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ENERGY MARKET EFFECTS ON RECENTLY PASSED RFS

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

TO

RECEIVE TESTIMONY ON THE ENERGY MARKET EFFECTS ON THE RECENTLY-PASSED RENEWABLE FUEL STANDARD

FEBRUARY 7, 2008

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ENERGY MARKET EFFECTS ON RECENTLY PASSED RFS

THURSDAY, FEBRUARY 7, 2008

UNITED STATES SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:40 a.m. in room SD–366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Thank you for coming today. This hearing is an oversight hearing to look at the renewable fuel standard that was included in the Energy Independence and Security Act that was signed by the President on December 19.

This groundbreaking legislation will save more energy than all of the previous energy bills we've passed. Americans will spend less money on gasoline as their cars and trucks get more miles per gallon. We'll also spend less on our electricity bills, as inefficient incandescent light bulbs are phased out in favor of highly efficient compact fluorescents and LEDs. These measures will make us better stewards of our country's energy resources. They're good for the environment and good for our energy security.

However, today's hearing is concerned with the renewable fuel standard, which is a cornerstone of this legislation, which several have suggested is flawed in the way it was enacted. The RFS requires that increasing amounts of our motor vehicle fuel come from biofuel, such as ethanol from corn, and biodiesel from soy. Homegrown biofuels are good energy policy, good environmental policy, and good national security policy. However, there is some concern that the RFS, as enacted, risks taking the biofuels industry backward rather than pushing it ahead.

I'm particularly concerned about three aspects of the RFS. First, the early year biofuel requirements could be too aggressive. A second concern is that mandates for specific technologies and feedstock's could prove to be overly prescriptive. Finally, the environmental restrictions that are imposed may be too narrow.

Very briefly, let me discuss each of those. The RFS almost doubles the amount of ethanol and biodiesel required this year, from 4.7 billion gallons in 2007 to 9 billion gallons in 2008. While it appears that there will be enough ethanol and biodiesel production capacity to satisfy the requirement, it's not clear how all of this biofuel will find its way into the fuel tanks of our cars and trucks.

Because the law was signed only weeks before the 2008 requirement came into effect, refiners had no opportunity to ensure that sufficient infrastructure would be in place to handle that much of an increase.

The second issue is the concern that the law favors certain technologies and feedstocks with individual mandates. I'm glad that the requirement for cellulosic biofuel includes cellulosic biobutanol. Butanol is a very promising new technology that could turn woody biomass into biofuel that is compatible with our existing energy infrastructure. I'm glad that the world's first commercial biobutanol plant may be located in our home State of New Mexico.

However, the fact remains that this kind of micromanagement is likely to make government policy look foolish in the long run. What if a breakthrough in some other technology, like biocrude from algae, were to emerge as a cost-effective technology that is a better fit for the marketplace? With roughly 80 percent of the advanced biofuels requirement already dedicated to specific feedstocks or technologies, there is little room in the RFS for technological advance.

The final concern is the definition of renewable biomass, from which the required biofuel can be derived, is quite narrow. Examples of excluded feedstock include woody biomass from hazardous fuels reduction on Federal lands, and urban and commercial wood waste, and old-growth forests on Federal lands are not adequately protected in the legislation.

We obviously need to take the legislation that's been passed, and do all we can to make it workable. The question before us is how to proceed. The cost of failure is high. If we are not able to produce enough ethanol and biodiesel to meet these aggressive mandates, while maintaining food and fuel prices that consumers can accept, taxpayers will blame Congress, as they should. Furthermore, the biofuel industry will be tarnished, and for these reasons, I'm committed to doing all we can through this committee to try to make the RFS work as intended.

[The prepared statement of Senator Menendez follow:]

PREPARED STATEMENT OF HON. ROBERT MENENDEZ, U.S. SENATOR FROM NEW JERSEY

Thank you Mr. Chairman for holding this hearing examining some of the impacts anticipated from the Renewable Fuels Standard which we passed last year. In part due to the efforts of this committee and the leadership of Chairman Bingaman and Ranking Member Domenici, the 2007 Energy Independence and Security Act is an important step towards meeting our nation's pressing energy security, energy affordability, and environmental challenges. The Renewable Fuels Standard (RFS) is part of the solution. Implemented properly, the RFS can help free us from imported oil and fight global warming. The law we passed sets aggressive goals for increases in renewable fuels, and guarantees that these goals will be met with biofuels produced in a sustainable, environmentally responsible manner.

The goal of the RFS is to incentivize a viable, large scale biofuels industry that promotes domestic energy security and helps address global warming. Central to achieving this goal are the environmental safeguards established to make sure the law's 36 billion gallon biofuels mandate in fact results in a source of renewable energy that successfully mitigates dangerous climate change, while avoiding costly and harmful unintended consequences to the environment and public health.

Not all biofuels are good for the climate. Demand for palm oil, for instance, has led to wholesale destruction of Indonesian rainforest. Depending on how they are produced, biofuels can significantly lower or increase global warming pollution. The energy bill we passed requires a comprehensive analysis of lifecycle greenhouse gas

emissions and has provisions which will prevent clearing forests or destroying native prairie in order to grow feedstock for biofuels. Not only does this environmental destruction endanger wildlife and degrade water resources, but it also releases millions of tons of greenhouse gasses.

The intent of the Energy Independence and Security Act of 2007 is for the RFS to reduce both dependence on oil and emissions of greenhouse gases by promoting advanced biofuels and innovation, not the clearing of forests. As climate change increasingly alters our landscape, it is all the more important that we protect our important wildlife habitat, natural forests, native grasslands, and public lands.

The challenge before us as we continue to shape Federal biofuels policy is to make sure we wisely invest in policies that are both effective and sustainable. That means striking the kind of balance represented by the Energy Security Act of 2007.

Senator Domenici, go ahead with any comments you have.

STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

Senator DOMENICI. Thank you, Mr. Chairman. Since I'm the reason for us being late, I'll ask that my statement be put in the record and just make my one observation as to what we're trying to do.

We want to make sure that the new RFS will do everything it can to promote the new biofuels industry. We also want to make sure that we take the right approach to facilitate the implementation of the program and provide a smooth transition to a greater integration of biofuels into our fuel infrastructure. I look forward to testimony from today's witnesses, and hope to learn what work we have to ensure that we meet these objectives. I ask that the rest of my statement be made a part of the record. It's an analysis, somewhat like yours, so I see no reason to lose time at this point. Thank you, Mr. Chairman.

[The prepared statement of Senator Domenici follows:]

PREPARED STATEMENT OF HON. PETE V. DOEMNICI, U.S. SENATOR FROM NEW MEXICO

Thank you, Mr. Chairman, for calling this hearing on a topic that you and I worked very hard on last year. I am proud of the work that we have done to promote the use of homegrown biofuels, because of their potential to lessen our nation's dependence on imported petroleum. The Energy Policy Act of 2005 created the first Renewable Fuels Standard (RFS), and the Energy Independence and Security Act of 2007 expanded upon it.

A lot has changed since we created the first RFS in 2005. We were really thinking of renewable fuels as fuel additives. The President's "Twenty in Ten" initiative announced in last year's State of the Union Address inspired people to think of renewable fuels as full-fledged transportation fuels.

In 2005, when we were talking about renewable fuel we were talking almost exclusively about ethanol. Today, there is tremendous excitement about a broad range of technologies that we collectively call "advanced biofuels."

Advanced biofuels include cellulosic ethanol, biodiesel and renewable diesel. Other examples that show great technological promise include biocrude made from algae, biobutanol made from a variety of feedstocks, and a host of other cutting-edge approaches currently under development at laboratories and start-up companies around the country.

I'll mention an example of one such company that is working in my home state of New Mexico. Cobalt Biofuels is positioned to develop the nation's first industrial biobutanol production facility in Portales. I am very excited about this facility because it will bring good jobs to New Mexico, just as many other biorefineries are creating good jobs across the nation.

That raises another important advantage of biofuels—each region of the country has the potential to develop a biofuels market based on local feedstocks. That is why the Energy Independence and Security Act authorized the creation of additional, geographically dispersed bioenergy research centers. I hope that through this re-

gional approach we will develop a diverse biofuels industry using cellulosic feedstocks in the Midwest, woody biomass and forest products in the Northeast and Northwest, and algae in my own state of New Mexico.

We want to ensure that the new RFS will do everything it can to promote a new biofuels industry. We also want to make sure we take the right approach to facilitate the implementation of the program, and provide a smooth transition to greater integration of biofuels into our fuels infrastructure.

I look forward to the testimony from today's witnesses, and hope to learn if we have more work to do to ensure that we meet these objectives.

The CHAIRMAN. Thank you very much, and we'll include that in the record. Our first panel is made up of Assistant Secretary Karsner, who is Head of the Office of Energy Efficiency and Renewable Energy in the Department of Energy; and Robert Meyers, who is the Principal Deputy Administrator in the Office of Air and Radiation in the EPA.

Thank you, both, for being here, and we'll proceed in that order, unless there's some reason to go in a different order. Secretary Karsner, why don't you go right ahead?

