile when compared to other industries due to (1) the inability of farmers to readily change production levels, (2) a fixed demand for food regardless of price, and (3) the unpredictability of climate events. But many uniquely modern challenges face U.S. agriculture as well, such as competition from foreign producers in an increasingly global economy, the proliferation of large-scale industrial agriculture, and the rising cost of energy inputs. Naturally, the economic hardships within the agricultural sector have had repercussions throughout Rural America.

U.S. agriculture is at a crossroads. The decisions that shape this Farm Bill will determine the course of the agricultural sector for years to come. Although many challenges lie ahead, many new opportunities present themselves as well. Our fossil fuel-based economy, which heats our homes, powers our automobiles, and provides us with an array of products, is ultimately unsustainable in the long-term. But a new sustainable economy is slowly emerging, an economy which will rely increasingly on renewable sources of energy such as wind, solar, geothermal, and biomass. Farmers can be at the forefront of this revolution; utilizing the commodities they grow, and even the waste streams they now must dispose of, in innovative new ways to produce power, transportation fuels, and a new generation of biobased products and chemicals. Linking agriculture and renewable energy is key to diversifying our energy market, protecting our environment, and revitalizing rural America – truly a "win-win-win" opportunity that is good for American farmers and good for the country.

Background

The extraction and use of fossil fuels has many environmental consequences. If leaked in transport, petroleum can contaminate land and water, requiring costly environmental clean-ups. The burning of fossil fuels releases dangerous air pollutants, such as sulfur dioxide, nitrogen oxide, and particulate matter to the detriment of public health, as well as climate changing greenhouse gases.

Increasingly, we rely on imported oil to produce the fuels that power our nation, including our farms. Currently the United States imports more than 50 percent of its oil, which accounted for approximately one quarter of the 2000 trade deficit at over $100 billion. At this level of dependence, we have little control over oil prices, which consumers have seen fluctuate unpredictably in recent years. World production of oil is predicted to peak between 2010-2020,[3] which will lead to sharp price increases in years to come. Yet if the full environmental and social costs were factored into the market price, oil would be considerably more expensive.

Agriculture remains one of the most energy intensive industries. The Department of Energy (DOE) Office of Industrial Technologies estimates that in 1994 U.S. farms consumed 1 quad (equal to one million billion BTU's) of energy, the typical amount of energy consumed annually by three million Americans. Related food processing and production of inputs consumed another 1.9 quads. Diesel fuel, gasoline, and electricity accounted for most on-farm energy usage, making U.S. agriculture highly susceptible to energy price increases. In part because it is such an energy intensive industry, agricultural production accounts for 11 percent of total U.S. greenhouse gas emissions.[4] Although the Intergovernmental Panel on Climate Change concludes that U.S farmers will likely be able to adapt to climate changes, recent research argues that global climate change could be potentially devastating to American agriculture. Researchers at the University of California, Berkeley predict that a five-degree rise in average global temperature could result in $15-30 billion in annual damage to American crops.[5]

Agriculture can be an important part of the solution to meeting our nation's energy needs, mitigating global climate change, and revitalizing our rural communities. The benefits of bioenergy were recognized in Title III of the Agricultural Risk Protection Act of 2000 and Executive Order 13134 which set the goal of tripling the use of biofuels and biobased products by 2010. By utilizing the renewable resources on America's farmland, we can generate electricity, fuel our vehicles, and create a variety of products, all of which can provide new revenue streams to farmers.

Tremendous untapped renewable resources exist throughout the country. Biomass, defined as any organic matter available on a renewable basis, is one such resource. Burdensome waste streams can be converted into revenue streams, including crop residues (e.g. corn stover, rice straw, sugar cane bagasse, etc.), animal manure, forestry residues, and segregated organic municipal wastes. Over 1 billion tons of waste is produced annually by the farming sector. Dedicated energy crops are also being developed, such as switchgrass and hybrid varieties of poplar and willow trees. These

energy crops require little or no inputs, can be grown on marginal lands, and can be used to prevent soil erosion and fertilizer runoff into rivers and streams.

