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Policy Report

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The 2007 Farm Bill: Policy Recommendations for Integrated Renewable Energy Production

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Introduction

Developing agriculture-based renewable energy, including bioenergy, geothermal, wind, small scale hydro and solar, has the potential to respond to security, climate change and economic development which will boost farmer income, create jobs in rural communities, diversify the nation's energy markets, and protect the environment. 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, while bridging the divide between 'renewable energy rich' rural America and our 'energy hungry' urban communities.

The reauthorization and expansion of energy provisions in the upcoming 2007 Farm Bill is vital for renewable energy to meet its potential. The existing Farm Bill energy provisions represent just the tip of the iceberg of integrating energy into agriculture policy. We need to utilize the reauthorization process to take the Farm Bill from the initial conception of including a few energy programs to one where renewable energy and energy efficiency are broadly incorporated into the core approach – that agriculture policy is, in part, energy policy. Pressures from the WTO to reduce subsidies, an increasingly large budget deficit and international instability will all have implications on the reauthorization of the Farm Bill.

The current challenge is to ensure that clean and sustainable renewable energy, specifically from biomass, becomes an integral part of agriculture policy. The increased production and consumption of biofuels, biobased products and biopower may cause or be the trigger for significant change in US agriculture policy. A strong domestic market for biomass may help reduce trade pressures from US commodities on the international market. This in turn may help increase international prices for farmers worldwide. Rural communities which produce biomass for energy and products may be revitalized through fair market prices for their crops and through ownership of biorefineries. Furthermore, US farm and energy policy needs to advance every opportunity in renewable energy to be a significant international player by researching, demonstrating, deploying and commercializing technologies in the United States. Infrastructure and facility development paired with manufacturing production of renewable energy systems could develop and maintain jobs in our country.

The 2007 farm bill needs to include a variety of policies that address the bottlenecks and barriers that still exist for the expansion of renewable energy in our rural communities. Policies must undertake and incentivize educating the public, research, rural economic development through local ownership, feedstock production, biorefinery development, increased market development and use of biobased products.

Background

In 2001, at the request of Senate committee staff, EESI published its white paper, *The 2002 Farm Bill: Revitalizing the Farm Economy Through Renewable Energy Development*, because of EESI's concern that the 2002 farm bill needed to address the opportunities of farm-produced renewable energy. The *Farm Security and Rural Development Act of 2002* (P.L. 107-171), signed into law May 2002, was the first farm bill to contain an energy title and include significant incentives for renewable energy, biomass production and use.

The tenuous relationship between our rural communities and energy production not only was tied together but codified in this bill. Energy production was taken to a new level of importance for rural small businesses and farmers. With several key programs included in the 2002 bill, farmers and small businesses began to see energy production and efficiency as a way to reduce costs and enter into new markets. The three key energy initiatives that the farm bill encouraged were electric and thermal power production from renewable energy including biopower, solar, and wind; products made from organic materials or biobased products; and liquid transportation fuels or biofuels.

The energy title encouraged federal procurement of biobased products, provided grants and loans for renewable energy projects, and funded vital research and development in bioenergy. Since the 2002 Farm Bill, only the Healthy Forests Restoration Act of 2003 (P.L. 108-148) and the American Jobs Creation Act of 2004 (P.L. 108-357) had made any changes to bioenergy policy until Congress finally passed the Energy Policy Act of 2005 (EPAct '05, P.L. 109-58), which has significant provisions to boost biomass and renewable energy production and consumption. There are a host of biomass-related provisions authorized in EPAct '05, most notably the Renewable Fuel Standard (RFS), which will more than double the current market for biofuels. The RFS requires that 7.5 billion gallons of biofuels (including ethanol and biodiesel) be utilized by 2012. Moreover, one gallon of cellulosic ethanol or waste-derived ethanol will be counted as 2.5

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gallons. After 2012, the 2.5-to-one ratio no longer applies; instead the RFS at that point will annually require a minimum of 250 million gallons of cellulosic biomass fuels. This standard created significant demand for renewable fuels and many experts believe that the RFS will be increased to spur the demand for advanced biofuels, like cellulosic ethanol, biobutanol, and other renewable fuels.

Other significant provisions enacted by EAct '05 include the Renewable Energy Production Tax Credit and the Clean Renewable Energy Bonds (for public power), which are vital to obtaining project financing for the renewable energy industry. In addition, Senators Lugar (R-IN) and Harkin (D-IA), worked to include significant biofuels, biobased products and biopower provisions in EAct '05, thereby providing legislation for research and market development programs which may give biomass and other renewable energy projects a step-up in the growing energy market. There are specific provisions authorizing funding to spur development of cellulosic biofuels facilities and integrated biorefineries, including the **Integrated Biorefinery Demonstration Projects (Sec. 932(d))** and the **Department of Energy (DOE) Loan Guarantee Program**. These programs sketch a clear path for farmers, co-ops, researchers, and investors to shift into biomass technologies, including cellulosic ethanol. Authorizing these programs was just the first step, without continued appropriations and thoughtful implementation of these programs the industry may be slowed down. In 2007 DOE announced six grants for up to \$385 million for cellulosic ethanol facilities under the Integrated Biorefinery Demonstration program. Although this is an important move in commercializing these technologies, several companies still need a loan guarantee from DOE before they can complete their financing and start their projects. Unfortunately, implementation of the loan guarantee program continues to move forward slowly and has been laden with missteps.