STATEMENT OF ALEXANDER KARSNER, ASSISTANT SECRETARY, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, DEPARTMENT OF ENERGY

Mr. KARSNER. Thank you, Mr. Chairman, and Ranking Member Domenici, and the committee. I want to thank you for the opportunity to appear today to discuss energy market effects of the recently passed renewable fuel standard, the RFS, and to provide comments on the relevant portions of H.R. 6, the Energy Independence and Security Act of 2007, which I'll refer to as EISA.

The President called for a bold mandate in his 2007 State of the Union, and I'd like to express my appreciation to the members of this committee for their work on this historic bipartisan legislation. Together, we have taken great strides to enhance our energy security and reduce emissions that contribute to global 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 actions.

Only last week, I was honored to represent the United States at the Major Economies Meeting on Energy Security and Climate Change in Honolulu, comprised of the world's largest economies. This law, demonstrating United States leadership, was a major topic on the agenda, and as we began to discuss the actions in the transportation sector, as well as efficiency for buildings, appliances, and government operations.

As you know, EISA increases the minimum required levels of renewable fuel and United States transportation fuels set by the Energy Policy Act of 2005. The goal is to meet the mandates in a manner that is cost-effective and consistent with our economic growth. One important feature of the President's proposed alternative fuel standard was the economic safety valve, which was proposed originally to be a dollar per gasoline equivalent gallon.

The safety valve sought to improve the likelihood that the program would not impose unreasonable cost on consumers. So we will contribute technical assistance and work closely with EPA to evaluate if the safety valve in title II of EISA provides similar levels 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 that are embedded in the EISA legislation.

I look forward to working together with the committee to improve EISA, as and when 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, as well as the state of the biofuels industry and the feasibility of meeting the EISA goals in an effective and environmentally sustainable manner.

Since 2001, the Federal Government has helped to 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're maximizing the probability that we will meet the President's goal of making cellulosic ethanol cost competitive by 2012.

On January 29, 2008 the Secretary announced that DOE will invest up to $114 million over the next 4 years, subject to appropriations, for four small-scale biorefinery projects located in Colorado, Missouri, Oregon, and Wisconsin. These projects, built at 10 percent of commercial scale, complement the Department's February 2007 selection of the six projects that would receive up to $385 million over 4 years, subject to appropriations, to develop commercial-scale biorefineries, which were authorized in EPACT section 932.

As the topic of this hearing is market effects of the RFS, let me provide some information on the state of the biofuels markets. United States corn ethanol industry currently has an estimated capacity to produce nearly 8 billion gallons of ethanol annually. Assuming completion of construction underway, we will produce another 5 billion gallons per year, adding up to approximately 13 billion gallons per year by 2010.

The United States has approximately 139 ethanol plants already in the ground. At this time, no commercial-scale cellulosic ethanol plants are operational, but some of the joint DOE industry's cellulosic biorefineries are projected to be up and running ahead of schedule, with all 6 projected to be operational within the next 4 years. In terms of infrastructure, 1,348 United States fueling stations offer E85 blends. We have about 1,350 gasoline terminals where ethanol can be potentially blended, with additional capacity needed to provide for blending of larger volumes expected in the next few years. I would also like to note that any blend up to E15 may be used certifiably at every pump in the United States of America.

While on the subject of biofuels infrastructure, I would like to note that EISA limits franchise restrictions on E85 pumps. The Department believes that the promotion of an E85 delivery system is an important and worthwhile goal of an alternative fuels infrastructure. But also, that intermediate blends, such as E15 and E20, offer an indispensable parallel approach to scale and retail distribution in order to enable continuous and consistent uninterrupted growth in production.

To assess the potential of intermediate blends, DOE in collaboration with EPA and the Department of Transportation and other Federal agencies has begun extensive testing programs. Preliminary results from these tests will be available later this summer. While the ethanol gas blends and fueling stations form one side of the equation, the other side is flex fuel vehicles.

There are an estimated 230 million vehicles on America's highways today. The United States Department of Energy sees no technical reason whatsoever why flex fuel vehicles cannot be more uniformly ubiquitous across all markets, nor do we see any technical reason that at least the option of flex fuel could be offered to every America and all consumers at a relatively low price and in short order.

In addition to the obvious energy security challenge, transportation in the United States is the fastest-growing source of CO_2 emissions. It already counts for about one-third of the United States contribution to global greenhouse gas emissions. So we cannot afford to look at the problem in an insular way. We need to add millions of flex fuel and hybrid vehicles, which are available at low cost—not thousands, not hundreds of thousands—but millions, in the near term, so that we can convert the car park.

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 and sustainable. Cellulosic ethanol is a domestically available fuel that does not compete with food crops, and has the potential to reduce greenhouse gas emissions by up to 85 percent relative to gasoline. One example, 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 potentially improve soil quality, sequester carbon, and reduce erosion in the areas in which they are planted. They are non-edible and they do not compete with the food supply.

So I would like to thank the committee for its continued commitment to the development of renewable fuels and resources and the infrastructure necessary to make these fuels more broadly available and acceptable to a new generation of Americans. Advanced biofuels offer significant promise for helping our Nation bring about a new, cleaner, more secure and energy-affordable future. Mr. Chairman, this concludes my prepared statement, and I'm happy to answer any questions the committee members may have.

[The prepared statement of Mr. Karsner follows:]

PREPARED STATEMENT OF ALEXANDER KARSNER, ASSISTANT SECRETARY, ENERGY EFFICIENCY AND RENEWABLE ENERGY, DEPARTMENT OF ENERGY

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 costshared 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 commercialscale 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 high-

ways 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 CO_2 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.

Mr. CHAIRMAN. Thank you, very much. Mr. Meyers, go right ahead.

STATEMENT OF ROBERT MEYERS J., PRINCIPAL DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, ENVIRONMENTAL PROTECTION AGENCY

Mr. MEYERS. Thank you, Mr. Chairman, Ranking Member Domenici, and Senator Johnson. I appreciate the opportunity to come before you today to testify on the implementation of the renewable fuel provisions of the recently enacted Energy Independence and Security Act of 2007.

Renewable fuels are a key element of our national strategy for addressing the challenge of global climate change. Through his 20 in 10 initiative, the President proposed to reduce gasoline consumption through the increased use of renewable fuels and new vehicle standards. Congress agreed with these goals by approving new fuel and vehicle economy standards as part of EISA, and these changes will build upon the program that was established in 2005 by the Energy Policy Act of that year.

The Environmental Protection Agency is responsible for implementing the RFS program and we are proud of our success today in working with stakeholders in the fuel industry, States, and in the environmental community to build an efficient program for increasing the volumes of renewable fuel use in the transportation sector. The Agency worked very closely with the Departments of Energy, Agriculture, and other Federal partners and stakeholders to develop broad and early support for the program established by EPACT in 2005. Since EISA was signed into law on December 19, 2007, the Agency has been working diligently to review its provisions and begin to develop regulations to implement the new RFS program established by that legislation. In this regard, our first and most pressing task is to issue a new renewable volume standard for 2008. EISA increased the current 5.4 billion gallon RFS in 2008 to 9 billion gallons, and we would expect the notice on this action to be published in the Federal Register very soon.

Otherwise, we recognize that EISA made a number of significant changes to the RFS program, and developing EPA regulations will require careful evaluation and considerable new analysis. First, EISA increases the total renewable volume mandates to a minimum of 36 billion gallons by 2022. This is nearly a 5-fold increase over 7.5 billion gallons mandated under EPACT 2005 that constitutes a 10-year extension to the schedule provided for in that legislation.

Implications of volume expansion of the program are not trivial. Development of substantial infrastructure capable of delivering, storing, and blending these volumes in new markets and expanding existing market capabilities will be needed. In addition, for the market to fully absorb the increased volumes of ethanol, as Mr. Karsner mentioned, new outlets for blends greater than E10 blends—that is, gasoline blended with 10 percent ethanol, will be required. This can include, as referenced also by Mr. Karsner, E85 vehicles and utilization of that fuel. But second, EISA extended the RFS program which focus on gasoline to include both on-road and non-road gasoline and diesel fuel volumes. This is a significant change that may affect new parties, possibly including a number of small businesses that have not been regulated under the existing RFS program. Third, EISA created new requirements for total re-

newable fuel volumes in three new subcategories, each with their own required minimum volumes: advanced biofuels, biomass-based diesel, and cellulosic fuels.

The fuels industry will be required to demonstrate compliance with the four separate fuel standards. This will likely require obligated parties to forge new business relationships, contracts, and IT systems that will be needed to ensure compliance with the four standards.

Importantly, EISA increases cellulosic mandate from 250 million, under the previous RFS, to 1 billion gallons by 2013, with additional yearly increases up to a minimum of 16 billion gallons in 2022. The law also required in certain circumstances that the Agency make credits available for compliance with the new cellulosic mandate. EISA establishes, for the first time, minimum volume standards for biomass-based diesel fuel beginning in 2009, and ramping up to 1 billion gallons in 2012 and thereafter.

Fifth, new provisions that are included in EISA require the Agency to apply life cycle greenhouse gas performance threshold standards to each category of renewable fuel. The Agency, in coordination with DOE and USDA has done a substantial amount of work in life cycle analysis over the past year, and we've made significant advances. However, additional improved analysis will be necessary to implement the statute's life cycle GHG (Green House Gas) performance standards.