Wind energy is one of the fastest growing energy technologies in the world, growing over 20 percent each year during the 1990's. The American Wind Energy Association anticipates that close to 2,000 new MW of wind energy will be added in the United States by the end of 2001. Many farms are located in areas with great potential for wind development, and enthusiasm among farmers for developing this potential revenue stream is rapidly growing. Recent workshops held in Idaho about developing wind energy on farmland were attended by hundreds of farmers.

Solar, while still one of the most expensive forms of renewable energy, continues to drop in cost. In remote locations not connected to the grid, solar can be the most cost-effective way to generate power for applications such as pumping water for irrigation or livestock. Geothermal power, which uses the heat of the earth to produce energy, is also viable in many regions of the country, and could provide income to farmers in the form of lease payments from geothermal developers.

Because wind and solar are intermittent energy sources, energy developers may develop hybrid systems fueled with natural gas. But renewable hybrid systems that incorporate biomass and geothermal power can also meet this need.

"If the hundreds of billions of dollars that now flow into a few coffers in a few nations were to flow instead to the millions of people who till the world's fields, most countries would see substantial national security, economic, and environmental benefits," **Senator Richard Lugar** and **former CIA Director R. James Woolsey**, Foreign Affairs, January/February 1999.

"...We have only scratched the surface of developing farm-based sources of renewable energy -- ethanol, biodiesel, biomass, wind, methane, hydrogen. Agriculture is not just about food and fiber. Anything we can produce from a barrel of oil, we can also produce on our farms," **Senator Tom Harkin**, Senate Agriculture Committee, June 28, 2001.

Biopower

Biopower is the production of electricity and heat from biomass. Biopower currently accounts for 7000 megawatts of U.S. electric capacity, accounting for around 85 percent of non-hydroelectric renewable energy generation.[6] Biomass can be combusted directly, or cofired with coal. Gasification is the process of converting biomass into a gaseous fuel, which can improve the efficiency of biopower production, and is compatible with conventional gas-fired turbines and cofiring operations.

Cofiring biomass can displace up to 15 percent of the coal burned, and reduces emissions of sulfur dioxide (SO_2), nitrogen oxides (NOx), lead, and mercury. By displacing a percentage of coal, cofiring also reduces the amount of new carbon dioxide (CO_2), the primary greenhouse gas, released into the atmosphere. Research is also being done to cofire biomass with natural gas. The Department of Energy estimates that 45,000

megawatts of capacity could be brought online by 2020, employing 190,000 people in mainly rural areas.[7] This would also create the infrastructure necessary to bring more dedicated biomass plants online.

Another method of biopower production is the anaerobic digestion of animal manures. Animal wastes, particularly in large-scale livestock operations, are usually stored in "lagoons," which often leak and contaminate groundwater, and release vast amounts of methane, a natural byproduct of decay and a very potent greenhouse gas. Anaerobic digesters are a viable alternative, wherein the manure is stored in an enclosed tank to facilitate its partial digestion by anaerobic bacteria. The methane emitted is captured and burned to produce on-farm heat, and in larger scale operations, electricity that can be sold on the grid. The solid byproducts of anaerobic digestion are ideal for fertilizer or for the production of biobased products.

Biofuels

Biofuels, such as ethanol and biodiesel, can be mixed with petroleum fuels in smaller percentages and used in standard engines, or be used in higher percentages as stand-alone fuels in modified engines. Biofuels currently account for 0.4 percent of the transportation fuels market in the United States.