With hurricanes, skyrocketing and volatile oil and natural gas prices, national security, and climate concerns, the atmosphere in the last few years has turned out to be ripe for biomass-related legislation to finally garner much broader attention and support. Members of Congress have introduced over 130 bills with new programs and incentives to encourage biomass-to-energy and other renewable energy technologies since the beginning of the 110th Congress.¹ Although these programs are very important, we have seen in the past that **appropriations and implementation of existing programs that are already authorized** do not receive this same attention and support. Barriers to technology commercialization do not lie in the lack of programs to help incentivize these technologies, but in the lack of funds to implement and support existing programs for research, demonstration, capital investment and sustainable market development. Many renewable energy programs authorized in the Farm Bill and in EAct '05 have never received funding or have had funding significantly cut year after year. The President's budget has drastically slashed Sections 9006, 6401 and 9008 almost every year since the passage of the 2002 farm bill; only through Congressional leadership has funding been restored to these programs every year. Because of the disconnect between new authorizations and the low level of appropriations for existing programs, many of EESI's recommendations will be built around the reauthorization and expansion of existing programs.

US Agriculture Department Authorized Energy Programs

Program Name (Section Number)	Authorization over the life of the authorizing bills	Rec'd Funds
Federal Procurement of Biobased Products (Sec. 9002 of 2002 Farm Bill) Requires Federal agencies to purchase biobased products. Funding will be used for testing and certifying biobased products.	FY02-07, \$1 mil/yr	Funded
Biorefinery Development Grants (Sec. 9003 of 2002 Farm Bill) – Creates a grant program to help establish facilities for the conversion of biomass into electricity, fuels, chemicals, and other marketable products.	Such sums as are necessary FY02-07	Never Funded
Biodiesel Fuel Education Program (Sec. 9004 of 2002 Farm Bill) A grant program to educate the public and private fleet managers about the benefits of biodiesel.	\$1 mil/yr FY03-07	Funded
Energy Audit and Renewable Energy Development Program (Sec. 9005 of 2002 Farm Bill) Establishes a cost-share grant program to help farmers identify and assess their renewable energy resources, and energy efficiency improvement potential.	Such sums as are necessary FY02-07	Never Funded

¹ Sissine, Fred. "Energy Efficiency and Renewable Energy Legislation in the 110th Congress." CRS. Paper prepared for CRS Report for Congress. Updated March 30, 2007.

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Renewable Energy System & Energy Efficiency Improvements (Sec. 9006 of 2002 Farm Bill) Establishes a grant and loan program to assist farmers in purchasing renewable energy systems and making energy efficiency improvements	\$23 mil/yr FY03-07 & \$3 mil FY07 (Deficit Reduction Act of '05)	Funded
Hydrogen and Fuel Cell Technologies (Sec. 9007 of 2002 Farm Bill) Creates a memorandum of understanding under which the Secretaries of Agriculture and Energy shall cooperate in the application of hydrogen and fuel cell technology programs for rural communities and agricultural producers.	No authorization	Never Funded
Biomass Research and Development Act of 2000 (Sec. 9008 of 2002 Farm Bill and EPAct '05 Sec. 941) Reauthorizes and funds the Biomass Research and Development	Up to \$214 mil/yr FY06-15)	Under Funded
Cooperative Research and Extension Projects 'Carbon Sequestration Research' (Sec. 9009 of 2002 Farm Bill) Funds research into the potential for storing atmospheric carbon in soils and plants.	Such Sums as Necessary FY02-07	Never Funded
Commodity Credit Corporation Bioenergy Program (Sec. 9010 of 2002 Farm Bill) Continues program to reimburse ethanol and biodiesel producers for the purchase of commodities to expand existing production.	Up to \$150 mil/yr for FY03-06	Funded
'Sun Grant Centers' (Sec. 9011 of 2002 Farm Bill, as amended by P.L.108-199) Research, extension, and educational programs on biobased energy technologies and products.	FY07-10, \$75 mil/yr	Under Funded
Value-Added Product Market Development Grants (Sec. 6401 of 2002 Farm Bill) An existing program amended to allow renewable energy systems to qualify for grants.	FY02-06, \$40 mil/yr	Under Funded
Rural Industrialization Assistance in Consolidated Farm and Rural Development Act (Sec. 6013 of 2002 Farm Bill) Amended the program to allow loans and loan guarantees for wind systems and methane digesters.	No Authorization	Under Funded
Conservation Reserve Program (Sec. 2101 of 2002 Farm Bill) Amended to allow wind turbines and biomass harvesting on CRP lands where consistent with soil, water, and wildlife habitat goals of the CRP program.	Mandatory Funding	Funded
Environmental Quality Incentives Program (Sec. 2301 of 2002 Farm Bill) Amended to allow methane digesters.	Mandatory Funding	Funded
Procurement of Biobased Products (Sec. 943 of EPAct '05) The Architect of the Capitol, the Sergeant at Arms of the Senate, and the Chief Administrative Officer of the House are to establish procedures to comply with Section 9002 of the 2002 Farm bill to procure biobased products for the Capitol Complex.	No Authorization	Never Funded
Small Business Bioproduct Marketing and Certification Grants (Sec. 944 of EPAct '05) Creates competitive grants for marketing and for the certification of biobased products to qualify for the label described in Section 9002 of the 2002 Farm bill.	FY 2006, \$1 million Such sums as are necessary FY 07-15.	Never Funded
Regional Bioeconomy Development Grants (Sec. 945 of EPAct '05) Competitive grants to support and promote growth and development of a bioeconomy within a region will be made available for work pertaining to coordination, education, and outreach.	FY 2006 \$1 million Such sums as are necessary FY07-15	Never Funded
Preprocessing and Harvesting Demonstration Grants (Sec. 946 of EPAct '05) Competitive grants up to five per year for the purpose of demonstrating cost-effective, cellulosic biomass innovations will be made available to agricultural producers. Biomass material harvested must be used to produce ethanol or for another energy purpose, such as the generation of heat or electricity.	FY06-10, \$5 mil/yr	Never Funded
Education and Outreach (Sec. 947 of EPAct '05) A program of education and outreach on biobased fuels and biobased products shall be established within the USDA or through a designated contracting entity.	FY06-10, \$1 mil/yr	Never Funded

Challenges

After years of stagnant agriculture policy, energy production is providing a great opportunity to change the face of this industry across the country. The inclusion of renewable energy as a new ‘crop’ or revenue stream in our agriculture sector could not have come at a better time. Significant budget constraints, pressures to encourage free trade, climate protection and calls to reduce our imports of foreign oil prove to be huge challenges to overcome – but agriculture and renewable energy policy could turn challenges into opportunities.

