

**Statement of Alexander Karsner
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**U.S. House of Representatives
Committee on Agriculture
Subcommittee on Conservation, Credit, Energy & Research**

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Mr. Chairman, thank you for the opportunity to participate in this hearing on the financing structure of renewable energy sources. I will discuss initiatives under way in the Office of Energy Efficiency and Renewable Energy (EERE) at the Department of Energy (DOE), and focus on activities within our Biomass and Biorefinery Systems program that provide incentives for ethanol production and support the development of biofuels.

I would like to say, at the outset, that the Department of Energy shares an excellent working relationship with the U.S. Department of Agriculture (USDA). Under Secretary Dorr and I collaborate on a variety of renewable energy issues, each bringing the unique perspectives of our agencies to the table in order to achieve the goal of enhancing our energy independence. This Committee has the weighty charge of reauthorizing the Farm Bill this year, and there appears to be strong consensus that a robust energy title is essential. America's farmers and ranchers have the opportunity to play a historic role in shaping domestic energy policy, while creating new jobs and stimulating economic growth in rural America. I look forward to assisting USDA in working with Congress on these efforts.

In his 2007 State of the Union address, President Bush challenged our country to reduce gasoline consumption by 20 percent in the next 10 years, our "20 in 10" plan. In that plan, the President called for a new mandatory fuel standard, requiring the equivalent of 35 billion gallons of renewable and alternative fuels in 2017, nearly five times the target now in law. Expanding the current Renewable Fuel Standard (RFS) established by the Energy Policy Act of 2005 (EPACT 2005) should decrease projected gasoline use by 15 percent. The renewable and alternative fuels included in the expanded standard are sources such as corn ethanol, cellulosic ethanol, biodiesel, methanol, butanol, hydrogen, and other alternative fuels.

President Bush believes our scientists, farmers, entrepreneurs, and industry leaders will continue to lead the world in developing and investing in cutting-edge technology, infrastructure, and farming methods. Advances in many fields will play an important role, such as continued improvement in crop yields, optimization of crops and cellulosic materials as fuel feedstock, and cost reduction in the production of cellulosic ethanol and other alternative fuels. The increased and expanded fuel standard creates a tremendous incentive for research, development, and private investment into alternatives to oil.

The Department of Energy is dedicated to helping our Nation develop a full portfolio of renewable and alternative fuels technologies. Because biomass is the most viable renewable option for producing liquid transportation fuels in the near term, conducting research that can help further grow our biofuels industry is a priority. The Department is funding research, development, and demonstration (RD&D) programs through the use of cost-shared partnerships with industry, universities, and the National Laboratories to advance biofuels technologies.

The Department is funding a biofuels demonstration program authorized in EPACT 2005, Section 932. Under the commercial-scale biorefineries solicitation, the Department recently announced selection of awards worth up to \$385 million over five years to six different companies, subject to negotiation and future appropriations. These projects are for the commercial demonstration of near-term technologies in integrated biorefineries for the production of liquid transportation biofuels, biobased chemicals and products, and heat and power from cellulosic biomass feedstocks. While these “first of a kind” facilities will likely have higher costs of production than subsequent cellulosic biorefineries, they will initially help identify scale-up issues and direct further research, and could launch cellulosic ethanol technologies into the marketplace in the future. Further, many of these facilities will be located in rural communities, bringing valuable investment to the backyards of America’s farmers and ranchers. Moreover, the Department is partnering with other Federal Agencies through the Biomass Research and Development Initiative to guide the Federal investment effort.

Ethanol is currently the renewable fuel having the most success in the market, with potential for both near and long-term displacement of gasoline. The focus of DOE’s Biomass Program is to make cellulosic ethanol cost-competitive by 2012, a target put forth in the President’s 2006 Advanced Energy Initiative (AEI). In Fiscal Year (FY) 2007 the Administration has budgeted approximately \$150 million for EERE’s Biomass and Biorefinery Systems R&D program to implement key activities necessary to achieve the 2012 “Biofuels Initiative” goal for cost-competitive cellulosic ethanol.