Sixth, EISA adds a number of new provisions, including changing the definition of renewable fuel feedstocks in a fundamental manner. The new law limits crops and crop residues that can be used to produce renewable fuel. Developing appropriate and enforceable regulations addressing this provision will require extensive dialog with USDA, USDR, DOE, the agricultural community, renewable fuel producers, and others to better understand current practices and potential improvements to these practices.

Finally, as required by Congress, we are reassessing the impacts of EISA and its renewable fuel program on vehicle emissions, air quality, greenhouse gasses, water quality, land use, and energy security. These analyses, along with previous requirements enacted in 2005, will provide important information to the public and Congress on the effectiveness of the new legislation.

We will look forward to working closely with members of congress and our many stakeholders during this process. While this will be a challenging endeavor and time for the agencies, we are confident that together we can develop implementing regulation that enhance both energy and security in our environment. Thank you, Mr. Chairman, and I would be pleased to answer any questions.

[The prepared statement of Mr. Meyers follows:]

PREPARED STATEMENT OF ROBERT J. MEYERS, PRINCIPAL DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman and members of the committee, I appreciate the opportunity to come before you today to testify on implementation of the renewable fuel provisions of the recently enacted Energy Independence and Security Act of 2007 (EISA). The Act's aggressive new renewable fuel standards (RFS) will further our nation's goals of achieving energy security and reducing greenhouse gases by building on the successful RFS program established by the Energy Policy Act of 2005 (EPACT 2005).

Renewable fuels are a key element of a national strategy for addressing the challenge of global climate change. Through his "Twenty in Ten" initiative, the President has committed the United States to take the lead in reducing greenhouse gas emissions by pursuing new, quantifiable actions. Congress has agreed by approving new fuel and vehicle fuel economy standards as part of the Energy Independence and Security Act of 2007. These national standards will reduce greenhouse gases and improve our energy security. They recognize that climate change is a global problem and are part of the solution. The changes brought about by EISA will prevent billions of metric tons of greenhouse gases emissions into the atmosphere over the next several decades.

The Environmental Protection Agency is responsible for implementing the RFS program, and we are proud of our success to date in working with stakeholders in industry, states and the environmental community to build an effective program for increasing the volumes of renewable fuel used by the transportation sector. Last April we issued final regulations for implementing the RFS Program under EPACT 2005. The Agency worked very closely with both our federal partners and stakeholders to develop broad and early support for the program. This program was successfully launched in September 2007, and we are pleased to say that the implementation process has been smooth and our stakeholders' feedback very positive. We believe our success is grounded on our close collaboration with stakeholders on the design and implementation of the program. The Agency continues to work with these parties to refine certain aspects of this program.

Since EISA was signed into law on December 19, 2007, the Agency has been working diligently to review its provisions and develop regulations to implement the new RFS program established by that legislation. In this regard, our first and most pressing task is to issue a new renewable volume standard for 2008. The RFS program established by EPACT 2005 required 5.4 billion gallons of renewable fuel in 2008. The EISA legislation increases the standard to 9 billion gallons in 2008, with further yearly increases in mandated volumes resulting in 36 billion gallons being required in 2022. We expect a notice of this action to be published in the Federal Register soon.

Looking beyond 2008, we continue our in-depth evaluation of all mid and long term actions required under the RFS provisions of EISA. While the RFS program established under EPACT 2005 provides a solid foundation from which to begin developing the new regulations, EISA includes new elements which add complexity to the program. As a result, the new EISA provisions require careful evaluation and considerable new analysis.

In this new undertaking, the Agency intends to follow much of the same approach we used in developing the first RFS program. This includes obtaining critical input from our stakeholders early and throughout the rulemaking process. Using a collaborative approach will help the Agency gather important information quickly and facilitate EPA's development and promulgation of regulations to implement the legislative provisions enacted by Congress.

While EPA will draw from its experience in developing the original RFS regulations, it is important to understand that EISA made a significant number of changes to the RFS program. First, as mentioned previously, EISA increases the total renewable fuel volumes mandated to 36 billion gallons a year by 2022. This is nearly a five fold increase over the 7.5 billion gallons a year mandated under EPACT 2005 for 2012, and constitutes a 10-year extension of the schedule provided for in that legislation. EPA believes that the implications of the volume expansion of the program are not trivial. Development of infrastructure capable of delivering, storing and blending these volumes in new markets and expanding existing market capabilities will be needed. In addition, the market's absorption of increased volumes of ethanol will ultimately require new "outlets" beyond E10 blends (i.e., gasoline containing 10% ethanol by volume). A rule of thumb estimate is that E10 blends, if used nationwide, would utilize approximately 15 billion gallons of ethanol. Accommodating approximately an additional 20 billion gallons of ethanol-blended fuel is expected to require an expansion of the number of E85 vehicles and their utilization of E85 and/or other actions.

Second, beyond the significant increase in the volume mandate, EISA extended the RFS program to include both on-road and non-road gasoline and diesel fuel volumes. Under the regulations implementing EPACT 2005, RFS volume requirements were applied only to producers and importers of on-road gasoline. EISA's extension of this program to both onroad and non-road gasoline and diesel fuel volumes is a significant change that may affect new parties, including a number of small businesses that have not been regulated under this program in the past.

Third, EISA has established new categories of renewable fuel. EPACT 2005 established standards for two categories of renewable fuels: one standard for the total

volume of renewable fuel; and a second standard for cellulosic ethanol requiring 250 million gallons beginning in 2013. EISA increased the number of renewable fuel categories and standards from the current two to a total of four, including total renewable fuel and three new categories within that, each with their own required volumes: advanced biofuels, biomass-based diesel and cellulosic fuels. Industry will be required to demonstrate compliance with the four separate fuel standards. This will likely require the obligated parties, produces and importers, to forge new business relationships and contracts that are necessary to guarantee their compliance with the new standards. Establishing the necessary systems to track and verify the production and distribution of these fuels and demonstrate compliance with four separate standards will also require sufficient lead time to design and implement these new tracking systems. As in the current program under EPACT 2005, some parties may not be able to comply by blending the renewable fuels, and thus may need to purchase or trade credits for the appropriate number and category of fuels to satisfy their volume obligations. It will be very important to conduct effective outreach with these parties to help with implementation issues.

As part of its restructuring of the renewable fuel mandate, EISA increased the cellulosic mandate from 250 million to 1.0 billion gallons by 2013, with additional yearly increases to 16 billion gallons in 2022, and provided a new definition of this fuel. Implementing these requirements will entail additional work by EPA as it develops its upcoming regulation. For example, the Act authorizes EPA to set a cellulosic standard lower than that established in the law, however it requires in this circumstance that the Agency also make credits available for compliance purposes and provides instructions on how to establish a specific price for these credits. The Agency will therefore need to address several critical issues, such as how many credits will be generated, to whom they will be available, the extent to which they can be traded, and what the life of the credit will be.

EISA also established for the first time minimum volume standards for biomass based diesel fuel. These standards begin in 2009 at a half billion gallons and ramp up to one billion gallons per year in 2012 and there after. To qualify as biomass based diesel, the renewable fuel portion of the biodiesel blend must result in greenhouse gas emissions that are at least 50 percent lower than the baseline GHG emissions for petroleum based diesel fuel.

Fourth, new provisions were included in EISA requiring the Agency to apply lifecycle greenhouse gas (GHG) performance threshold standards to each category of renewable fuel. The Agency has done a substantial amount of work on lifecycle analysis over the past year, and has made significant advances, honing the overall methodology, updating data inputs and including new inputs for land use, in particular from corn production. However, even with these advances, additional new and improved analyses will be necessary to implement the statute's lifecycle GHG performance standards. Given our experience in this area and the statute's utilization of lifecycle GHG performance standards as part of the definitions of different renewable fuels mandated in the Act, we would anticipate extensive comment from all stakeholders on both lifecycle analysis inputs and methodology. In addition, certain of the requirements in EISA pertain only to renewable fuel production facilities that commence construction after the bill was passed. EPA will need to carefully consider how the terms in this new provision should be interpreted and defined in the context of the new law.

Fifth, EISA added a number of other new provisions, including changing the definition of renewable fuel feedstocks in a fundamental manner. The new law limits the crops and crop residues used to produce renewable fuel to those grown on land cleared or cultivated at any time prior to enactment of EISA, that is either actively managed or fallow, and non-forested. Developing appropriate and enforceable regulations addressing this provision will require extensive dialogue with USDA, USTR, the agricultural community and renewable fuel producers to better understand current practices and changes in practices that can be developed, implemented and enforced consistent with our international obligations.

Finally, in support of the rulemaking we will be assessing the many impacts of the EISA renewable fuel program on emissions and air quality, including greenhouse gases, water quality, land use, the economy, and energy security. These analyses will provide important information to the public and Congress on the many anticipated impacts of the new legislation.

