

STATEMENT OF

ALEXANDER KARSNER

**ASSISTANT SECRETARY FOR ENERGY EFFICIENCY
AND RENEWABLE ENERGY**

U.S. DEPARTMENT OF ENERGY

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

February 7, 2008

Mr. Chairman, Members of the Committee, thank you for the opportunity to appear before you today to discuss energy market effects of the recently passed renewable fuel standard (RFS), and to provide comments on the relevant portions of H.R. 6, the Energy Independence and Security Act of 2007 (EISA). The President called for a bold fuel mandate in his 2007 State of the Union as part of 20 in 10. I would like to express my appreciation to the Members of this Committee for their work on this historic legislation. Together, we have taken great strides to enhance our energy security and reduce emissions that contribute to climate change. This new law will result in the avoidance of billions of tons of greenhouse gases. The United States is leading the world in advancing alternative fuels and the world has taken note of our action. I was honored last week to have attended the Major Economies Meeting on Energy Security and Climate Change where this new law was a major topic as we discussed actions within the transportation sector as well as for buildings and government operations.

As you know, EISA increases the minimum required levels of renewable fuel in U.S. transportation fuel set by the Energy Policy Act of 2005 (EPACT). The EPACT renewable fuel standard (RFS) was set at 5.4 billion gallons for 2008, rising to 7.5 billion by 2012. The modified RFS included in EISA mandates 9 billion gallons of renewable fuel in 2008, rising to 36 billion gallons by 2022. Of these 36 billion gallons, 21 billion in 2022 are to be obtained from cellulosic ethanol and other advanced biofuels. The goal is to meet the mandates in a manner that is economically cost-effective and consistent with economic growth.

One important feature of the President's proposed Alternative Fuel Standard was the economic safety valve (proposed to be \$1.00 per gasoline-equivalent gallon). This safety valve sought to improve the likelihood that the program would not impose unreasonable costs on consumers or result in unreasonable profits for alternative fuel producers. The safety valve in Title II of EISA does not provide the same level of protections to obligated parties or consumers. DOE, EPA, and USDA will coordinate on analyses needed to support the rulemaking to implement the new RFS program, including an assessment of what gaps, if any, exist in the incentive system in EISA, taking into account the costs of conventional (corn-based) ethanol, and cellulosic biofuels production.

In addition to concerns about the waiver/safety valve, the Department recommends that the definition of woody biomass in Section 201 be modified in order to parallel the definition contained in the Administration's Farm Bill proposal. This revision would allow us to more readily meet the renewable fuel standard set forth in the law since it encourages producers to use materials from federal lands or non-industrial private forest lands.

I look forward to working with the committee to improve EISA as needed and establish the most efficient pathway to meeting the legislation's RFS targets. I'd like to provide now an update on the Department of Energy's activities in the area of biofuels, particularly cellulosic ethanol, as well as the state of the biofuels industry and the feasibility of meeting the EISA goals in an effective and environmentally sustainable fashion.

DEPARTMENTAL ACTIVITIES IN BIOFUELS

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.

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 reducing cellulosic ethanol production costs to \$1.33 per gallon by 2012. Since 2001, the Federal government has helped reduce the cost of cellulosic production, via biochemical conversion. Given continued investments in R&D, as well as cost-shared development of commercial scale and small scale biorefineries in many federal agencies, we are maximizing the probability that we will meet the 2012 goal.

The aggressive cellulosic biofuels volumes established in the new RFS are very ambitious, and continuing R&D will help facilitate achievement of these volumes, while ensuring that these fuels' GHG emission-reducing potential is realized. To help ensure that a diverse set of effective crops are available for conversion to biofuels, we are conducting field trials on dedicated energy crops this year. This type of work can begin to help validate research-scale cellulosic energy crop production results at the industrial scale including both new agricultural crop practices and innovative collection and storage methods.

On January 29, 2008, the Secretary announced that DOE will invest up to \$114 million over four years, subject to appropriations, for four small-scale biorefinery projects to be located in Colorado, Missouri, Oregon, and Wisconsin. Building on the President's goal of making cellulosic ethanol cost-competitive by 2012, these biorefineries, built at ten percent of commercial scale, will use a wide variety of feedstocks and test novel conversion technologies to provide data necessary to bring online full-size, commercial-scale biorefineries. On average, commercial-scale ethanol biorefineries input 700 tons of feedstock per day, with an output of approximately 20 to 30 million gallons a year. These small-scale cellulosic facilities are expected to input approximately 70 tons of feedstock per day, with an estimated 1.5 to 2.5 million gallons of cellulosic ethanol to be produced per year.

These small-scale projects complement the Department's February 2007 selection of six projects to receive up to \$385 million over four years (subject to appropriations) to develop commercial-scale biorefineries, also authorized by EPACT section 932. The full-scale biorefineries focus on near-term commercial processes, while the small-scale facilities will experiment with diverse feedstocks using novel processing technologies. Both small- and commercial-scale projects contribute to fulfilling EISA requirements. Further, the projects support the Administration's long-term strategy of increasing the nation's energy, economic and national security by reducing our nation's reliance on oil through increased efficiency and diversification of clean energy sources.

On November 6, 2007, Range Fuels, Inc, became the first of the six 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.

The Department expects to use its new loan guarantee authority to stimulate investment and commercialization of new technologies. EERE has provided technical expertise in review of loan guarantee pre-applications in the area of biomass. Additionally, DOE's work in basic science includes \$405 million over five years for three bioenergy research centers to provide the transformational science for bioenergy breakthroughs needed to meet the President's goal.

