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Before the
Subcommittee on Forests and Forest Health
Committee on Resources
U.S. House of Representatives

Oversight Hearing on the
"GAO Report on Promoting Woody Biomass for Energy and Other Uses"

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Mr. Chairman and Members of the Subcommittee, I appreciate the opportunity to testify on the Department of Energy's (DOE) Biomass Program within the Office of Energy Efficiency and Renewable Energy (EERE), a central part of the Department's commitment to developing renewable alternatives to fossil fuels.

In his 2006 State of the Union address, President Bush launched his Advanced Energy Initiative (AEI) to help reduce our dependence on imported oil and advance clean energy technologies. A key component of the AEI is the President's Biofuels Initiative. The initiative aims to conduct the research to make cellulosic ethanol cost competitive by 2012 so it can begin to displace gasoline use. The Department plans to accomplish this goal by investigating production of cellulosic ethanol from a variety of regionally available biomass feedstocks and agricultural residues.

Significant displacement of gasoline with cellulosic ethanol will require the development of the complete range of biomass resources: agricultural crops and trees, plants, grasses, residues, fibers, municipal solid wastes, and wood and wood wastes. Since the focus of this hearing is woody biomass, I would like to discuss the role that this important renewable resource can play in America's energy future, within the overall context of DOE's broader biofuels R&D program.

The Billion Ton Study

As biomass development increases, one of the fundamental questions is: what is the size of the potential biomass resource supply in the U.S.?

In April 2005, the DOE and the U.S. Department of Agriculture (USDA) co-published a report assessing the potential of the land resources in the U.S. for producing sustainable biomass: *Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply*. Looking at forestland and agricultural land, the two largest potential biomass sources, this study estimates that the U.S. can sustainably produce up to 1.3 billion tons of biomass feedstocks by mid-century. This would be enough feedstock to produce 60 billion gallons of ethanol with today's technology. There are many assumptions in the report that impact these estimates, but we believe that the estimates reasonably reflect the *potential* availability and impact of biomass resources.

Of the total estimated resource, the study suggests that forestlands in the contiguous United States can produce approximately 368 million dry tons annually. This projection includes 52 million dry tons of fuelwood harvested from forests and woodlands, 145 million dry tons of residues from wood processing mills and pulp and paper mills, 47 million dry tons of urban wood residues including construction and demolition debris, 64 million dry tons of residues from logging and site clearing operations, and 60 million dry tons of biomass from fuel treatment operations.

Regional Partnerships

The next question is how the available resource can be used most effectively. The forest resources industry has a long history of using woody biomass for production of pulp and paper products, wood products, and even energy and chemicals. To more fully develop this woody biomass resource, the Department of Energy's 2007 budget requests funds to work jointly with a number of organizations, including USDA, several universities, industrial partners, and State organizations to establish Regional Feedstock Partnerships that will facilitate the development of regional biomass resources, including woody biomass.

The Regional Partnerships will address the barrier technology research packages that resulted from the "Biomass to Biofuels Workshop" held in December 2005 by DOE's Office of Science (OS) and EERE. Addressing basic genomic questions such as sequencing and applied aspects related to genomics, this effort will focus on the creation of a new generation of biomass resources that could increase production both in areas with adequate rainfall, and in drier or colder zones.

The Regional Partnerships will also target development of sustainable and predictable feedstock supplies. We anticipate that partnership activities will support research on biorefinery development. Therefore, we plan to allocate some effort on overcoming barriers of integrating biomass feedstock supply systems, including woody biomass, to conversion technologies optimized for woody biomass.

The Department of Energy plans to work with and through the regional partnerships to develop more accurate cost supply information and improved communication with all

elements and partners in the feedstock supply chain. For woody biomass, this will include:

- Validating industrial experience on collection and transportation of forest biomass, and then applying that information to the collection of a broader range of forest resources and other woody materials;
- Assessing impact of increasing demand on the land base with the shifting market demands of a woody biomass biorefining industry;
- Investigating near-term and longer-term potential impacts of changes in the pulp and paper, and wood products manufacturing industry with biorefineries as part of existing pulp and paper mills; and
- Identifying and quantifying impacts of collecting woody biomass on forest health and the rural economy. Factors to consider are wood quality and value from early thinning; overall forest health including fire, insects, disease, water quality, and carbon balances; the impacts of landscape and recreational values; and the impacts of changing ownership and forest fragmentation.

Directives, Oversight, and Management

The Energy Policy Act of 2005 (EPACT) addressed many aspects of biomass development. One EPACT directive is to have DOE's Biomass Federal Advisory Committee update its roadmap document, which was first issued in December 2002. The committee is presently holding road-mapping meetings in various regions of the country to hear first hand about the needs and opportunities for feedstock development and use in each of the regions. Information gathered from these meetings will be considered as the committee revises the roadmap. We expect the committee to complete the revised roadmap this year.

The original roadmap identified objectives for feedstock research:

- To improve understanding of plant biochemistry and the ability to engineer enzymes within desired crops,
- To develop the chemical and chemical/biological pathways necessary to improve the energy density and chemical characteristics of delivered feedstocks, and
- To optimize agronomic practices for sustainable biomass feedstock production and handling.

Earlier legislative drivers are fostering additional inter-agency coordination. The Biomass R&D Act of 2000 directed DOE and USDA to enhance and coordinate biomass R&D efforts. In 2003, DOE, USDA, and the Department of Interior signed a Memorandum of Understanding (MOU) for Woody Biomass Utilization for Restoration and Fuel Treatments on Forest, Woodlands, and Rangelands. This MOU aims to maximize the coordination and effectiveness of the three departments in developing complementary policies to encourage harvest and use of woody biomass by-products.

To further facilitate our collaborative efforts, we formed an Interdepartmental Woody Biomass Utilization Working Group (Federal Working Group). New partners include the Environmental Protection Agency, and the Department of Defense. The Federal Working Group reports to the Biomass Board which was authorized under the Biomass Research and Development Act of 2000. The Working Group's mission is to implement the Woody Biomass MOU policies, coordinate our activities, oversee research and development, provide information and assist in technology transfer. The Working Group holds quarterly meetings on technical and policy issues and has developed an implementation strategy.

DOE's Broader Biomass Efforts

DOE's biomass program is funding research in cutting-edge methods of producing ethanol from agricultural residues, wood and forest residues, and grasses. The program's research focus is in three areas: Feedstock Infrastructure, for reducing the cost of collecting and preparing raw biomass, and for the sustainable production and delivery of future energy crops; Platforms R&D, for reducing the cost of outputs and byproducts from biochemical and thermochemical conversion processes; and Utilization of Platform Outputs, for developing technologies and processes that utilize intermediates such as sugars and syngas to co-produce fuels, value-added chemicals and materials, and heat and power. The program's strategy is to research ways to reduce cost, integrate new technologies and processes in biorefinery configurations, and partner with industry to validate biorefinery technology at an industrial scale.

The added impetus created by the President's Biofuels Initiative, coupled with a 65 percent increase in EERE's Fiscal Year 2007 budget request, will enable program RD&D to accelerate the development of cost-competitive, bio-based liquid transportation fuels.

Conclusion

Achieving a secure energy future with reduced greenhouse emissions is going to take a broad, yet focused national effort that develops all of our diverse, domestic renewable resources. Woody biomass stands to play an important role, and the Department of Energy will continue to work with other agencies to explore the best strategies for its development.