In closing, the Agency is moving forward with the development of regulations implementing the new RFS provisions and is utilizing the successful approach we employed in developing the implementing regulations for the original RFS program. We look forward to working closely with members of Congress and our many other stakeholders during this process. We are confident that together we can develop implementing regulations that enhance both our energy security and our environment.

Thank you, Mr. Chairman, and the members of the committee for this opportunity. This concludes my prepared statement. I would be pleased to answer any questions that you may have.

The CHAIRMAN. Thank you, both, very much. Let me start with a few questions. I mentioned in the opening statement a couple of the concerns that have caused us to have this hearing. One is this issue about whether or not the early year requirements are too aggressive, and whether or not the infrastructure is there to get this renewable fuel actually blended and into the fuel supply as required.

Is this something, Mr. Meyers, is this a concern that you have? Or am I the only one on the planet that worries about that?

Mr. MEYERS. I don't think, Senator, you're the only one who's been worried about this. It is a concern. It is a challenge, as I think I mentioned. I think it's important to understand that the actual blending levels under the previous act, under EPACT 2005, has exceeded what was required in the law. So there is a ramp up in 2008, but it's not from a 5.4 to a 9.0, although that's what the law requires. It's from a higher level than 5.4. I don't have the exact figure, but perhaps somewhere in the range of 7.

There will be challenges. We went through transitions before in the fuel system. One of the transitions we had was when we phased out MTBE. It was phased out voluntarily by the industries back in 2005 and 2006. There were some circumstances where there was some small fuel disruptions, but that transition went all right. We'll be working to analyze it under our legislation and in the proposal that will be coming out on the regulations, and we'll work again with DOE and others on this matter as we go forward.

The CHAIRMAN. Let me ask about the regulations. You're required to have those in place—What? By the end of this year? Is that right?

Mr. MEYERS. The Act, I think, requires within 1 year for the broad regulations. There are some other statutory deadlines, also.

The CHAIRMAN. OK. Do you see any problem in getting those regulations out and under the timeframe that's called for in the legislation?

Mr. MEYERS. It will be very challenging. It's not a long period of time for rulemaking of this size.

The CHAIRMAN. One of the issues that's concerned me is that we don't really have just a RFS; we've got four, as I understand this legislation. You're going to have to administer all four of those, as I understand it. How do you envision the carve-out mandates, each of these four, being implemented? Will each of the mandates simply be apportioned to an obligated party? A party that's obligated to comply with this, as is the case with the current RFS, so that each obligated party will have a renewable fuel blending requirement, and an advanced biofuel requirement, and a cellulosic biofuel requirement, and a biomass-based diesel requirement?

Mr. MEYERS. Those are very good questions, Mr. Chairman, and those are some of the issues we're looking at right now. Obviously, I think we can build off the EPACT 2005 legislation, and implementing regulations for that. But as you point out, there are four separate fuel standards required here. We have implemented RFS

through essentially RINs renewable numbers that are used for tracking purposes.

But we will have some fundamental issues in terms of figuring out who is an obligated party under the legislation, how that obligation will be met, and the transparent and enforceable system to do that. As I said, I think it will be a challenge.

The CHAIRMAN. Let me ask you, Mr. Karsner. I think in your written testimony, you make reference to Range Fuels, a cellulosic ethanol plant, which is under construction at this point, as I understand it, down in Georgia. Could you comment on whether the cellulosic ethanol that's produced from that facility would count toward the RFS, as you understand it?

Mr. KARSNER. It's difficult to comment, because the RFS would ultimately depend on how the rule comes out. But it is my understanding that any of the cellulosic ethanol produced from the Department-supported projects, theoretically, should qualify, unless there's something I'm missing in law. By volume, they won't be quantitatively significant in achieving those targets. So these plants that are demonstration plants are really meant to be qualitative models to replicate and scale, rather than major volumetric additions to satisfy the targets.

The CHAIRMAN. OK. Did you have any thought on that, Mr. Meyers, as to whether in your reading of the law, whether the type of production that is contemplated down at range fuels with that feedstock would qualify?

Mr. MEYERS. I wouldn't offer a definitive opinion at this point in time. We have a lot of new legislative language that the Agency will need to interpret and seek public comment, and notice some comment on. So I think it will be awhile before we specifically are able to answer some of those questions.

The CHAIRMAN. OK. I think my time's up. Let me defer to Senator Domenici.

Senator DOMENICI. Mr. Chairman, let me just say that it's obvious to me that these two witnesses are trying to be very helpful. But at the same time, they don't seem to be able to give forthright, strong answers as to how we're going to achieve what we thought we were ordering done, because we're either asking too much or the timetables are too severe. I'm rather confused. I guess I would just like to ask a general question of you.

A statute came into being. We're not going to discuss how it happened. It clearly wasn't written in this committee. It was written elsewhere, but it became law. We're here because the chairman and the staff that have been following it think that there are some big problems in implementing the law as it is written.

So here we are, heralding these great achievements, and they're all based on these statutes and it seems to me you're having difficulty figuring out whether they're going to work in a timely manner, and what the definitions mean in certain aspects. Am I correct? Or maybe let me put it this way. Do you think that what's on the books is going to work?

Or are we going to have to modify it to reach the goals that are obviously very, very prominent goals, and, if achieved, would do a fantastic job for America in terms of transportation fuels? Could you start with just that simple question, Mr. Karsner?

Mr. KARSNER. Yes, sir. And I think you hit the heart of the matter. Today's hearing is for the right reasons. How do we optimize the efficiency of implementation for what are broadly accepted bipartisan objectives for the Nation's displaced oil and carbon emissions? So, as well as how the chairman laid them out, three major points that require attention are the infrastructure and retail distribution challenges—not just on the retail side, at the pumps and in the cars, but also on the input of scaling the feedstock inputs for these type of cellulosic volumes.

As you know, the original legislation, as was proposed and discussed in this committee, was far more technology-neutral. It was basically anything that competed with gasoline. So the more narrow and prescriptive that we get, obviously, the more we handicap our probability of achieving the top-line objective.

Then, there is the question of the restrictions. For example, on feedstock inputs for woody biomass, or how we more acutely carve out the need to protect old-growth forest, but at the same access resources that have been identified in the Billion Ton Study on Federal lands. So there are technical corrections that certainly would optimize the efficiency pathways, and remove technical impediments. As for the regulatory side and actually standing up the implementation, I'd defer to——

Senator DOMENICI. Before you go to him, let me follow up. Are these shortcomings that you have just described to us, are they bad enough that we ought to consider modifications now to the law that you're trying to implement?

Mr. KARSNER. I certainly think it would be worthwhile, now that we've had a chance to digest the legislation, to get together with the members of the committee and offer these technical comments and assess what those impacts and tradeoffs would be. I think that there are things that have to be paid attention to, beyond ethanol and alternative and renewable fuel production alone.

It is a holistic supply chain issue. It is a challenge as we move forward to scale this and transition and transform the fuel mix, and it would be a worthwhile exercise to explore those technical corrections.

Senator DOMENICI. Do you feel the same way, Mr. Meyers?

Mr. MEYERS. I would not venture opinion with regard to any particular technical amendments or anything of that stage at this point in time. But I would say that we would be happy to work with the committee as we further analyze the legislation and go forward here. But it should also be understood, while there are four separate mandates, there are also provisions which we also need to interpret, which effectively constitute off ramps. We have different waiver provisions that are existent within the legislation, as well as standing waiver authority that exists outside of the specific Act.

So I would say that we would have to look at the whole of what Congress enacted before being able to render an opinion as to achievability or workability.

Senator DOMENICI. Let me tell you, I don't think matters get better when you start off with them being somewhat difficult, and interpretations don't seem to resonate. They don't get better in a market this big. We're not playing with marbles. I mean, this is a gigantic expectation on the part of the American people, and on the

part of an industry. If we don't know what we're doing, we'll muddle around and there'll be excuses out there in the marketplace as to why things weren't done.

What bothers me, is that people will say we couldn't get where we're supposed to because—and I think the chairman will agree. Although this sounds like a technical hearing, and it's very early, I think that it's pretty obvious that a lot of good administrative people are going to have to get together and resolve this in some way that would be extraordinary, from my observation of the various agencies that are in conflict here. Or we'll have to end up changing things. Thank you, Mr. Chairman. I yield now.

The CHAIRMAN. Senator Johnson.

Senator JOHNSON. Yes. Thank you, Mr. Chairman. Mr. Meyers, the ethanol production is quickly approaching the maximum market demand for E10. Can you tell me when we can expect the administration to be ready to approve higher volumes of ethanol, since it's E20? What is the Administration's timetable?

Mr. MEYERS. Senator, we have been working closely with the Department of Energy, the State of Minnesota, and others to assess intermediate blends or blends above E10. As you rightly note, it is a rule of thumb or something along that line, but on a national level, E10 blends are around 15 billion gallons in terms of what could be taken in current levels of gasoline usage.

So the issue is a very important one. There are a number of technical analyses, though, that need to be accomplished. As the Environmental Protection Agency, our mandate is to look at the different motor fuel blends, look at their performance within the vehicle, and the performance within emission control systems. Here, I would mention we're not necessarily just talking about cars.