One of the largest challenges that Congress faces in the reauthorization of the farm bill is the tight budget that has been shrinking for the last several years. In 2002, Congress had a surplus of funds to create new programs for rural development, conservation and energy. In 2007, the pressure to cut and/or combine programs and reduce authorizations will be enormous. No doubt there may be programs that need to be done away with or streamlined for usability. Shaping programs so that they can provide secure renewable energy for our nation, jobs for our rural communities and carbon reductions to mitigate climate change needs to be a part of the strategy of reauthorization.

Moreover, international trade and the possibility of the US being taken to the WTO over several commodity programs have brought a new eye to agriculture policy. Encouraging the growth of sustainable biomass feedstocks across our country will diversify our agriculture portfolio, reducing our reliance on a set number of crops for economic stability. Biomass for local and domestic production, with the right market development and incentives, can be a way to reduce the US pressure on international markets and possibly increase the worldwide price of agricultural products. By developing a number of new crops and markets, US agriculture policy could reduce WTO challengeable federal subsidies while restoring federal coffers.

Some of the major issues that will influence bioenergy policy deal with some fundamental agriculture issues, including competition for land, natural resource protection and competition for funds. The competition for land is a complicated issue that stems from the perceived differences between growing crops for food, feed, fiber and now fuel (including thermal, liquid, and/or electricity). Unquestionably, the production of bioenergy needs to be done in a way which enhances natural resources, including soils, water supply and native habitats. Adding renewable energy feedstocks and production should not be deemed to be in competition with the goals of sustainable agriculture. In fact, the opportunity for renewable energy production to aid conservation efforts and environmental sustainability are much greater than compared with conventional agriculture and fossil fuel production and consumption and may bring more attention, funds and political support to essential conservation programs.

Nevertheless, to overcome these challenges through good integrated policy, a transition must occur. The 2007 Farm Bill should be a time to shift to conservation, energy production, food security and fair prices for our farmers and foresters. Current agriculture programs should be reassessed for their ability to meet the needs of farmers, foresters, small rural business and our country – not the needs of multinational corporations, who have been the major benefactors of US agriculture policy in the past. Commodity program changes and competition law reform (not included in this paper) should be considered and initial steps should be taken to prepare for change, if not in the 2007 farm bill then in the next farm bill. Indeed, this is essential to the ability of renewable energy to contribute to rural economic growth and environmental sustainability as competition in this industry grows.

Policy Recommendations

The success of the energy title in the last farm bill has brought more attention to energy for the 2007 farm bill. Even with this success the renewable energy potential of our rural communities has barely been tapped. Continued research, demonstration, deployment and, most importantly, commercialization of new technologies must continue to be encouraged. Transitioning to a diversified agriculture portfolio which includes renewable energy will take a comprehensive approach. The integration of energy efficiency and energy production should be a part of all farm practices and hence a part of several existing programs that influence those practices.

As policymakers put together their agriculture packages it is important to remember that there are several different ways to encourage renewable energy and that programs in the Farm Bill represent some of these ways. The renewable energy industry has seen success from a combination of policy tools including tax credits, grants and loans, and regulatory standards. To see continued growth in renewable energy from our rural communities it is important to develop a system of agriculture incentives that complement incentives being created by other Congressional committees with more direct

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jurisdiction over energy programs. It is EESI's belief that all of these tools are important in the commercialization of biomass-to-energy technologies, but it is important to prioritize the programs that can be authorized in the farm bill because of the tight budget constraints. For this reason, this paper will briefly touch on energy and tax provisions while going more in-depth on the upcoming farm bill.

Accordingly, several recommendations made in this paper will not be able to be included in the next farm bill because of the issues mentioned above. It is the purpose of this paper to identify areas that need further exploration, attention and investment. Because of the significant barriers and rapid changes in our country's energy system, it is our belief that the 2007 farm bill will be a transitional bill preparing farmers, foresters and rural small businesses for a transition to new crops, technologies, and policies to be developed in the 2012 farm bill.

Recommendations: Education and Outreach

To achieve a considerable reduction in our country's oil imports, to reduce greenhouse gas emissions and to catalyze rural economic development, the US has to act as a nation to overcome barriers to acceptance of renewable energy technologies. National efforts to build a railroad system across the country, to win World War II and to go to the moon, were not done with minor investments or without national leadership around these goals. Similar efforts are necessary to move the whole country towards national renewable energy goals thereby changing the way this country uses energy. There is growing recognition that biomass is a critical and exciting piece of the transition away from fossil fuel dependence. However, there still is a tremendous lack information about the real contribution that bioenergy can make. A public education campaign on renewable energy technologies, specifically biomass technologies, is needed.

Recommendations

- Education and Outreach: Nation Wide Consumer Education Program for Biofuels and Biobased Products (Sec. 947(a(2)) of EPAct '05) should be fully funded at \$1 million for FY08-12. This program, which has never been funded, could be a vital catalyst in building a market for biobased products. Consumers need to know that these products exist and the differences between these products and the conventional products that they are replacing.
- Fundamental knowledge in hard sciences and math including, biology, chemistry, physics and calculus should be stressed in all academic programs. Understanding science and gaining technical skills will help our growing workforce transition into this new renewable energy, specifically bioenergy, industry.
- Grants and fellowships for food and agricultural sciences education (Sec. 7102 of the 2002 Farm Bill) should be fully funded and expanded to include energy production. New majors and concentrations in renewable energy should be created. Students need to be encouraged to learn about renewable technologies. Innovation will boom as students learn more about how the science behind these technologies work. Curriculum development for students in K-12, college and graduate schools should be adapted to include renewable energy technologies. Grants should be provided for graduate level financial aid for students working in the bioenergy field.

