STATEMENT OF

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COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

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Mr. Chairman, Ranking Member Voinovich, Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the Renewable Fuel Standard (RFS) included in the Energy Independence and Security Act of 2007 (EISA), particularly life-cycle analysis of alternative fuel usage and the Department of Energy's (DOE) research and development of the next generation of biofuels. All of us recognize the national and economic security importance of reducing our dependence on oil. The implementation of the RFS is one way that Congress and the Administration have recognized and responded to the urgency of expanding use of non-petroleum fuels to improve energy security, reduce costs, and reduce greenhouse gas emissions.

EISA's Renewable Fuel Standard and Life-Cycle Analysis

In the 2007 State of the Union Address, President Bush called on Congress to significantly increase the use of advanced biofuels as part of the Twenty in Ten Initiative. Congress passed and the President signed EISA into law, requiring that U.S. transportation fuels contain at least nine billion gallons of renewable fuels in 2008, growing to 36 billion gallons in 2022. Of the quantity required in 2022, at least 21 billion gallons must be advanced biofuels (non-corn ethanol), and of that 21 billion, 16 billion gallons must be cellulosic biofuels; to meet the RFS, ethanol from corn is capped at 15 billion gallons. DOE and other federal agencies are working to develop diverse, non-food feedstocks that require little water or fertilizer, and to foster sustainable agricultural and forestry practices. Our efforts will help spur the resources, technologies, and systems at the rate and scale needed to enable this mandate to be met.

The Department believes that the RFS is critical in scaling up the production and use of biofuels in the U.S. and deploying next generation biofuels. Creating a predictable policy environment for investors is critical to ensuring growth in all parts of the biofuels supply chain, from feedstocks, to biorefineries, to infrastructure, including pipelines. In both the short and long term, relaxing the RFS would likely undercut investments in new capacity as well as in research, development, and demonstration of cellulosic ethanol and other advanced biofuels. Generally speaking, the RFS included in the EISA can act to displace petroleum used for transportation purposes and to reduce greenhouse gas emissions; relaxing that mandate can hinder progress toward these efforts.

DOE previously projected that the transportation fuel industry had the ability to meet the nine billion gallon requirement for renewable fuels this year, from domestic ethanol and biomass-based diesel production, ethanol imports, and credits accrued by refiners for 2007 blending levels. However, the effects of recent flooding in the Midwest have not been fully analyzed, and we cannot predict future catastrophic weather events that may have an impact. Section 211(o)(7) of the Clean Air Act, as amended by EISA, gives the Environmental Protection Agency (EPA) Administrator the authority to waive, in whole or in part, the total volume of renewable fuel mandated by the RFS if there is inadequate domestic supply to meet the mandate, or if "implementation of the requirement would severely harm the economy of a State, a region, or the United States." The EPA Administrator is required to consult with the Department of Agriculture (USDA) and DOE if he is to consider a petition to waive or reduce the RFS in a given year. The

consultative process with DOE has begun because of a petition submitted by Texas Governor Rick Perry to reduce the RFS from 9.0 to 4.5 billion gallons in 2008.

Over the longer term, to ensure the continued availability of resources to meet RFS volume requirements in an environmentally sustainable manner, we are implementing the sustainability provisions of EISA.

- EPA, in consultation with DOE and USDA has already initiated the development of a methodology to assess the life-cycle greenhouse gas emissions of biofuels production and use to ensure conventional and advanced biofuels meet minimum greenhouse reduction requirements.
- EISA Section 204 requires EPA, in consultation with DOE and USDA to assess and report to Congress on the environmental and resource conservation impacts of the RFS every three years. EPA has initiated this work.
- EISA Section 203 requires DOE, in consultation with USDA and EPA, to contract with the National Academy of Sciences (NAS) to assess the impact of the renewable fuel standard on the industries involved in the production of feed grains, livestock, food, forest products, and energy. DOE and NAS have conducted preliminary discussions to scope this study.

The Department is focused on robust empirical validation of all environmental impacts of bioenergy across the production life cycle, from feedstocks to vehicles. In FY 2008, DOE is funding approximately $1 million worth of research across the national labs and universities to collect and analyze data to assess the indirect impacts of biofuels production. This work is to validate DOE's existing life cycle analysis models as well as inform the development of new analytical tools.

In addition to these analytical efforts, DOE is engaged in field trials to grow and harvest dedicated energy crops into biofuels, to address the lack of data available at a large scale, so that life cycle analysis tools can be adequately validated. A better understanding of carbon and water cycling in environments where dedicated energy crops are produced will increase our ability to model the environmental impacts of large-scale bioenergy production nationally.