Over the next two years, the Department, together with a number of our key strategic partners in government, including USDA and the Environmental Protection Agency (EPA), will undertake five key activity areas to accelerate the development, production, and deployment of cellulosic ethanol.

FINANCING

EPACT 2005 created the Title XVII Loan Guarantee Program. This program seeks to facilitate financing for commercial projects that avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases while employing advanced technologies. Under Section 1703 of EPACT, renewable energy systems, such as advanced biofuels projects are eligible for Title XVII loan guarantees.

To continue advancing cellulosic ethanol technologies, DOE's Biomass Program is planning a solicitation in support of biorefinery processing technologies at 10 percent of commercial scale this year. Many industry leaders have expressed the need for biorefinery technology demonstrations at this less costly scale, which is roughly a 1.5 million gallon per year size facility, in order to resolve remaining technical and process integration uncertainties for the "next generation" of biorefinery process technologies. Ultimately, such demonstrations reduce the overall cost and risk to both DOE and the industry, while improving the likelihood of obtaining financing for larger, commercial-scale facilities.

DOE is also working to implement Section 942 of EPACT 2005 which directs the establishment of a reverse auction incentive program in consultation with USDA, the Environmental Protection Agency, and the Department of Defense for the production of cellulosic biofuels. The FY 2008 budget request includes \$5M to establish this incentive program. This program is authorized to provide a production incentive for cellulosic ethanol production on a per-gallon basis, and could help to accelerate deployment and commercialization of biofuels, facilitate the delivery of billions of gallons of biofuels, and ensure that small feedstock producers and rural small businesses are full participants in this industry.

BIOENERGY RESEARCH AND DEVELOPMENT

DOE continues to work on reducing enzyme costs, which are currently too high for cost-competitive cellulosic ethanol production. The Department has already invested approximately \$35 million in a cost-shared project with Novozymes, Genencor, and the National Renewable Energy Laboratory (NREL) that led to a 2004 R&D 100 Award for "Enzymatic Hydrolysis of Biomass Cellulose to Sugars." On February 22, President Bush toured Novozymes' plant in North Carolina to see firsthand this important enzyme research. Until the advent of this breakthrough technology, other methods of hydrolyzing cellulose to sugars were inefficient, expensive, and had low sugar yields. By improving the pretreatment process, engineering new enzymes that are exceptional at breaking down cellulose, and optimizing enzyme production, NREL and its partners developed a technology that dropped the cost of cellulose hydrolysis by 20-fold. We believe that improvements in enzymes and pretreatment technologies have the potential to decrease the pretreatment cost by another order of magnitude or more, so the Department will run another industry cost-share solicitation in this important area.

A major cost component within the "conversion" cost category for producing cellulosic ethanol is developing fermentation organisms to convert multiple sugars found in biomass for ethanol production. While there are some organisms that have this capability, they have not reached commercial readiness. To address this challenge, DOE issued a solicitation for development of fermentation organisms. Awards could be valued as much as \$37.4 million over four years, subject to appropriations, for cost-shared projects leading to commercial-ready organisms for cost-competitive cellulosic ethanol.

DOE efforts in the Biomass Program also include gasification and pyrolysis technology development that can process biomass resources better suited to these “thermochemical” technologies, such as forest resources and lignin-rich process residues. The funding to develop these technologies has almost quadrupled from the FY 2006 appropriated level to the FY 2008 request. DOE plans on running a solicitation on integrated gasification fuels synthesis cost-shared projects.

In recognition of the complementary goal of improving the characteristics of plant biomass feedstocks for conversion to biofuels, DOE's Office of Science, Office of Biological and Environmental Research (OBER), and the USDA, Cooperative State Research, Education, and Extension Service (CSREES), National Research Initiative (NRI) have jointly initiated a fundamental research program in Plant Feedstock Genomics for Bioenergy to facilitate the use of woody plant tissue, specifically lignocellulosic materials, for bioenergy or biofuels. In FY 2006, the joint program awarded \$4 million for genomics research on a variety of plant feedstocks, including poplar, alfalfa, sorghum, wheat and other grasses; an additional \$4 million is expected to be awarded in FY 2007.