Recommendations: Research

Tremendous breakthroughs have been made in biomass technologies. The cost of enzymes for cellulosic ethanol has been reduced helping to cut production costs at facilities. These gains move the renewable energy industry closer to becoming a larger player in energy markets every day. But more needs to happen to continue to phase in these important technologies.

Key areas of research include: sustainable production, social and economic impacts of production and technical applications including conversion of materials, harvesting and storage infrastructure.

The overarching program that has helped to break through barriers for biomass technology is the **Biomass Research and Development Act of 2000**, which requires the coordination of federally-funded biomass research. This is facilitated by the "Interagency Biomass R&D Board," which reports to the "Biomass Research and Development Technical Advisory Committee." The Biomass R&D Technical Advisory Committee is required to make recommendations on the strategic direction of research being funded by the U.S. Department of Energy (DOE) and the U.S. Department of Agriculture (USDA). Since the passage of the 2002 farm bill the Biomass Research and Development Act of 2000 has been reauthorized twice. The last and current authorization is in the EPAct '05 – the authorization is up to \$214 mil/yr from FY06-15. The administration's FY08 budget does not fund this program.

Recommendations

- **Sustainable Production:** The ability to produce biomass in a sustainable manner is essential to its success as a renewable resource for energy. Continued research needs to be carried out in four main areas, including: biomass assessments for potential; sustainable production practices; environmental impacts of biomass facility production; and carbon sequestration.
 - Biomass Assessment: A national biomass assessment needs to be funded on a state/regional basis. Specific attention needs to be paid to crop residues, current and potential new energy crops (perennial and annual), and “waste” streams (woody and herbaceous). Assessments should be done on a state-by-state basis, and should take into account the specific soil type, climate, precipitation, and inputs etc. within that state. Furthermore, economic models have to be created and tested to determine/predict feedstock availability and cost. The goal should be to help farmers and foresters know which feedstocks are most appropriate to grow where and with as little inputs as possible. Assessment of Renewable Energy Resources (Sec. 201 of EPAct '05) could be used to carry out these assessments or similar language could be used for a new biomass assessments program.
 - Sustainable Practices: Develop appropriate ways to grow regionally diverse row crops, perennial crops and woody biomass used for energy production in low input and sustainable ways. Identification of diverse crops could be funded through the Thomas Jefferson Initiative for Crop Diversification (Sec. 7625 of the 2002 Farm Bill).
 - Identify Environmental Impacts of Biomass Facilities: A large number of biofuel facilities have developed in the last few years. Although this increase in production is good for displacing liquid petroleum fuels, there are unforeseen trade-offs taking place that need to be addressed. The impact of biomass facilities on air, energy, and water quality and quantity needs to be explored and reduced through efficient technology improvements.
 - Carbon Cycle and Sequestration Research: A series of carbon sequestration pilot projects throughout the country need to be funded with the goal to 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 US Forest Service should continue its work in this area, and provide technical assistance and expertise to private foresters. Carbon Cycle Research (Sec. 7223 of the 2002 Farm Bill) could be used to conduct some of this research through the Consortium for Agriculture Soils Mitigation of Greenhouse Gases (CASMGs), which is a group of nine land-grant universities (Colorado State, Iowa State, Kansas State, Michigan State, Montana State, Nebraska, Ohio State, Purdue and Texas A & M) and Battelle-Pacific Northwest National Laboratory.
- **Social/Economic Impacts/Benefits:** Increased production of biomass for energy has happened extremely fast and needs to be assessed for social and economic sustainability. This industry is changing the face of our rural communities and it is important to shape these changes in the most beneficial manner possible.
 - Identify and Monetize Environmental Benefits of Energy Crop Production: Emission benefits produced by the consumption of biomass for energy has been well-documented, but other environmental benefits may also exist. Exploration of the impact of growing feedstocks for energy and other biobased products needs to be researched and compared to current fossil fuel production.
 - Social Implications/Benefits: Studies should be conducted to determine the effect of renewable energy facilities on local governments, school districts, and infrastructure.
 - Local Economic Impacts: The overall effect of the renewable energy industry needs to be assessed for local communities across the country. (Jobs, taxes, infrastructure development/destruction etc.)
 - Markets/Standards for Biobased Products: Value-added products such as biobased products including Dried Distillers Grains (DDGs) and fibers should be developed for existing and new markets.
- **Technical:** A variety of sciences are needed to develop economically and environmentally sustainable energy. Work and innovation in biology and chemistry have been focused on petroleum and synthetic materials for generations. General scientific research needs to be refocused on organic natural processes. To the extent possible, care should be taken in the development of crops and other technical areas to preempt undesirable consequences.
 - Genomic: New crops need to be identified and enhanced through traditional breeding to increase yields, develop special characteristics for harvesting/storage, and enhance crop traits for extreme weather, drought tolerance and poor soils.
 - Conversion Technologies: A variety of conversion technologies and platforms need to be demonstrated and brought to commercialization. Develop complementary technologies that can be added to existing renewable energy technologies to enhance natural resources and decrease non-renewable energy consumption.