Ethanol is an alcohol produced from the fermentation of simple sugars. A 1.6 billion gallon market for ethanol currently exists in the United States. The primary feedstock used is corn, and other starch-based crops, thus most current ethanol production is centered in the Midwest. Ethanol is non-toxic, biodegradable, and contains no sulfur. When considered on a full life-cycle basis, which takes into account energy used in growing the feedstock, transportation costs, and emissions when burned, corn-based ethanol reduces greenhouse gas emissions by up to 25 percent compared to gasoline according to the Argonne National Laboratory.[8]

Research is being conducted to bring down the costs of utilizing cellulose, a complex molecule found in the cell walls of all plants, to produce ethanol. This would allow conversion of crop residues, forestry residues, segregated organic municipal wastes, and energy crops into ethanol. According to the Argonne National Laboratory, cellulosic ethanol could achieve over a 100 percent reduction in greenhouse gas (GHG) emissions compared to petroleum, because less energy is needed to produce the feedstock (little or no cultivation and few inputs) and the CO_2 emitted is reabsorbed by plants, making the process a closed carbon cycle. Cellulosic ethanol could be produced throughout the country, creating new revenue streams for farmers just as the starch ethanol market has in the Midwest, while allowing us to lessen our dependence on foreign oil and reduce our greenhouse gas emissions.

Biodiesel is a relatively new biofuel. It can be produced from soybean oil, other oilseeds, or even waste oils (e.g. restaurant frying oil). According to the Department of Energy, biodiesel reduces GHG emissions up to 80 percent on a life-cycle basis. In addition, biodiesel contains no sulfur. Like ethanol, biodiesel production can provide a new revenue stream for farmers while meeting multiple environmental and energy goals.

Biobased products

Just as petroleum revolutionized the lives of Americans in the last century, biomass can do the same in this century. Essentially any product that can be derived from petroleum can also be produced from biomass. This includes chemicals, polymers, adhesives, textiles, packaging materials, and any number of other products. Producing biobased products in conjunction with biofuels and other useful co-products in a "biorefinery" facility, similar in concept to a petroleum refinery, can lower production costs. Biorefineries can be established by farmer-owned cooperatives, creating new revenue streams for farmers, and new jobs for rural communities.

Wind

Technological advances have brought the cost of wind power down by 85 percent over the last 20 years,[9] with modern wind plants generating electricity at a cost of to 3-6¢ per kilowatt-hour (kWh). Farmers can reap great economic benefit from developing these renewable resources. By leasing land to a wind developer, a farmer can earn on average $2000-3000 a year per wind turbine, with little or no land being taken out of production. Rural communities benefit from increased tax revenues, as well as the creation of new construction and maintenance jobs.

Across the country, farmers have welcomed wind development because of the steady revenue it can provide. Wind developers near Clear Lake and Storm Lake, Iowa pay rent to 115 landowners to site their wind turbines. They pay around $2000 per turbine, which require about ¼ acre of land each (the average Iowa corn yield for ¼ acre would sell for around $72), for a total of $640,000 per year. The wind projects also generate $2 million per year in tax revenue to the counties, and have created 40 new jobs.[10]

Policy Recommendations

Many opportunities exist for integrating renewable energy development into the Farm Bill. But for farmers to utilize their renewable resources, they must first know what those resources are, their extent, and economic value. Partnerships should be formed with state and local governments and universities to do regional **Renewable Resource Assessments**. Farmers must be provided education and technical assistance, given access to the local electrical grids, and be provided with the initial support needed to get these ventures off the ground. Research and development must go forward to bring down costs, and discover new innovative and economical ways to produce energy and products from agricultural commodities and waste streams. At the same time, there must be ongoing market development work done for these products.

The Environmental and Energy Study Institute (EESI) is encouraged by support in Congress for the inclusion of an Energy Title in the new Farm Bill. However, EESI also believes it is important to integrate renewable energy development initiatives throughout the Farm Bill. Many of our recommendations suggest amendments to existing Farm Bill programs, as well as related appropriations and tax legislation. We have also proposed new programs that would fit well into a new Energy Title, one or more existing titles, or as stand-alone legislation. For the purposes of this paper we have assumed the new Farm Bill will follow a structural format similar to the 1996 Farm Bill.