We also have other equipment, obviously, down to lawnmowers, gasoline-powered lawnmowers, and other handheld equipment that we have to be conscious of the effect of something other than E10 or higher ethanol blends. So I would say we're working with the state that's interested, we're working with DOE, and we'll continue to work expeditiously to review this matter.

Senator JOHNSON. What is your timetable, if any, to draw conclusions?

Mr. MEYERS. There are a number of engines and engine systems, fuel systems, that have to be considered. When fuel is essentially considered to be legal to use in a fuel motor vehicle, our responsibility is not only to the environment, but I think there are a number of other issues that are looked at in terms of the integrity of the motor vehicle, the fuel system, as well as the other off-road equipment.

So that type of analysis, that type of detailed analysis, is necessary. Again, I think DOE has been very helpful in funding and working with us on this, as well as some private parties in the state. But it does require very intensive outreach effort to all the stakeholders who are involved—not only the fuel producers, but also the equipment manufacturers and vehicle manufacturers and others. It's unfortunately a very, I guess, data-intensive technical process.

Senator JOHNSON. So, in short, there is no timetable.

Mr. MEYERS. I cannot offer you a timetable at this point in time. The law, of course, was changed in EISA, in terms of section 211(f), which was the basic authority with regard to review of waiver requests. Once we would have a request, the current law requires 270 days for a decision to be made.

Senator JOHNSON. I'll submit other questions. Thank you.

The CHAIRMAN. Thank you. Let me ask a few other questions here. Mr. Meyers, I've been concerned also about the functioning of the credit market for RINs. As I understand the subject of RINs, it stands for Renewable Identification Numbers. Is that right?

Mr. MEYERS. That's correct, Mr. Chairman.

The CHAIRMAN. There exists today a market for RINs, but how does EPA anticipate this new mandate will affect the RINs market, and how can we prevent that market for these credits from being manipulated?

Mr. MEYERS. Very good questions. I think, under the 2005 Act, where we have a situation where actual blending of ethanol exceeded the mandate, we were able to, I think, pioneer and get the RINs up in place, but we haven't seen the market dynamics that will occur under the new law, where you have the propensity here for the mandate to more readily drive the market than vice versa, as under the current situation.

You've mentioned earlier the complication of four different fuels. There will be necessary tracking required there. Then, I think the other complication is with respect to the new players and the possibility of newer obligated parties from those that are obligated under the current law. They will need to get up to speed. So I don't want to minimize the task. I think you're right to say it will be a much more complex system than we have right now. I think that's evident.

We're trying to reach out to the stakeholder community. We had some meetings a couple of weeks ago to start that process. That's our desire, is to continue the process to try to design the program around existing market mechanisms to the degree we can.

The CHAIRMAN. Do you have any thoughts on that, Mr. Karsner?

Mr. KARSNER. With regard to the credits, themselves?

The CHAIRMAN. Yes.

Mr. KARSNER. Of course, we don't administer them at DOE. The only thought I would add to that is that the original alternative fuel standard that was proposed and discussed in the committee supported tradable credits going forward; whereas, the existing legislation is relatively silent on that. So it is one of those areas that one would look at, in terms of the enforcement mechanisms, as the rule progresses.

The CHAIRMAN. Let me ask about one other issue. We set these various greenhouse gas reduction targets in the legislation. Then we call on EPA to determine whether people meet those, not just by reference to direct emissions, but by reference to indirect emissions, as well. That's not something that I'm aware that EPA has been doing to a great extent. Am I right that this is another additional complication? Or do you folks have this one well under control?

Mr. MEYERS. You're absolutely correct, Mr. Chairman. This is a new legal requirement under the Act. We have specific language

defining life cycle greenhouse gas emissions and legislation. As you noted, it will serve for production from new facilities and will serve as a threshold for qualifying the fuel as meeting any of the four definitions within the bill.

We have not used this in a regulatory context. We have done extensive work, again, using some of the DOE's work product and modeling on the matter of life cycle analysis, generally, so we have some experience in this area. We have not applied any regulatory context, which will be required in this bill.

The CHAIRMAN. You don't have any preliminary thoughts as to whether or not the reduction requirements that we're talking about here can be achieved with a new ethanol plant, for example, when you factor in these indirect emissions?

Mr. MEYERS. The threshold question you're asking, Mr. Chairman, is what are the indirect emissions and how we would quantify, I guess, versus—I'm sorry. Let me be more specific. How we would both identify what they are, and then quantify them on a net basis, with respect to the other life cycle factors that we have to take into account. That will be new.

We are looking at the legislation now. It's approximately 6 or 7 weeks old, so we haven't gotten to the stage where we will venture to say what we will be proposing. But we will work again with the stakeholder community on this issue. It's complicated. There are a number of factors. But we have to identify both direct and indirect, and then come up with an empirical basis to use them for the thresholds.

The CHAIRMAN. All right. That's the extent of my questions for this panel. Senator Craig, you haven't had a chance to ask questions of this panel. Did you want to pose some questions to them, or wait for the second panel?

Senator CRAIG. Uno momento.

Senator DOMENICI. I think he's too late.

[Laughter.]

The CHAIRMAN. Now, now. Your ranking member thinks you're too late.

Senator DOMENICI. No. I think I should ask before him, because he's so late. We'll start a second round here. Go ahead.

Senator CRAIG. Mr. Chairman, Pete was uptight about lateness yesterday, weren't you?

Senator DOMENICI. It hasn't gone away.

[Laughter.]

Senator CRAIG. So I noticed. I apologize, but I was attending the prayer breakfast for all of you guys. All right, all right.

[Laughter.]

Senator DOMENICI. That's your excuse?

Senator CRAIG. That's as good as it gets.

Senator DOMENICI. I had a table and didn't go, so I'm very bad.

Senator CRAIG. Thank you all very much. I will read your testimony. These are issues that we're greatly concerned about. I must say at the outset, Mr. Chairman, I am glad that what was written in this committee that got changed in the house that gave us jurisdiction over these key issues, you're holding hearings on and reasserting some of that, and I appreciate that.

I guess my question is, the RFS as it is currently written excludes woody biomass from Federal lands. Has that question been discussed or asked?

Senator JOHNSON. No.

Senator CRAIG. All right. Will this affect the availability of viable feedstock? That would be the first question. If so, what impact does this have on the ability to meet the yearly RFS volumes?

Mr. KARSNER. If I may, Senator?

Senator CRAIG. Please.

Mr. KARSNER. It would have an impact. I don't know that we could quantify it on an annual basis as to what the precise impact would be yearly. I suppose because we know it would have an impact by fundamentally eliminating about 24 percent of the forest feedstock supply that has been identified in the Billion Ton Study——

Senator CRAIG. Yes.

Mr. KARSNER. In other words, you tie your hands for a quarter of the available forest feedstock supply. It's obvious it'll have an impact, if not on the availability of supply, certainly on the availability of the pricing of the supply. So we would view that as a deficiency that requires attention and potential technical correction. In other words, as we move to erode our addiction to oil, it shouldn't be our first move out of the shoot to tie our hands when we do it.

Senator CRAIG. Yes, it is an omission. It got taken out. There were some of us worked to get it in, and see that as an important part. We can obviously control the supply or access, but there is a huge supply out there. We've learned about 2 million acres in my State last year, and not through the right processes.

Mr. Meyers, what can you tell me about the waiver language, if available biofuels are not ready to meet our requirements? Has that been asked? OK. Thank you.

Mr. MEYERS. We have talked a little bit about the waivers as potential off ramps here. I guess the first thing I would say is that there is existing waiver authority that the Agency has by virtue of EPACT 2005. Additional waiver authorities are also supplied within the context here. I think the prime one people would probably focus on would be with respect to cellulosic biofuel.

Senator CRAIG. Exactly. The volumes there that we've dedicated to that category.

Mr. MEYERS. Yes. We are in the process of looking at the waiver authority, as you know, with respect to cellulosic. There's also a safety valve that's triggered, prospectively, with respect to projected volumes and in cases where the projected volume would be below the statutory required level.

So I think my general answer would be it's too early for us to really definitively tell you our direction on these new authorities, but I think that our goal would be so that the whole regulatory system would work together, as a whole. That's probably not a completely satisfactory response, but I said at the onset this would be a challenging task. It's a complicated piece of legislation, and my statements, I think, reflect that.

Senator CRAIG. Thank you. Gentlemen, thank you. Mr. Chairman, let me comment as this panel leaves, I hope our agencies involved in this can lead instead of follow. I think a good many of

us have put a substantial amount of interest, and I think our country is showing a substantial amount of interest in these opportunities that will make us greatly more independent as a Nation, as it relates to certain types of energy supply.

If we have to wait for lag time because of an Agency's inability to lead us, stay in advance of this instead of follow, that only hurts the consumer, and it hurts the, I think, the viability of our country as it relates to energy supply. So thank you, all. We'll work to get this right.

The CHAIRMAN. All right. Thank you, both, very much. We appreciate your testimony, and we will continue to communicate with you on how we proceed. Let me call the second panel forward.