- Harvesting, Transportation and Storage: Identify barriers to these logistical areas, develop innovative solutions and demonstrate economic, environmental and social sustainability. Incentives should encourage an easy and low cost transition to energy crops and bioenergy technologies. Preprocessing and Harvesting Demonstration Grants (Sec. 946 of EPAAct '05), which has never been funded could be used for this research. This program should be amended and reauthorized for \$10 million and expanded to research, not just preprocessing, but other types of logistical issues.
- **General Recommendations:** Our academic and research institutions are the lifeblood of establishing a sustainable bioeconomy in the United States. Research, demonstration and deployment needs to happen in the public domain so our society can reap the benefits. Public institutions need to have a surge of new federal funding to galvanize farmers, foresters and rural communities interests in a renewable energy industry. The benefits of renewable energy technologies, specifically bioenergy, has the ability to revitalize our rural communities only if those communities are working hand-in-hand with public institutions to move these new technologies forward.
 - 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. These institutions should receive funds to research all of the above-mentioned research initiatives and to prepare for the bioeconomy of the future.
 - Sun Grant Initiative (Sec. 9011 of the 2002 Farm Bill²): The Sun Grant Initiative established five regional centers of excellence for research, extension, and educational programs on biobased energy technologies and products. This initiative should be reauthorized to continue their work in regional grant giving and also in overseeing the direction and content of the BioWeb, a tool for researching biofuels, biopower and biobased products. The Sun Grants may also be an option for implementation of biomass assessments.
 - Initiative for Future Agriculture and Food Systems (Sec. 7621 of the 2002 Farm Bill): Created to address emerging issues in agriculture and rural issues, this program could fund research, extension and education grants on the renewable energy technologies.
 - Agriculture Innovation Center Demonstration Program (Sec. 6402 of the 2002 Farm Bill): This program designed to provide technical assistance, scaled production, and business and market development should be reauthorized for \$10 million for FY08-12 for the continuation and/or establishment of 10 regionally diverse and equally funded centers.
 - George Washington Carver Innovation Award for Agriculture Products: A prestigious award should be established to research, develop and commercialize new innovative agriculture products that overcome scientific barriers to national energy and environmental security (e.g. jet fuel production from biomass). The competition should encourage broad participation, by individuals, universities, and large and small businesses. The Secretary of Agriculture should establish parameters and criteria for the annual or bi-annual competition.

Recommendations: Rural Economic Development

As our country continues to lose jobs and our work force continues to age, it is the responsibility of our policymakers to stop this regression. Biomass can help propel the manufacturing economy for the 21st century. Farmers can be at the forefront of a 'employment and energy' 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, while providing jobs to our overall economy.

Over the last several decades major changes in production agriculture and federal policies have created an environment enabling enormous concentration within the agriculture industry. Energy production has the opportunity to break this trend because it can, and must, be vastly different than conventional production of crops. **As the new bioenergy industry develops unique policies need to be adopted to make sure its growth is not just environmentally sustainable but economically beneficial to rural communities.** It has been found that the contribution of farmer-owned ethanol plants to the local community is 56 percent more than an absentee-owned corporate plant.³ Innovative incentives for small

² 7 USCS § 7625, authorized in P.L.108-199 [H.R. 2673], JAN. 23, 2004, CONSOLIDATED APPROPRIATIONS ACT, 2004.

³ Urbanchuk, John M. "Economic Impacts on the Farm Community of Cooperative Ownership of Ethanol Production." LECG LLC. Paper prepared for the National Corn Growers Association September 2006.
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businesses, farmers and foresters to take advantage of the opportunities presented by bioenergy should be a priority of rural development.

Although the US has seen increasing attention and interest from investors paid to biomass, most of this has been related to current technologies (corn-based ethanol and soy-based biodiesel). There is substantial potential to ramp up sustainable production of biomass for energy through new cutting-edge technologies. Companies interested in entering into US markets for biofuels and biobased chemicals are running up against huge financial barriers to implement near-term technologies to produce these products. In fact, we are aware of several companies that have developed their pilot plants and licensed their technology in other countries because the overall environment has been more favorable to them. The United States could very well lose new technologies to other countries, including EU nations, Japan as well as India and China – and be in the circumstance of having to ‘import’ or license those technologies back to the United States. Moreover, incentives to bring these technologies to our rural communities will help make the United States competitive with other countries which are currently sprinting ahead of it in these fast growing biomass industries. This could garner positive benefits for US agriculture and regional sustainable development across the country as well as be very positive for the international agricultural arena.

To fulfill its rural economic development potential, the 2007 Farm Bill needs to provide support for medium and small biorefineries. It must bring together differing interests around common goals and ensure that programs are designed in such a way that the **scale** is appropriate to the environment, the output and the feedstock supply.

Recommendations

- **Capacity Building:** For individuals, communities and small businesses to keep/increase ownership of production and biorefineries, they will need a number of new skills including business development, financial planning, networking, technical training, etc. Rural development programs should spur innovation and entrepreneurship, while developing these skills.
 - USDA should assess training programs, community colleges, land-grant, colleges and universities, and the agricultural extension service for their ability to develop the human capital necessary to meet the challenges and opportunities that renewable energy brings to our rural communities and report their findings back to Congress.
 - Several of the programs below could facilitate capacity building in our rural communities. Some of the following programs could be combined to conserve federal funds and optimize coordination. Programs amended to build human capacity should focus on the strengths and weaknesses of individual states or regions, **modified block grants may be an important tool in funding capacity building programs.**
 - Rural Business Opportunity Grants and Rural Business Enterprise Grants (Sec. 6003 and 6014 of the 2002 Farm Bill, respectively): should be extended and funding should be increased. Renewable energy feasibility studies and business planning for energy-related entities should be eligible for these programs.
 - Grants to Train farm workers in new technologies and to train farm workers in specialized skills necessary for higher value crops (Sec. 6025 of the Farm Bill) could be renamed ‘New Business and Technology Training’ and should enable renewable energy production.
 - Rural Cooperative Development Grants (Sec. 6015 of the Farm Bill), which was created to facilitate the creation of jobs in rural areas through value-add processing and rural businesses should be extended and amended to allow for energy technical training and management skills for energy businesses. This program should be reauthorized.
 - Rural Strategic Investment Program (Sec. 6030 of the Farm Bill) should be reauthorized to include feasibility studies for renewable energy production in ‘planning grants’, including increased human capacity for the growing energy industry. Regional planning boards should consider renewable energy resources (quantity and quality) and infrastructure during the planning process (In fact, regional planning boards should ensure that their investments are viewed through a “greenhouse lens”). The program’s ‘innovative grants’ should make eligible retrofits for local and state government facilities for renewable energy and energy efficiency systems and for infrastructure improvements to facilitate economic development (e.g. roads, rail, transmission, meters and pumps for renewable energy).
 - National Biomass Initiative, formerly the Biomass Regional Energy Programs: This public-private partnership program must be reauthorized and funding increased to support networking, information dissemination, applied practice of research and policy implementation. It should provide assistance to farmers for growing, handling, and processing energy crops and waste streams for the production of biopower, biofuels, and biobased products. Partnerships among the states and with the private sector can speed the movement of new biomass technologies