CONSERVATION TITLE PROGRAMS

Conservation Reserve Program - CRP is the largest of the Farm Bill conservation programs, with a current enrollment cap of 36.4 million acres (equivalent in size to the state of Iowa). Its mission is to preserve land vital for soil conservation, water quality protection, and wildlife habitat. EESI recommends adding renewable energy production to those goals.

Recommendations:

- Permit the growing of biomass crops, and the harvesting of biomass, for the production of biopower, biofuels, and biobased products, on CRP lands with an appropriate reduction in rental payments[*]. The rental reduction should not be so high as to cancel any incentive for a farmer to undertake a biomass project.

- Allow wind turbines to be sited on CRP lands, where ecologically and economically appropriate.

- Restrict allowable energy crops to vegetation that can be grown with few or no inputs and minimum tillage. As a requirement for approval, wind energy and biomass development projects on CRP lands should be compatible with, and

[*] The House Farm Bill (H.R. 2646), passed by the Agriculture Committee, we recommend replacing the term "energy production" with "the production of biopower, biofuels, and biobased products."

when possible enhance, the soil conservation, water quality, and wildlife habitat goals of the CRP program. For example, energy crops could be planted to serve as buffer strips to prevent soil erosion and fertilizer runoff. In addition, the harvesting of biomass should be timed so as not to interfere with the natural nesting and migration cycles of wildlife.

Natural Resource Conservation Service – NRCS manages most of USDA's conservation programs, and provides farmers with technical assistance to better manage their natural resources.

Recommendations:

- Give a higher priority in awarding Environmental Quality Incentives Program (EQIP) contracts to producers who propose to convert animal waste operations over to anaerobic digestion systems for the capture and burning of biogas to produce heat and electricity.

- Provide technical assistance within EQIP and other NRCS programs to farmers and farmer-owned cooperatives that wish to implement wind and biomass energy development projects.

CREDIT AND RURAL DEVELOPMENT TITLE PROGRAMS

Rural Business-Cooperative Service – RBS provides financial and technical assistance to establish and sustain agricultural cooperatives.

Recommendations:

- The mission of RBS should explicitly state that farmer-owned cooperatives are a crucial component of renewable energy development.

- Provide grants and loan guarantees to establish cooperatives or expand existing cooperatives to undertake wind, biopower, biofuel, and bioproduct development projects. Give priority funding to proposals that aim to produce several marketable products in the same integrated facility, such as a biorefinery.

Commodity Credit Corporation Bioenergy Program – CCC is the financing organization for USDA's commodity programs and several conservation programs. The Bioenergy Program provides partial compensation to producers of ethanol and biodiesel for the purchase of commodities to expand existing production (cellulosic energy crops are considered eligible commodities).

Recommendations:

- Expand the Bioenergy Program to compensate the Rural Electric Cooperatives, and other energy producers, for purchasing agricultural biomass for the production of electricity, including coal cofiring operations.

- In granting payments, give priority to farmer-owned cooperatives and small biofuel producers.

Rural Utilities Service – RUS provides grants, loans, and technical assistance to rural electric and water utilities. The following recommendations will likely entail amending the Rural Electrification Act of 1936.

Recommendations:

- **Net Metering:** Rural Electric Cooperatives (RECs) should provide net metering services to their customers (potential small residential generators) to encourage the production and use of renewable energy sources for on-farm use by their members. In essence, net metering allows the electric meter to run backwards as electricity produced by the customer is fed back into the system. In this way, customers already connected to the co-op's distribution lines can feed into the co-op's system any excess power they may generate – thereby customers pay for the net amount of power they consume. Customers should receive a fair price on power they contribute to the system. Over 40 states have already passed various versions of net metering legislation, and bills have been introduced in the House and Senate regarding net metering. Because RECs serve so much of rural America, this is an important way in which RECs can benefit their members and improve the reliability and capacity of their systems.