On the second panel, we have Carol Werner, who is the Executive Director of Environmental and Energy Study Institute here in Washington; Michael McAdams, who is the Executive Director of the Advanced Biofuels Coalition; Brian Jennings, who is the Executive Vice President of the American Coalition for Ethanol. There are two others. Charlie Drevna, President of the National Petrochemical and Refiners Association; and Bob Dinneen, who is President and CEO of the Renewable Fuels Association.

OK. Why don't we go ahead? Why don't we start with Ms. Werner, and then go right across the table here? If each of you could take 5 or 6 minutes and summarize the main points that you think we ought to understand, we very much appreciate your willingness to be here. Senator Johnson, did you have a comment?

Senator JOHNSON. Just to introduce Mr. Brian Jennings, he's a South Dakotan, and he's a former staffer of mine. Welcome, Brian.

The CHAIRMAN. We are glad to have him here, and appreciate your introduction of him. Ms. Werner, why don't we start with you? You go right ahead.

STATEMENT OF CAROL WERNER, EXECUTIVE DIRECTOR, ENVIRONMENTAL AND ENERGY STUDY INSTITUTE

Ms. WERNER. Thank you very much, Mr. Chairman, and members of the committee for inviting me to be here with you this morning to talk about this very important issue of a renewable fuel standard, which we see as a really critical piece of helping us to address climate change in our overall energy picture. We also want to congratulate you upon the passage of the energy bill, which was no small accomplishment, indeed.

Our organization is an independent nonprofit organization that was founded by bipartisan congressional caucus in the mid-1980s. Members of our board come from an interdisciplinary background, in terms of academia, the private and public sector. Our board is currently chaired by Dick Ottinger, who is a former Member of Congress, and was the former chair of the Energy and Power subcommittee on the House side.

We wanted to express our appreciation for the leadership that you, through the committee, Mr. Chairman, have also taken with regard to climate change and in recognition of the fourth assessment of the intergovernmental panel on climate change, and in terms of the recognition now of the critical nature of this issue and the need to move forward.

We recognize that renewable biomass energy technologies are a critical tool in the effort to reduce national transportation emissions coming from greenhouse emissions, and that renewable fuels are especially attractive as a low- and no-carbon alternative, uh, non-petroleum-based fuel. Therefore, the RFS is aggressive and ambitious, and we think that it is definitely doable.

It includes cradle-to-grave life cycle analysis as part of its structure. This analysis also includes direct and indirect. We want to say that our organization supports having a greenhouse gas screen. After all, without having some sort of a greenhouse screen, how can we guarantee that we're really accomplishing a very important goal of the RFS, which is to make sure that we really reduce greenhouse gas emissions?

So these aren't easy to satisfy, but there have been numerous reports that have been clear that we can really reduce emissions dramatically, reports by the Union of Concerned Scientists, and many other organizations around the country. But this only tells part of the story, since the RFS that was passed into law also requires looking at indirect. That poses additional issues that will make it very, very difficult. We would suggest that while it is important to look at these issues—because, after all, a ton of carbon is a ton of carbon—and we really do need to be about reducing carbon emissions.

However, because it will be difficult, and while we're going through the process of trying to better ascertain and understand what happens with regard to the indirect, it really makes it critical that the kind of renewable biomass that we use, that our definition to be as flexible as possible, to make sure that we are really utilizing the renewable biomass resources that are truly available.

That also includes dedicated energy crops, grasses, algae, a variety of things that were listed in the bill, including urban wood debris, agriculture, forestry, biomass from livestock production, and including, unfortunately, also the debris coming out of the disasters that we've had to recently, in terms of hurricanes and the awful tornadoes from the other night.

Key things that I want to mention then, that if we are really going to be serious with regard to dealing with meeting these emission criteria and looking at the definition, a huge exclusion that we think creates a problem, that we really need to be looking at wastes and residues, that indeed those are the ways in which we wouldn't have any indirect land use impacts from those, in terms of the definitions that are included, and therefore, there is an enormous amount of this kind of biomass that is available.

The definition in the law currently excludes woody biomass coming from public lands. We think this should be redressed, and that there is a huge amount of this kind of resource available. There are many, many analyses and reports coming out, from whether it's the Western Governor's Association, Oregon Environmental Council, many, many reports that have indicated the significance of this resource, and that it should be included. It is important in terms of thinking about the thinning of forests, in terms of dealing with catastrophic wildfire prevention, in terms of, indeed, sustainable forestry management, and that it would be important to ensure that we truly are looking at this as an important resource. Sustain-

ability is key, and we feel that this is an important part of ensuring that we indeed to have sustainable forestry management, and also have a workable RFS. Thank you.

[The prepared statement of Ms. Werner follows:]

PREPARED STATEMENT OF CAROL WERNER, EXECUTIVE DIRECTOR, ENVIRONMENTAL AND ENERGY STUDY INSTITUTE

Mr. Chairman and Members of the committee, thank you for the opportunity to testify here today on behalf of my organization, the Environmental and Energy Study Institute (EESI), about the Renewable Fuels Standard, which we view as a very important tool in our mutual efforts to address climate change and energy and economic security. We congratulate you upon the passage of the Energy Independence and Security Act of 2007 (P.L. 110-140)—no small accomplishment. EESI is an independent non-profit organization founded by a bi-partisan Congressional caucus in 1984 to provide policymakers with reliable information on energy and environmental issues, to help develop consensus among a broad base of constituencies and to work for innovative policy solutions. Our Board is interdisciplinary and is drawn from academia as well as the public and private sectors, including Dr. Rosina Bierbaum, Dean, School of Natural Resources and the Environment, University of Michigan, and Amb. Richard Benedick, who was a lead US negotiator of the Montreal Protocol. Our Board is chaired by Richard L. Ottinger of New York, a former chair of the House Energy & Power Subcommittee and the Dean Emeritus of Pace University Law School.

EESI began its Energy & Climate Program in late 1987 to focus on the nexus between energy and global climate change—the most serious challenge facing the world today. Evidence of existing climate change impacts is staggering and alarming new ramifications of global warming are reported weekly. While skepticism about the reality of climate change has waned, agreement on the policy approach, technologies of preference, and time frame are still very much in debate—with no clear consensus yet emerging. We are faced with a very dynamic and exciting opportunity for creating significant change. Energy, both as a security and (now more prominently) as a climate issue, is on top of the national policy agenda. Indeed, we want to especially thank you, Mr. Chairman, for the leadership you have taken on climate issues in the Senate, the holding of many hearings and the introduction and sponsorship of climate legislation in the Senate. We now have candidates for the Presidency who have outlined for voters what they plan to do to address climate change and energy (security and price). More than 780 US mayors have signed a Climate Protection Statement, and numerous Governors of both parties have taken strong leadership positions addressing climate change. As evidence of climate change builds, the pressure to become 'green' or sustainable has become a driving force not only in politics but in the economy. Multinational corporations and many others in the private sector, including many energy companies, have emerged as interested players in renewable energy and energy efficiency (RE/EE) technologies as a way to combat climate change and increase their bottom line. Biomass-to-energy technologies, such as biofuels, clearly have been recognized by the federal and many state governments, corporations and investors as a renewable energy technology that is a critical component of a climate change mitigation strategy.

According to the 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)[1], the increase in concentration of greenhouse gases since the pre-industrial era is due primarily to human activities, especially the extraction and combustion of fossil fuels. The report specifically concludes that the "global net effect of human activities since 1750 has been one of warming".

According to the U.S. Environmental Protection Agency (EPA) inventory of greenhouse gas emissions[2], the U.S. emitted a total of 7,260.4 Tg CO_2-eq/yr in 2005, an increase of 16.3% from 1990 emissions, 23% of these emissions (1669.9 Tg CO_2-eq/yr) were from petroleum-based transportation fuels.

Renewable biomass energy technologies will be a critical tool in the effort to reduce our national transportation emissions. Renewable fuels are especially attrac-

[1] IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group 1 to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L.Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[2] U.S. Environmental Protection Agency. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2005. 15 April 2007.

tive as a low-or no-carbon alternative to petroleum-based fuels. The technology is sustainable, rapid to implement, and available across the entire United States. By utilizing the renewable biomass resources from America's farms, forests, and open spaces, we have the potential to lower our greenhouse gas emissions, increase energy security and stimulate economic development in rural communities. Renewable fuels from biomass feedstocks (coupled with increased fuel efficiency, plug-in hybrids, and similar technologies) provide the most immediate means to begin dealing with the 23% of U.S. emissions associated with petroleum transportation fuels.

On December 19, 2007 the President signed the Energy Independence and Security Act which substantially increases the Renewable Fuel Standard, calling for the production by 2022 of 36 billion gallons of renewable fuels—defined as fuels derived from renewable biomass that achieve at least a 20% reduction (for all new facilities) in greenhouse gas emissions relative to gasoline or diesel, as determined by a "cradle-to-grave" life-cycle analysis that includes direct and indirect greenhouse gas emissions. Within the 36 billion gallon mandate, 21 billion gallons must come from advanced biofuels—those derived from biomass other than corn starch that achieve at least a 50% reduction in greenhouse gas emissions. There are further carve-outs within these 21 billion gallons biomass-derived diesel fuels and cellulosic fuels (which must meet a 60% reduction in emissions).