ADVANCED BIOFUELS INDUSTRY

As the topic of this hearing is market effects of the RFS, let me provide some information on the state of the biofuels market. The United States continues to be the leading producer of ethanol in the world. The U.S. corn ethanol industry currently has capacity to produce nearly 8 billion gallons of ethanol annually, with construction underway that will produce about another 5 billion gallons per year, bringing the total capacity to approximately 13 billion gallons per year by 2010. The nation's 134 ethanol plants are primarily located in the Midwest. At this time, no commercial scale cellulosic ethanol plants are operational, but some of the joint DOE-industry cellulosic biorefineries are projected to be up and running within one year, with all six operational in four years.

In terms of infrastructure, 1,348 U.S. fueling stations offer the E85 blend. Stations are more common in the corn belt (Minnesota, Iowa, Illinois) but are spreading throughout the country. In fact, E85 is now offered in 40 states. We have about 1,350 gasoline terminals where ethanol can potentially be blended, with additional capacity needed to provide for blending of larger volumes expected in the next few years.

While on the subject of biofuels infrastructure, I would like to note the provision in EISA that limits franchise restrictions on E85 pumps. By preventing constraints on the installation of renewable pumps and encouraging the conversion of existing pumps to renewable fuel use as well as signage to advertise the sale of renewable fuels, this provision may reduce potential barriers to bringing E85 fuels to consumers.

The Department believes that an E85 delivery system is an important goal of an alternative fuels infrastructure, but that intermediate blends (e.g., E15, E20) may offer an alternative approach to balance fuel production and use in parallel in order to enable continuous uninterrupted growth in production. Intermediate blends may provide for more rapid absorption of renewable fuels into consumer markets in the near-term. Studying intermediate ethanol blends could help policymakers to determine whether they might be suitable and cost-effective outlets for consuming additional renewable fuel, and DOE is working with other agencies to undertake such studies currently.

To assess the potential of intermediate blends, DOE, in collaboration with EPA, the Department of Transportation (DOT), and other federal agencies, has begun an extensive testing program. In addition to our own testing, we are collaborating on test plans and methodologies with other

groups, including state governments, industry associations, auto manufacturers, small engine manufacturers, and others that are conducting similar or complementary tests on intermediate blends. Preliminary results from these tests will be available later this summer.

While increasing the availability of ethanol-gas blends and fueling stations is one side of the equation, the other is growing the fleet of flex-fuel vehicles (FFVs) available to consumers. There are an estimated 230 million vehicles on America's highways today, and that number continues to grow, with 16 million vehicles bought each year and no more than 12 million retired. Furthermore, the majority of these vehicles rely exclusively on gasoline and will remain in the fleet for 17 years on average. We see no technical reason why ultimately flex-fuel vehicles can not be more uniformly ubiquitous across all markets. Nor do we see any technical reason that at least the option of flex-fuel vehicles could not be offered to all consumers at a relatively low price.

Transportation in the United States is the fastest growing source of CO₂ emissions – it already accounts for about one third of the U.S. contribution to global greenhouse gas emissions – so we cannot afford to look at the problem in an insular way. We need to continue to evaluate how these emissions may affect global trend lines.

For these reasons, both the Secretary and I have been calling on automakers to make flex-fuel and hybrid vehicles ubiquitous across the fleet, for every make and model, for every manufacturer that services the U.S. market. We need to add millions of these vehicles to the fleet each year.

ENVIRONMENTAL SUSTAINABILITY

Just as we are committed to making cellulosic biofuels cost competitive, we are equally dedicated to ensuring that biofuels production and use are environmentally sound. Minimizing carbon emissions and ensuring environmental sustainability are vitally important in large-scale ventures like advanced biofuels production.

Cellulosic ethanol is a domestically available fuel that does not compete with food crops and has the potential to reduce greenhouse gas emissions by 85 percent relative to gasoline. Its production can also be environmentally friendly and sustainable. In addition to better use of waste streams for feedstocks, non-food related cellulosic energy crops such as perennial grasses have many environmental benefits over traditional edible crops. In general, perennial grasses require less water and chemical inputs per acre than corn because their extensive root systems increase nutrient and water capture. Properly managed cellulosic crops can improve soil quality, sequester carbon, and reduce erosion in the areas in which they are planted. They also can serve as a good habitat for certain forms of wildlife.

The distribution of ethanol presents both economic and environmental challenges. Most ethanol plants are concentrated in the Midwest, but consumption is high along the East and West coasts. Shipping via pipeline would produce lower greenhouse gas emissions than the current methods of truck, rail, and barge distribution, but pipeline construction and use come with their own set of challenges.

As you know, EISA directs DOE, in coordination with DOT, to carry out a feasibility study of the construction of pipelines dedicated to the transportation of ethanol. The study is to consider economic viability, barriers to construction, market risks, and other factors and incentives that have an impact on the construction of an ethanol pipeline.

We have already established a good working relationship with DOT's Pipeline and Hazardous Materials Safety Administration, and have been assisting them on research investigating the impacts of ethanol on stress, corrosion, and cracking in pipelines. We will continue to work with DOT to carry out the pipeline analysis called for in EISA. DOE has also begun working with the Association of Oil Pipe Lines and will work with that association and its members to ensure a robust analysis of this important issue.

CONCLUSION

I would like to conclude by thanking the Committee for its continued commitment to the development of renewable resources and the infrastructure necessary to make renewable fuels available to the average American. Advanced biofuels offer significant promise for helping our nation to bring about a new, cleaner, more secure and affordable energy future.

Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions the Committee Members may have.