- **Standardized Interconnection:** Rural Electric Co-ops should provide interconnection to their distribution systems at a fair and non-discriminatory price for their member/customers who want to generate power from renewable energy sources for their own "on farm" use but also be able to sell excess power back to the co-op. Such renewable resources would include solar, wind, and anaerobic digestion systems. Some states have enacted their own legislation, and bills have been introduced in the Senate (e.g., S. 933), but if farmers are going to be allowed/encouraged to develop their "on farm" renewable energy resources, then it is important that RECs provide this service to their members. Too many times utilities (of all kinds) have thwarted development of "on site" renewable energy by not allowing interconnection or by charging exorbitant fees.[*]

[*] The National Rural Electric Cooperative Association (NRECA) is working with the RECs in the development of an Application Guide for Distributed Generation/Interconnection, representing a co-ops guide to implementing the Institute of Electrical and Electronics Engineers P1547, Standard for Distributed Resources Interconnected with Electric Power Systems (IEEE P1547), which should be published as the national standard at the end of 2001. RUS and NRECA were on the IEEE P1547 drafting committee].

- **Transmission:** Facilitate financing for RECs to improve the carrying capacity, reduce line loss and increase the overall efficiency of their existing transmission/distribution networks. In many places, a major barrier to the large-scale development of rural renewable energy resources (especially wind and biomass) is the lack of transmission capacity. Development of rural renewable energy resources is critical to U.S. energy supply, greenhouse gas mitigation, air and water protection and increased farm income and rural economic development. Therefore, it is critical that lack of transmission capacity in the grids owned by RECs not be the downfall of renewable energy development.

- Provide loan guarantees or other appropriate financing assistance for on-farm renewable energy systems, including wind turbines, solar panels and anaerobic digestion systems.

- Encourage existing **Rural Electric Cooperatives** to develop and utilize the renewable energy resources that can be produced by their members (e.g., wind, biomass (power/fuels), anaerobic digestion, solar) and encourage the development of new co-ops for this purpose. This enables them to provide value-added income to their members and keeps important energy dollars circulating locally, creating jobs and other local rural economic development benefits.

RESEARCH AND EXTENSION TITLE PROGRAMS

Biomass Research and Development Initiative –
A multi-agency effort to coordinate and accelerate all Federal biobased products and bioenergy research and development, as outlined in the Biomass Research and Development Act of 2000 and Executive Order 13134.

Recommendations:

- Fully fund the Biomass Research and Development initiative at its authorized level of $49 million a year, as authorized in the Biomass Research and Development Act.

- Extend the initiative from 2005 to 2010, conducting a review in 2005 to determine which areas of research have proved the most promising.

- Give priority funding in awarding competitive research grants to projects for the commercialization of cellulosic ethanol and the development of energy crops.

National Agricultural Research, Extension, and Teaching Policy Act of 1997 -

Recommendation – Amend the **Supplemental and Alternative Crops Program** to include the development of energy crops, for the purpose of producing

biopower, biofuels, and biobased products. This should include energy crops that can be grown on marginal and highly erodible land, as well as crops that can be grown on cultivated land to replace commodities that are declining in demand (e.g. tobacco).

Agricultural Research Service – ARS is USDA's primary scientific research agency. The **Bioenergy and Energy Alternatives** program does research in the areas of ethanol, biodiesel, energy alternatives for rural practices, and energy crops.

Recommendation - Increase funding within the Bioenergy and Energy Alternatives program for the development of biofuels and energy crops.

Land-Grant Universities - The Land-Grant Universities are public institutions established by the Morrill Act of 1862. Funds to initially establish the institutions were obtained from the sale of federal land that was granted to the states for that purpose. Later, the Hatch Act of 1887 formed the state Agricultural Experiment Stations and the Smith Leaver Act of 1914 formed the state Cooperative Extension Service, both attached to land-grant institutions.

Recommendations:

- Expand the mission of the **Cooperative State Research, Education, and Extension Service** (CSREES) to promote the development of renewable energy resources on America's farmland.

- Provide funding to CSREES to provide education and technical assistance to farmers and farmer-owned co-ops for the development and marketing of renewable energy resources, including biomass, wind, solar, and geothermal. The CSREES should also conduct outreach to the general public on the societal benefits of developing these resources.