to the marketplace and replicate innovative best practices from state to state. States are instrumental in effectively testing and moving new ideas from research to implementation. By helping remove barriers to commercialization, these strategic bioenergy partnerships can address energy needs and spur economic development, particularly in rural areas. Furthermore, the National Biomass Initiative could work with the Sun Grant Initiative to bring more of the research found on the BioWeb to farmers and foresters looking to implement and invest in new technologies, grow new crops and connect to other parts of the country working on similar issues. The initiative could also provide reliable information to the latter's BioWeb and provide access to other projects that are testing new technologies etc. Contact information for farmers, researchers and other resources could be kept up to date for each region of the initiative. This program was originally authorized as a DOE program in 1983, but should be reauthorized as a USDA program for \$7.5 million annually for FY08-12.

- **Ownership:** Current agriculture policy has encouraged large scale production while providing few incentives to small farmers and foresters. Furthermore, the current energy industry is dominated by a select few that has already expressed interest in funding, owning and operating huge biorefineries. The opportunity exists for our farmers and foresters to play a larger role in owning facilities, allowing their local communities to receive the benefits of a higher value product further down the production chain. Until the energy field is leveled through monetizing the externalities of fossil fuels and cutting tax breaks to conventional technologies, small farmers investing in renewable energy technologies will need additional incentives to compete against these large energy companies.
 - Rural Empowerment Zone and Enterprise Community Program (26 USC1391): This program should be encouraged to incorporate energy planning into their strategic development initiatives. They should also help coordinate the development of biorefineries consistent with local feedstocks, ownership and employment.
 - Grants for Youth Organizations (Sec. 7630 of 2002 Farm Bill) should be reauthorized for \$8 million per year for FY08-12 and amended so priority is given to organizations that focus on renewable energy education, initiatives or research projects.
 - Renewable Energy Systems and Energy Efficient Improvements (Sec. 9006 of the 2002 Farm Bill): This program was originally authorized at \$23 million per year for FY03-07 in grants, loans, and loan guarantees to farmers, ranchers, and rural small businesses for the development of renewable energy projects and energy efficiency improvements. In the Deficit Reduction Act of 2005 the authorization was cut to \$3 million for FY07.
 - Authorization should be at least \$50 million per year for FY08-12
 - Specific language should be added for the implementation of direct loans
 - Specific language should be added to cap the amount of funding that can be used for loan guarantees
 - Priority should be given to applicants that have the lowest carbon emissions, use the most energy efficient technologies and reduce water needs
 - The maximum amount of each grant for renewable energy systems should be increased to \$1 million
 - Grants under this program should be increased from 25 percent to 50 percent of the projects costs and combined grants and loans should not be more than 65 percent of the project costs
 - A monitoring component should be added to ensure implementation of projects
 - Energy Audit and Renewable Energy Development Program (Sec. 9005 of 2002 Farm Bill) Establishes a cost-share grant program to help farmers identify and assess their renewable energy resources, and energy efficiency improvement potential. This should be rolled into Sec. 9006, which should then have an added authorization of \$5 million per year for this function for FY08-12.
 - Value-added Producer Grant Program (Sec. 6401 of 2002 Farm Bill) which provides grants used for planning activities and for working capital for marketing value-added agricultural products and for farm-based renewable energy should be reauthorized for \$60 million per year for FY2008-12.

Recommendations: Feedstock Production

Existing conservation programs, such as the Conservation Reserve Program (CRP) and the Conservation Security Program (CSP), as well as the possibility of new conservation programs, have been suggested as opportunities to further the production of feedstocks (woody, herbaceous and grain-based) for energy production. **If biomass for energy is included in any conservation program, it is essential that such a program mandates sustainable agriculture practices.**