The Biomass R&D Board, an interagency coordination group established by the Biomass R&D Act of 2000 and co-chaired by DOE and USDA, is also addressing sustainability issues. The Board recently established a Sustainability Working Group, chaired by DOE, USDA, and EPA. This group is focused on collecting and analyzing existing criteria, benchmarks, and indicators to ensure sustainable production of biofuels. Such indicators may include metrics for water quality and quantity, GHG emissions, and air quality, as well as displacement of fossil-based energy for transportation fuels.

DOE Advanced Biofuels Research, Development, and Demonstration

The Department actively supports biofuels production, from the most basic science research activities to efforts toward the integration of advanced biofuels into the national fuel supply. To help meet our long-term energy needs, the Department's biomass

research and development (R&D) activities are designed to make biofuels from non-food feedstocks cost competitive by 2012.

The biomass feedstocks of today include grains (corn, sorghum, wheat), as well as oilseeds from plants (such as soybeans). Our goal is to allow the feedstocks of tomorrow to come from a variety of sources such as wastes and residues, and fast-growing energy crops. These future feedstocks may consist of agricultural residues like stalks, stems, and other crop wastes, as well as forest resources such as wood waste, forest thinnings, and small-diameter trees. Examples of energy crops include switchgrass, miscanthus, and hybrid poplar trees, in addition to algae and non-edible oilseeds like jatropha. Sorted municipal solid waste may also play a role.

Cellulosic ethanol is expected to improve upon the positive energy balance of today's corn ethanol by delivering four to six times as much energy as needed for production.[1] Additionally, DOE research has shown that cellulosic feedstocks can reduce life-cycle greenhouse gas emissions by 86 percent compared to gasoline.[2]

As a result of research, development, and demonstration efforts to date, I am pleased to report that we have already made significant progress toward the Presidential goal of making cellulosic ethanol cost competitive, which involves technology improvements to the production process that will result in a modeled cost of $1.33 (2007 dollars) per gallon of cellulosic ethanol by 2012.[3] Since 2001, the Federal Government has helped reduce the modeled cost of cellulosic production by 60 percent, from $6.00 to $2.40 per gallon.

The Department plans to invest up to $585 million over five years (FY 2007 – FY 2011), subject to appropriations, in cost-shared, integrated commercial- and demonstration-scale biorefineries that could produce up to 130 million gallons of ethanol from cellulosic biomass when fully operational. These biorefineries will demonstrate a wide range of advanced biochemical and thermochemical conversion technologies and use a wide array of cellulosic feedstocks.

On November 6, 2007, Range Fuels, Inc., became the first of the commercial-scale companies selected by DOE last February, as a part of the EPACT 2005 integrated biorefineries solicitation, to break ground on a commercial cellulosic ethanol plant, one of the first in the Nation. The plant is located near the town of Soperton, Georgia, and will draw on gasification technology to convert wood and wood waste from Georgia's pine forests and mills into 20 million gallons of ethanol per year during its first phase of operation. Construction of the first phase is expected to be completed next year.

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[1] Source: Wang et al, "Life-cycle energy and greenhouse gas emission impacts of different corn ethanol plant types," *Environmental Research Letters*, May 2007.
[2] Ibid.
[3] Biomass Multi-Year Program Plan, Office of the Biomass Program, Energy Efficiency and Renewable Energy, DOE, March 2008, http://www1.eere.energy.gov/biomass/pdfs/biomass_program_mypp.pdf.

In addition, the Department's Office of Science has recently established three major new DOE Bioenergy Research Centers—led by the University of Wisconsin-Madison, Oak Ridge National Laboratory, and Lawrence Berkeley National Laboratory, respectively—which are bringing together top scientists and researchers in an effort to accelerate the transformational breakthroughs in basic science needed to make next-generation cellulosic biofuels cost-effective. The Department plans to invest over $400 million, subject to appropriations, in the outyears.

Conclusion

The United States is now recognized as a world leader in committing to renewable fuels as a key component of its energy security strategy. Many developed and developing countries now also have renewable fuel standards and targets, including the European Union, Australia, India, and China.[4] As a recent example, on June 26, 2008, Canada, a major oil-producing nation,[5] implemented a renewable fuels standard requiring all gasoline to contain 5% biofuels by 2010 and diesel and home heating oil to contain 2% biodiesel by 2012.

We believe that the expanded RFS creates a predictable investment climate that will enable the substantial participation of the private sector, whose commitment is essential to maintaining U.S. world leadership in the development of next-generation, non-food biofuel feedstocks, and achieving the critical EISA goal of making the use of renewable fuels a standard component of the transportation fuel market.

Mr. Chairman, thank you again for holding this important hearing and for the opportunity to address EISA's renewable fuel requirements and the Department of Energy's work in advanced biofuels. This concludes my prepared statement, and I would be happy to answer any questions the Committee Members may have.

[4] Rajagopal and Zilberman, "Review of Environmental, Economic and Policy Aspects of Biofuels," The World Bank, September 2007.
[5] "Country Energy Profiles," EIA, http://tonto.eia.doe.gov/country/index.cfm.