To accelerate the transformational scientific breakthroughs necessary to advance the development of new approaches to cost-effective production of biofuels and bioenergy, including cellulosic ethanol, DOE's Office of Science is investing \$375 million over five years to support the establishment and operation of three Bioenergy Research Centers. These centers, to be selected in FY 2007, will conduct comprehensive, multidisciplinary research programs on microbes and plants to develop innovative biotechnology solutions to energy production. The centers will concentrate appropriate technologies and scientific expertise and focus research on areas spanning genomics to integrated systems understanding of the metabolic pathways and internal structures of plants and microbes most relevant to steps required to develop bioenergy compounds. The centers will serve as catalysts for the broader bioenergy research program of OBER. The research and technology development of these centers may also help overcome some key scientific and technical bottlenecks necessary advance DOE's R&D goals.

REGIONAL BIOMASS ENERGY FEEDSTOCK PARTNERSHIPS

To address biomass resource availability and feedstock infrastructure, DOE will continue to support the Regional Biomass Energy Feedstock Partnerships with USDA and its Sun Grant Initiative universities as identified in the 2002 Farm Bill. These partnerships are integral in order to unlock the potential biomass resource base and to identify the regional biomass supply, growth, and biorefinery development opportunities across the country. Using regionally available feedstocks, produced and used near where they are grown, will allow a “distributed” transportation fuels approach that will minimize shipping and transportation issues.

ETHANOL AND BIOFUELS INFRASTRUCTURE DEVELOPMENT

In addition to basic research for breakthroughs in systems biology to identify new biofuel-producing organisms or new bioenergy crops that will reduce the cost of producing cellulosic ethanol and other biofuels and applied research advancing biomass conversion technologies, the Department is working with other public and private sector partners to encourage the development and deployment of the biofuels distribution infrastructure which will be necessary for displacement of petroleum transportation fuels and increased consumer choice. To foster and sustain growth of the ethanol industry, DOE has also developed a biofuels infrastructure team comprised of staff from our Vehicle Technologies/Clean Cities programs and the Biomass Program to resolve fueling issues and encourage automobile manufacturers to significantly increase the production of E-85 vehicles. Activities include analysis of pipelines, water issues, and support of vehicle technology improvements. The infrastructure team may be expanded to include other agencies.

INTERAGENCY BIOMASS COLLABORATIVE EFFORTS

The Interagency Biomass Research and Development Board, which I co-chair with Under Secretary Dorr is the governing body that coordinates biomass R&D activities across the Federal Government, pursuant to the Biomass R&D Act of 2000. Under the auspices of the Biomass R&D Board, in November 2006, DOE hosted the National Biofuels Action Plan workshop in Washington DC, where representatives from multiple Federal agencies came together to identify agency roles and activities, assess gaps and synergies, and establish agency budgets in the area of biofuels. The Federal participants also made recommendations for improved coordination and collaboration of Federal agencies. The input collected at the meeting is currently being combined to form the National Biofuels Action Plan workshop report. Ultimately, the plan aims to improve the Board's ability to bring coherence to Federal strategic planning for biofuels production and use to meet the President's goals.

CONCLUSION

In conclusion, I believe that the President's Advanced Energy Initiative and "20 in 10" goal hold the promise of accelerating the penetration of cellulosic ethanol into the marketplace and bringing the benefits of a clean, renewable energy source more quickly to our Nation. The Department of Energy is investing in RD&D to overcome barriers to market entry of cellulosic biofuels, forging strategic cost-share partnerships with private industry, collaborating with other agencies of the Biomass R&D Board, and working with the different regions of our country to bring the promise of biofuels to fruition. Combined with the financial tools and tax credits included in EPACT 2005, this multi-pronged effort will help biofuels made from agriculture, forestry, and other domestic biomass resources to become an increasingly important contributor to our Nation's energy supply and economic future.

This concludes my prepared statement and I would be happy to answer any question the Subcommittee members may have.