  The proposed **Sun Grant Initiative** would create a network of regional centers at the Land Grant Universities to coordinate and fund research and outreach for the development of biopower, biofuels, and biobased products.

- Stipulate that the CSREES should work in close collaboration with the Regional Biomass Programs, sponsored by the Department of Energy. Together, the organizations should provide assistance to farmers for growing, handling, and processing energy crops and waste streams for the production of biopower, biofuels, and biobased products. Where possible, the two organizations should share resources, staff, and expertise.

NEW PROGRAMS

Renewable Resource Assessment - Provide grants within the Fund for Rural America or other programs to state and local governments, universities, or the CSREES to do renewable resource assessments on agricultural lands. Farmers, cooperatives, and economic development agencies cannot develop their renewable energy resources without first identifying the kind, extent, and economic value of those resources. Using national assessment data conducted by the National Labs as a guide, state and local governments can inventory their regional renewable energy resources. These should include wind, solar, geothermal, and biomass, including waste streams. The information should be available to the public. Funding should also be provided to do the necessary environmental assessment before developing an identified resource.

Renewable Portfolio Standard – Establish a national Renewable Portfolio Standard that will require 20 percent of power generated in the United States by the year 2020 to be derived from non-hydro renewable energy sources. This ensures a market for renewable power, critical to the development and use of renewable energy across the country and on America's farms.

Renewable Fuels Standard – Establish a national Renewable Fuels Standard that would require an increasing percentage of transportation fuel sold in the United States to be renewable biofuels, such as ethanol and biodiesel. The RFS should contain a credit trading system to allow refiners, blenders, and retailers to buy and sell credits from each other to meet their content goals. The RFS should also contain an incentive to expand the production of cellulosic ethanol.

Carbon Sequestration Pilot Projects – Atmospheric carbon can be sequestered in the soil and plant biomass. Carbon sequestration can play a role in helping mitigate global climate change. However, presently technologies for measuring and monitoring carbon storage in soils and plant biomass are in their infancy. EESI recommends that the USDA conduct a series of carbon sequestration pilot projects throughout the country, with the goal of better quantifying the level of carbon stored, the degree to which variability, saturation, and permanence play a role in sequestration. These projects should work with private farmers and foresters to determine which practices and technologies have the greatest potential, and should examine both the planting of crops and trees and agricultural practices such as no-till agriculture. The Forest Service should continue its work in this area, and provide technical assistance and expertise to private foresters.

Bioenergy and Wind Production Tax Credit – EESI recommends extending and expanding the **Bioenergy Production Tax Credit** and the **Wind Production Tax Credit**. Both the Biomass and Wind production tax credits expire at the end of 2001. The Biomass credit has never been used because of its limitation to "closed-loop" biomass. We also recommend the credit be expanded to include cofiring with biomass, as well as the burning of methane from anaerobic digestion systems. In the case of cofiring, any credit should be applied only to the biomass content. Such a proposal to expand the

tax credit had been introduced in the Senate, and was also part of the Administration's budget request.

We also recommend making the Biomass and Wind Production Tax Credits tradable, so that tax-exempt organizations such as public power and tribal governments can benefit from the credits. Alternatively, the appropriation for the **Renewable Energy Production Incentive** (REPI) program, which provides funding to public power to undertake renewable energy projects, should be substantially increased and the program should be expanded to include tribal governments. The REPI program is currently extremely oversubscribed.

EESI also recommends creating production tax credits for geothermal and solar generation as well. These incentives help level the playing field to make renewable energy projects cost competitive with established energy technologies.

Ethanol Small Producer Tax Credit – EESI recommends expanding this credit to include farmer-owned cooperatives. We also recommend allowing all producers with annual production capacity up to 60 million gallons to qualify (currently the limit is 30 million gallons).