Recommendations

- **Energy Crop Land Reserve:** The growth of energy crops is going to happen if there is a market for them. The transition to cellulosic energy crops from traditional row crops will be very risky especially if markets are not fully developed. A program that will incentivize this transition through pilot projects and research will be needed to bridge the time between when a farmer plants a crop for a biorefinery and when the crop is ready to be harvested or when a biorefinery exists to buy the crop. Due to the fact that there will not be a *substantial* market for cellulosic energy crops for a few more years, any program that funds the production of cellulosic energy crops should be based on pilot plots used to gather information about new and diverse crops. How and where these crops will be grown will determine how environmentally sustainable bioenergy production can be. Below are three suggestions on the production of bioenergy feedstocks.
 - The **Conservation Reserve Program (CRP)** can continue to be used for cellulosic bioenergy production as authorized in the 2002 farm bill. These crops can be grown within the CRP as long as the total acreage of the program is increased and program guidelines and contracts are upheld. This program allows farmers to keep their land in CRP and gives them the opportunity to sell their energy crop once a biorefinery is constructed in their area.
 - A new program can be created that would be similar to the CRP, but would only be for cellulosic energy crop production. Farmers could only enroll their land in the program if they could show that they had an existing contract to sell their crop to a bioenergy facility within 3-5 years of planting the crop.
 - The **Conservation Security Program (CSP)** could be amended to allow energy crop production. Since this is a working lands program, it is important to include all possible feedstocks used for renewable energy. Row crops grown under CSP would only receive payments if growers follow their conservation plan and enhancement practices. Cellulosic feedstocks would receive additional payments for the different benefits incurred by the unique characteristics of those specific feedstocks (e.g., water and soil conservation).
- **Energy Feedstock Reserve:** This could be similar to a Strategic Grain Reserve, in which energy feedstocks could be stored until needed for food, feed or fuel. This program would help create stability in energy crop markets, reducing price volatility due to weather and other disruptions. The trigger for release of the crop must be WTO compliant and based on national security (e.g., disaster relief, economic recession, drastic drops in energy supplies).
- **Improved Biomass Use Grant Program (Sec. 210(b) of EPAct '05)** which provides a \$20/ton transportation credit for woody-biomass used for energy production. This program has never been funded, yet this credit is essential for the removal of slash from our forests and for fuel-reduction practices (these materials have no current commercial value). Material must be transported out of the forest to reduce the possibility of wildfires and the spread of insect infestation across the nation. Transportation of this material is a limiting factor to the use of this material as a biomass feedstock. The program should be reauthorized and funded.
- **Biomass Utilization Grant Program (Sec. 210(c) of EPAct '05):** This program must be reauthorized at \$50 million annually. The grant amount should be increased to \$1 million and other programmatic changes would be beneficial. Funds are targeted to help improve forest restoration activities by using and creating markets for non-commercial small diameter material and low-valued trees removed through forest restoration activities, such as reducing hazardous fuels, handling insect and diseased conditions, or treating forestlands impacted by catastrophic weather events.
- **CCC Bioenergy Program (Sec. 9010 in the 2002 Farm Bill)** provided up to \$115.5 million for FY 2003 and up to \$150 million annually for FY2004-06. The program should be amended to reimburse biofuel, biopower and bioproduct producers for the purchase of **non-commodity** feedstocks for demonstration/pilot facilities and for existing facilities which are expanding production into advanced technologies that reduce energy consumption and/or replace fossil fuel energy sources through the use of non-commodity biomass feedstocks.

Recommendations: Biorefinery Development

Biorefineries and biobased products can play a vital role in a renewable energy future. Biorefineries – facilities that process biomass into multiple end products (biofuels, biopower/cogeneration thermal energy or biochemicals/ biobased products) are an effective way to develop biomass economically. Utilizing several (or all) components of the feedstock improves the profitability, environmental gains and energy production capacity of a biomass project.

Recommendations

- **Innovative Retrofitting of Biomass Facilities:** To make bioenergy more economically viable and environmentally acceptable, innovative pairing of technologies should be encouraged. Biomass facilities including ethanol, biodiesel,

wood-combustion, pellet, and existing pulp and paper mills should have access to grants and loans for retrofitting their facilities. Priority should be given to innovative pairing of technologies that reduce carbon through the use of biomass or other types of renewable energy systems (e.g. gasifiers and methane digesters) and energy efficiency improvements, especially combined heat and power. Co-firing with biomass at facilities that use coal for energy production should be included.

- Agriculture and Energy Manufacturing Zones: Grants, loans and possibly tax credits should be made available to companies which co-locate in one of these zones. Companies would be eligible for incentives if they produce 100 percent of their energy from renewable energy resources. The Small Business HUBZones or USDA Rural Empowerment and Enterprise Zones could be amended to include renewable energy investments, or a new 'zone' could be modeled from these programs.
- Biorefinery Development Grants (Sec. 9003 of 2002 Farm Bill): Creates a grant program to help establish demonstration and pilot facilities for the conversion of biomass into electricity, thermal power, fuels, chemicals, and other marketable products. This program has never been funded. The program should be amended to allow for loan guarantees. Priority should be given to facilities that have the smallest carbon emissions, use the least amount of water, have little impact on other natural resources, and use multiple feedstocks. Facilities should be at a 10 percent scale of commercial facilities, but should be easily scalable to appropriate feedstock availability.
- Fuels for Schools Program: This program should use non-commercial small diameter material and low-valued trees removed through forest restoration activities, such as reducing hazardous fuels, handling insect and diseased conditions, or treating forestlands impacted by catastrophic weather events as feedstock for small gasifiers, high-efficiency wood and pellet boilers in schools, public buildings, non-profits and other entities. This program is currently being implemented by the US Forest Service as a part of their National Fire Plan. There is no original authorization, but the program should be authorized at \$50 million per year for FY08-12.
- Environmental Quality Incentives Program: The program should be open to any on-farm use of renewable energy and energy efficiency systems, specifically anaerobic digestion and technical assistance. In the purpose section of the program, 'cost effective changes' should include 'reducing energy costs and carbon emissions through renewable energy production and energy efficiency systems'.

Recommendations: Biobased Products

Proper implementation of the Federal Procurement of Biobased Products Program (Sec. 9002 of the 2002 Farm Bill) can have a huge impact by opening up and transforming the market for biobased products. The federal government purchases about \$200 billion worth of products and services each year and many states follow the federal government's practices. The potential is enormous. Sec. 9002 makes available \$1 million per year for FY02-07 and requires Federal agencies to purchase biobased products that meet price, availability, and performance standards; provides for a voluntary labeling program of certified "Biobased Products;" and provides financial assistance for testing of biobased products by manufacturers.

The replacement of petrochemicals with biobased products is a valuable tool for displacing petroleum use and improving public health (by eliminating toxic processes and waste). Furthermore, they are vital in providing increased income streams to biorefineries. High-value biobased products can bring in more funds than liquid transportation fuels, making the economic viability of a biorefinery easier to achieve.