This is an aggressive and ambitious RFS. It is laudable, but it stirs up a lot of difficult issues regarding the sustainability of biofuels in general. Among these issues are some fundamental agriculture issues, including competition for land and natural resource protection. The competition for land is a complicated issue that stems from the perceived differences between growing crops for food, feed, fiber and now fuel. Unquestionably, the production of renewable fuels needs to be done in a way which enhances natural resources, including soils, water supply and native habitats. Production of renewable feedstocks 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 is much greater compared with conventional agriculture and fossil fuel production and consumption. In addition to these sustainability and agricultural concerns, the indirect emissions of greenhouse gases from deforestation and environmental degradation can negate the emissions savings in using renewable fuels.

EESI strongly supports the existing greenhouse gas screens. After all, without them we have no guarantee that the RFS will be able to accomplish one of its most fundamental purposes—the reduction of climate change-inducing greenhouse gas emissions from transportation fuels.

These emissions screens are not easy to satisfy, but they are certainly possible to meet. One of the biggest factors in whether or not a given renewable fuel will meet the screens is the choice of feedstocks that go into the fuel. A report by the Union of Concerned Scientists (UCS) reinforces the widely-accepted average direct life-cycle emissions reductions (compared to gasoline) of 20% for ethanol from corn starch and 80% for cellulosic ethanol.[3] These statistics immediately suggest two things—A) that the emissions screens in the current RFS can be met and B) that cellulosic fuels have the potential to dramatically reduce our greenhouse emissions compared to either gasoline or corn-starch ethanol.

The importance of cellulosic renewable fuels to the future of the United States has been hailed by many policymakers from across the country, including the President. Cellulosic biofuels can be produced from a highly diverse array of feedstocks, allowing every region of the country to be a potential producer of this fuel. (Cellulose is found in all plant/organic matter.) As a result, support for cellulosic fuels has brought together a broad array of constituents including environmentalists, farmers, national security experts, industry, and religious leaders.

Depending on choice of feedstock and agricultural practices, some cellulosic renewable fuels have the potential to substantially exceed the average 80% emission reduction found by UCS. A 5-yr field study jointly undertaken by the USDA Agricultural Research Service (ARS) and the University of Nebraska found a 94% reduction in direct life-cycle greenhouse emissions from switchgrass-based ethanol compared to gasoline[4].

These numbers only tell part of the story, however, in that they take into account only the direct life-cycle emissions of these fuels: the emissions associated with growing, harvesting, storing, and transporting the feedstock, as well as the emissions associated with producing the fuel itself. Included among these direct emissions are emissions associated with direct land changes—e.g. the clearing of forest

[3] Union of Concerned Scientists. Biofuels: An Important Part of a Low-Carbon Diet.

[4] Schmer, M.R., K.P. Vogel, R.B. Mitchell, and R.K. Perrin, 2008. Net energy of cellulosic ethanol from switchgrass. Proceedings of the National Academy of Sciences. 105(2): 464–469.

or native grassland to grow the feedstock. The RFS explicitly includes 'significant indirect land use emissions' in its GHG screens, however. These are the emissions associated with agricultural expansion in another location (either in the U.S. or abroad) directly resulting from the increased demand for agricultural products caused by shifting domestic farmland from food to fuel production—e.g. Reallocation of vegetable oils from cooking oil to biodiesel that results in the clearing of Indonesian rainforest to make way for palm oil plantations to fill cooking oil demand.

EESI supports the inclusion of indirect land use effects in the definition of 'lifecycle greenhouse gas emissions.' A ton of carbon is a ton of carbon, whether it is produced directly as a result of the production process or indirectly as a result of market effects. If we do not include these effects in the calculation of life-cycle emissions, we cannot know whether the emissions profile of a given renewable fuel is better or worse than an equivalent petroleum-based fuel. Without this information, we cannot be certain that the RFS will succeed in reducing our transportation emissions.

Since it is essential to include indirect greenhouse gas emissions, then, that leaves a very serious problem. It is unclear how to calculate these important numbers. A number of individuals have investigated the problem and the consensus seems to be that data and methods are currently unavailable, but being developed, to estimate these effects with any amount of precision. Problems range from a lack of consistent data on global land use change, to the difficulty of determining which land use changes are attributable to global biofuel production and separating these from changes associated with market globalization and rapid economic development in the developing world.

Despite the lack of hard data, current understanding of the problem suggests that these emissions have the potential to be quite substantial.[5] [6]Until we have the knowledge and the tools to accurately measure these indirect effects, the wisest course of action would be to focus on feedstocks that do not induce land use changes and therefore do not result in indirect greenhouse gas emissions. Fortunately, our nation possesses abundant and readily available feedstocks that satisfy this criterion. These feedstocks include dedicated energy crops, such as algae and some grasses (those that grow on non-agricultural land), as well as an abundant supply of wastes and residues from agriculture, forestry, livestock production, urban wood debris, and clean construction debris.

In order to ensure that feedstock production is pursued sustainably, a national biomass assessment needs to be funded and carried out. The "billion ton study"[7], a joint report issued by the U.S. Department of Energy (DOE) and USDA, was done to determine if "a 30 percent replacement of the current U.S. petroleum consumption with biofuels by 2030," could be accomplished. Although this is a controversial document and many of its conclusions are disputed, it nonetheless currently provides the most rigorous national estimate. In addition to this study, a number of regional biomass assessments have also been, but they are not consistent in scale, content, or methodology. Some of these assessments estimate substantially higher biomass supplies for their state or region than is estimated in the billion ton study.

A national assessment needs to pay specific attention to crop residues, agricultural feedstocks, dedicated energy crops and waste streams. Assessments should be done on a state-by-state basis, and should take into account the specific soil type, climate, precipitation, and nutrient inputs within that state. Furthermore, economic models have to be created and tested to determine and predict feedstock availability and cost. The goal should be to help farmers, foresters, and land managers know which feedstocks are most appropriate to grow where and with as little inputs as possible—this will also help farmers, for example, in making crop decisions.

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[5] Zah, R., H. Böni, M. Gauch, R. Hischier, M. Lehmann, and P. Wägner (Empa).2007. Life Cycle Assessment of Energy Products: Environmental Impact Assessment of Biofuels.

[6] O'Hare, M. Greenhouse Gas Emissions from Indirect Land Use Change. Presented at: CARB LCFS Working Group 3, Sacremento, CT., 17 January 2008.

[7] Oak Ridge National Laboratory (DOE) and USDA. DOE GO-102995-2135, Biomass as Feedstock for a Bioenergy and Bioproducts Industry: Feasibility of a Billion-Ton Annual Supply. April 2005.

AGRICULTURAL RESIDUES

Current assessments can give us some idea of the vast resources of agricultural residues that are available.* The billion ton study[8] estimated that 998 million dry tons of agricultural residues could be removed sustainably from farmlands in this country. This includes corn stover, grain straw, leafy material, and woody biomass produced as agricultural byproducts. The 998 million ton figure does not include the residues that must be left on the land to avoid soil erosion and nutrient loss.

A report published by the Sun Grant Institute at the University of Tennessee-Knoxville calculated that in 2005, 10 mid-western states produced an available 68,744,504 million dry tons of corn stover (excluding highly erodible land and using sustainable removal rates of <45%)[9]

According to a biofuels report by the Oregon Environmental Council[10], the state of Oregon alone could sustainable produce 1.4 million dry tons of wheat residues—enough to produce approximately 84 million gallons of ethanol. Another million gallons could be made from the 250,000 dry tons of seed grass straw that the state could sustainably produce each year.

The Western Governors' Association conducted a regional assessment of the biomass resources in the 23 western states and Pacific holdings[11]. As part of this assessment, they created a series of supply curves to determine the potential supply of agricultural residues at various prices. At an average price of $35/ton of residue, the entire region could yield an estimated 24,537,007 dry tons of agricultural biomass. At $50/ton, this number climbs to 59,588,270 dry tons (see Table 1). In addition, the reported estimated between 516,367 dry tons (at $20/ton) and 49,521,480 dry tons (at $70/ton) of native prairie grasses and 2,706,031 dry tons of woody orchard residues.

Table 1. Estimated Supply of Various Agricultural Residues in the Western U.S. at Two Different Prices. Western Governors' Association. 2008.

Feedstock	Supply (dry tons) at $35/ton	Supply (dry tons) at $50/ton
Corn stover	153,018	788,081
Winter wheat straw	2,728,816	3,578, 682
Spring wheat straw	255,864	579,335
Barley/oat/rye straw	21,399,308	54,642,172
Total	24,537,007	59,588,270

ALGAE

Algae represent another feedstock with great potential for high yields and little or no indirect emissions, because it does not require the use of arable land currently in food production. A report summarizing the DOE Aquatic Species Program estimated that algae could produce up to 15,000 gallons of renewable fuel per acre per year in open ponds[12]. Additionally, closed-loop algaculture systems promise to deliver even higher yields from small areas and can be located on marginal and non-productive lands. These systems, in which algae is cultivated in large plastic bags, have the potential to produce up to 100,000 gallons of algal oil per acre per year.[13]

*Availability refers, in general, to material that is physically accessible, cost-effective to remove, and which can be used without incurring any negative environmental or social costs. Methods of defining and estimating availability differ among assessments and reports.