Establish Federal Purchasing Programs – Executive Order 13134 and the Agricultural Risk Protection Act of 2000 set the goal of tripling the use of biofuels and biobased products in the United States by 2010. We recommend establishing a purchasing requirement for all federal government agencies and contractors that sets increasing percentages for purchase of biofuels and biobased products consistent with the above goals. We also recommend a federal Renewable Portfolio Standard requiring agencies to purchase no less than 10 percent non-hydro renewable power by 2010, and 15 percent by 2015.

Equipment Testing for Biofuels – Many gasoline and diesel engine manufacturers will not certify their engines to run on higher blends of ethanol and biodiesel. USDA and the Environmental Protection Agency should provide research grants to test biofuels in higher concentrations in farm equipment, construction equipment, diesel generators, and other applications. USDA should work in collaboration with equipment manufacturers to certify their engines to run on biofuels, and promote their use to consumers. America's farmers use a great amount of gasoline and diesel fuels, but in most cases are unable to use farmer-produced biofuels in their own equipment.

Glossary of Terms

ARS –
The Agricultural Research Service is USDA's primary scientific research agency.

Biofuels –
Biomass derived liquid fuels such as ethanol and biodiesel.

Biomass –
Any organic matter available on a renewable basis, including agricultural crops and residues, forestry products and wastes, and segregated organic municipal wastes.

Biorefinery -
A facility in which biofuels are produced in conjunction with biobased products and other marketable co-products, thereby taking advantage of the synergies an integrated system offers.

Biopower –
The production of power from biomass in the form of electricity and heat.

Carbon Sequestration –
The capture and storage of atmospheric carbon in plant biomass and soil.

CSREES –
The Cooperative State Research, Education and Extension Service provides education and technical assistance to farmers through the land-grant universities.

Cofiring –
The combustion of biomass in coal generators to produce power, and displace a percentage of the coal used.

CRP –
The Conservation Reserve Program's mission is to preserve land vital for soil conservation, water quality protection, and wildlife habitat. CRP is the largest of the USDA's conservation programs, with a current enrollment cap of 36.4 million acres.

CCC –
The Commodity Credit Corporation provides financing for USDA's commodity programs and several conservation programs.

EESI –
Environmental and Energy Study Institute

EQIP –
The Environmental Quality Incentives Program provides assistance to crop and livestock producers to make environmental and conservation improvements on the farm.

Gasification –
The process of converting biomass into a gaseous fuel.

Net Metering –
Allows the electric meter to run backwards as electricity produced by the customer (e.g., power from solar panels) is fed back into the electrical grid.

NRCS –
The Natural Resource Conservation Service is the USDA agency responsible for the administration of most of the Department's conservation programs.

RUS –

The Rural Utilities Service provides grants, loans, and technical assistance to rural electric and water utilities.

Standardized Interconnection –

Established rule for the interconnection of a small renewable/distributed generation system to the local distribution network at a fair and non-discriminatory price.

References

[1] U.S Census data

[2]USDA Economic Research Service estimate (1997)

[3] International Energy Agency estimate

[4]"A Climate and Environmental Strategy for U.S. Agriculture," Paul Faeth and Suzie Greenhalgh, World Resources Institute, November 2000. Estimates derived from U.S EPA's inventory (2000).

[5] Wolfram Schlenker, Anthony Fisher and Michael Hanemann, "Will U.S. Agriculture Really Benefit from Global Warming? - The Importance of the Weighting Procedure in a Cross-Sectional Estimation" University of California-Berkeley, presented for the American Agricultural Economics Association annual meeting, August 2001.

[6] DOE Office of Energy Efficiency and Renewable Energy

[7] DOE Office of Energy Efficiency and Renewable Energy

[8] "Effects of Fuel Ethanol Use on Fuel-Cycle Energy and Greenhouse Gas Emissions," M. Wang, C. Saricks, and D. Santini, Argonne National Laboratory, January 1999. Cited estimates apply to a blend of 95 percent ethanol, 5 percent gasoline.

[9] DOE estimate

[10] American Wind Energy Association, www.iowawind.org