Recommendations

- **Research and Commercialization of Biobased Products**
 - Biobased Products (Sec. 7124 of 2002 Farm Bill) should be reauthorized and funded at \$2 million per year for FY08-12. This provides funds for the Agricultural Research Service to enter into cooperative agreements with private entities to operate pilot plants and other large-scale preparation facilities for the purpose of bringing technologies necessary for the development and commercialization of new biobased products to the point of practical application.
 - Technology Transfer Tax Credit for Manufacturing Companies should be created to switch to biobased chemicals as a replacement for petrochemicals. Manufacturers who produce end-use products may face significant investments to change their systems and processes for a new biobased ingredient, requiring them to re-test their existing product lines.
- **Testing, Designation, Labeling and Federal Procurement**
Federal Procurement of Biobased Products (Sec. 9002 of the 2002 Farm Bill) should be reauthorized and its funding increased from \$1 million to \$3 million per year for FY08-12. The \$3 million should be divided evenly among the

continuation of bioproduct testing, the designation program and the implementation of the BioPreferred Voluntary Labeling Program. The following amendments should be considered in the reauthorization of this program:

- Provide authority to designate ‘intermediate materials’ and ingredients (e.g., materials like PLA and PHA Sorona, Methyl Soyate, and Soy Polyols). For designation, environmental and health information and life-cycle cost information would only be required at the intermediate material level. USDA would have the authority to designate items that contain only the intermediate material without the need to conduct additional environmental and health and life-cycle cost analyses (i.e. BEES) on an end/finished product basis. Products made from “designated materials” would automatically qualify for preferred procurement if product biobased content equaled or exceeded minimum content requirements set for the item (generic grouping of products) into which the product falls.
 - Provide authority to designate items that are finished products that have a component made with a biobased material (e.g., a chair with a biobased foam cushion, a refrigerator with biobased insulation, a piece of equipment with a biobased panel). This would stimulate market replacement of non-biobased product components with those that contain biobased materials.
 - Provide that biobased product manufacturers and vendors not be required by the USDA Guidelines, as a condition of purchase, to provide more data to federal purchasers than other manufacturers offering products for sale to the federal government. To keep the playing field level, all manufacturers or vendors responding to a federal procurement request should be required to provide the same data. For example, environmental and health information and life cycle cost information on biobased products at the item levels is provided by USDA at the time of item designation. This same information should be required of all manufacturers.
 - Require federal agencies to monitor and report annually the number of service contracts that have biobased purchasing clauses; and establish annual biobased product purchasing targets and report on progress in meeting them.
 - Provide for the designation for preferred procurement of items (generic groupings of products) in which there is only one product or one supplier. An important component of the BioPreferred Program is market development. The designation for preferred procurement of a new item sends signals to the marketplace that there is an opportunity to produce and to sell this new product. That, in turn, encourages new entrants into the market.⁴
- **Market Development and Demonstration**
Small Business Bioproduct Marketing and Certification Grants (Sec. 944 in EPAct ’05) provides up to \$100,000 in working capital for the marketing and certification of biobased products. This program which was authorized at \$1 million for FY2006, should be reauthorized for FY08-12 and expanded to include pilot projects demonstrating the bioproducts performance; priority should be given to pilot projects by state and local governments.

Recommendations: Other Important Energy Policies

It is clear that the farm bill will play a significant role in developing biomass technologies, but it is important to recognize that certain legislation will have to be authorized in other energy legislation. Creating markets and providing access to the grid are essential to the commercialization of renewable energy technologies. Provisions below are some of the major pieces of the energy picture that must be addressed not just to facilitate increased renewable energy production, but to ensure a more secure, reliable and diverse energy grid.

Recommendations⁵

- **Renewable Portfolio Standard (RPS):** An RPS is a requirement that mandates a certain percentage of a utility's overall energy capacity or energy sales be derived from renewable resources, including biomass. Congress should pass an RPS that requires 25 percent renewable energy by 2025.
- **Tax Provisions:** Tax credits, exemptions and other incentives have created a favorable environment for renewable energy. The long-term extension and expansion of several of these provisions is vital for renewable technologies to have a more level playing field, to have consistency in market signals which is critical for investment, and to competitively break into the fossil-dominated energy market. Indeed, most of the current tax incentives are for the

⁴ Industry letter to Chairmen and Ranking Members of the Senate and House Agriculture Committees. May 2007.

⁵ Several of the provisions in this section were discussed in EESI's original whitepaper, “The 2002 Farm Bill: Revitalizing the Farm Economy Through Renewable Energy Development on the Farm Bill”, unfortunately the country has not made much progress in these areas and hence implementation of these recommendations is still vital to the growing industry.

production of electricity and have not included thermal power, which would benefit technologies including anaerobic digestion, gasification, geothermal, combined heat and power and high-efficiency biomass boilers. This distinction should be corrected by creating a thermal power credit similar to the Production Tax Credit. The following programs should be reauthorized:

- Clean Renewable Energy Bonds (Sec. 1303 of P.L. 109-58): Extend for 10 years and increase the size of the bonding authority.
- Production Tax Credit (26 USC 45): 10 year extension.
- 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. Customers should receive a fair price on power they contribute to the system. 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: RECs should provide interconnection to their distribution systems at a fair and non-discriminatory price for their members/customers who want to generate power from renewable energy sources for their own "on farm" (home or business) use but also be able to sell excess power back to the co-op. Such renewable resources would include solar, wind, gasification, high-efficiency boilers and anaerobic digestion systems. Some states have enacted their own legislation, 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.
- Transmission: Facilitate financing for RECs to improve their 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.
- 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.

Conclusion

The opportunity is to take advantage now of renewable energy from rural America. The ground breaking 2002 Energy Title moved farm policy in this positive direction and now — because of the 'perfect storm' created from a low budget baseline, high commodity prices, national energy security and climate concerns — renewable energy can continue what it started in 2002, a revitalization of rural America. Nevertheless, policy must carefully be constructed to reduce backlash and unintended consequences. Renewable energy must be woven together with core initiatives including production of safe quality food and feed, conservation, rural economic development, and sustainability to see true results and benefits. With appropriate research on feedstocks and conversion technologies, attention to ownership and human capacity, and commercialization of new sustainable technologies — renewable energy will help transform our agriculture sector and create a leaner, safer and more sustainable energy future for our nation.