[8] Oak Ridge National Laboratory (DOE) and USDA. DOE GO-102995-2135, Biomass as Feedstock for a Bioenergy and Bioproducts Industry: Feasibility of a Billion-Ton Annual Supply. April 2005. Figure 1.

[9] Burton English, Jamey Menard, and Daniel de la Torre Ugarte. Using Corn Stover for Ethanol Production: A Look at the Regional Economic Impacts for Selected Midwestern States. Department of Agricultural Economics, University of Tennessee—Knoxville.

[10] Gilman, Dan. Fueling Oregon with Sustainable Biofuels. Oregon Environmental Council. October 2005.

[11] Western Governors' Association Biofuels Team. Transportation Fuels for the Future, Biofuels: Part 1. 8 January 2008. Appendix ACR, Appendix HEC, and Appendix O&V.

[12] Sheehan, John, et al. 1998. A Look Back at the US Department of Energy's Aquatic Species Program—Biodiesel from Algae. National Renewable Energy Laboratory, p.iii.

[13] Kram, J.W. Biomass in a Tube. Biomass Magazine. December 2007.

WOODY BIOMASS

Woody biomass from trees and shrubs is another promising cellulosic feedstock. Although the complex structure of wood fibers makes conversion difficult, technologies to accomplish this at a commercial scale are already gaining in momentum with projects such as the Range Fuels facility in Georgia and the two New York facilities—Catalyst Renewables and Mascoma Corporation.

Woody biomass is an incredibly abundant feedstock. Forests cover approximately one third of the nation's land area and much of that acreage is in need of thinning. Thinning describes a harvest activity in which undesirable growing stock (often saplings and small-diameter trees) are removed to reallocate resources (water, nutrients, sunlight) and growing space to desirable growing stock. There are many reasons why thinning is a valuable silvicultural operation. It is used to improve the vigor and growth of healthy trees for timber production and management for certain elements of wildlife habitat. Thinning is often a core component of restoration forestry, as dense, overstocked stands of stressed trees can be more vulnerable to destruction by fires and insect outbreaks.[14]

Thinning is an expensive operation, however, and the ability to thin is often limited by the lack of widespread markets for small-diameter trees and woody biomass. Without this financial outlet, forest and woodlot owners (private or public) can rarely afford to invest in thinning or other stand improvement activities.

A thriving renewable fuels industry would open up markets for forest biomass and make it possible for land managers to invest in a wider range of management activities, including restoration forestry, habitat management for mid-and late-successional species, recreation management, and more sophisticated forms of timber management. By adding value to forests and forest products, the renewable fuels industry is one tool that can help slow down encroachment by urban sprawl, reduce the threat of forest fires and improve the health of forests, while driving local economic development through the creation of jobs in rural communities.

The use of thinning materials and woody residues does not result in indirect emissions. In fact, expanded markets for these materials could provide an additional revenue stream for forest owners, put better forestry practices within the budget of conscientious landowners, and encourage the production of wood products from sustainably managed forests and woodlands. This in turn would result in a reduced demand for imported wood products, many of which are obtained through environmentally destructive (and often illegal) logging in the developing world. In this way, fuels produced from sustainable woody biomass could actually reduce the amount of indirect emissions of greenhouse gases from deforestation.

Given the appropriate markets, the amount of forest biomass that could be sustainably harvested is tremendous. The billion ton report[15] estimates a national supply of 8529.2 million dry tons of forest biomass, of which 108.3 million is available given current market conditions, technologies, and infrastructure (see Table 2). Of the 108.3 million dry tons currently available, 40.9 million dry tons could come from logging residues, 7.8 million dry tons could come from unused residues in sawmills and paper mills (the majority of these residues are utilized internally for heat and power), and 59.6 million dry tons could come from fuel reduction thinnings. This is a small fraction of the approximately 8410 million dry tons that could be thinned from the vast forest acreage that has been identified by the National Forest Plan as being at high risk for catastrophic wildfires. Given expanded markets and technological improvements, a much larger percentage of this material could be made available for renewable fuel production in the future. These numbers represent total availability on federal, state, and private lands.

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[14] Smith, D.M., B.C. Larson, M.J. Kelty, and P.M.S. Ashton. The Practice of Silviculture: Applied Forest Ecology. 9th ed. John Wiley & Sons, Inc., 1996. 560 p.

[15] Oak Ridge National Laboratory (DOE) and USDA. DOE GO-102995-2135, Biomass as Feedstock for a Bioenergy and Bioproducts Industry: Feasibility of a Billion-Ton Annual Supply. April 2005. Tables A.1, A.3, A.5, A.7, A.8.

Table 2. Estimated Quantity of Total and Available Forest Biomass in the United States. U.S. Department of Energy and U.S. Department of Agriculture. 2005.

Feedstock	Total quantity (million dry tons)	Available quantity (million dry tons)
Logging residues	67.1	40.9
Industrial wood residues	52.1	7.8
Hazardous fuels residues	8410	59.6
Total	8529.2	108.3

A number of other assessments provide regional and state estimates of available forest biomass from hazardous fuels reduction, logging residues, and other sources. The Western Governors' Association Report identifies 23 million acres in 12 states that are at high risk from wildfire. Thinning materials from this acreage could provide up to 318 million tons of biomass[16], of which 7.2 tons is immediately accessible and available. According to the Oregon Environmental Council Report, Oregon produces 3 million tons of slash and thinning materials per year, of which 1 million is available for use on a sustainable basis (enough to produce 66 million gallons of ethanol).[17] The California Biomass Collaborative estimated[18] that, in 2005, the state of California possessed more than 86 million dry tons of biomass, of which 34 million dry tons could be sustainably used. Of the total, approximately 31% could come from forestry.

In addition to residues from forest management, considerable quantities of woody biomass can be recovered from urban wood waste. According to the billion ton study, [19] the nation produces 62.3 million dry tons of urban wood waste annually, of which 28.0 million dry tons is available and currently unused (see Table 3).

Table 3. Estimated Quantity of Total and Available Urban Wood Waste in the United States. U.S. Department of Energy and U.S. Department of Agriculture. 2005.

Feedstock	Total quantity (million dry tons)	Available quantity (million dry tons)
Construction debris	11.6	8.6
Demolition debris	27.7	11.7
Yard debris	9.8	1.7
Solid Waste Wood	13.2	6.0
Total	62.3	28.0

Another potential source of woody biomass is disaster debris. Hurricanes, floods, ice damage, and other natural disasters annually destroy significant amounts of urban trees, forest growth, and wooden structures. Very little of this material is recovered and put to a productive use. Instead, it is land filled, incinerated, or piled and burned in the field (which emits greenhouse gases). Increasing the recovery rate for this material would be beneficial for a number of reasons, including reduced fire hazards, recovery of economic losses, and as a potentially significant feedstock for production of renewable fuels. The availability of this material is difficult to predict, however, as it depends largely on chance events. Infrequent, large-scale disasters (like Hurricane Katrina, for example) have the potential to contribute additional millions of dry tons of wood biomass when they occur.

SUGGESTIONS FOR THE RFS

I would like to reiterate my support for the inclusion of the reduction of total GHG emissions in the RFS.

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[16] Western Governors' Association Biofuels Team. Transportation Fuels for the Future, Biofuels: Part 1. 8 January 2008.

[17] Gilman, Dan. Fueling Oregon with Sustainable Biofuels. Oregon Environmental Council. October 2005.

[18] California Biomass Collaborative. CEC-500-2005-066-D. Biomass Resource Assessment in California: In Support of the 2005 Integrated Energy Policy Report. California Energy Commission, Public Interest Energy Research Program. April 2005.

[19] Oak Ridge National Laboratory (DOE) and USDA. DOE GO-102995-2135, Biomass as Feedstock for a Bioenergy and Bioproducts Industry: Feasibility of a Billion-Ton Annual Supply. April 2005. Table A.9

In order to fully accommodate and encourage the use of wastes and residues as feedstocks, it is essential that the definition of renewable biomass' in the RFS be flexible enough to include the wide availability of these feedstocks. The current definition includes algae, yard waste, food residues, crop residues, animal byproducts, and several kinds of woody biomass. This last category is not as inclusive as it should be, however. It excludes forest biomass from a number of sources. Although the definition may provide some exclusionary safeguards intended to protect the environment, these safeguards are not based on forest type, stand structure, or any other ecologically-meaningful characteristics, but on arbitrary distinctions of ownership and minor silvicultural details. Unfortunately, these provisions eliminate an opportunity to support hazardous fuels reduction, reduce the number of possible cellulosic feedstocks for production of renewable fuels, and shatter the hopes of many communities that wish to rid themselves of this material while creating job opportunities in rural areas stricken by unemployment.

The most egregious example is the exclusion of federal forest lands from the definition. We acknowledge concerns about sustainability and our public lands and we feel very strongly about enhancing sustainability of this resource. From an ecological perspective, however, there is no fundamental distinction separating federal forests from private forests in the United States. The entire range of forest types, habitats, and structural elements can be found across both ownerships. In the end, both public and private forests can be managed sustainably and both can be managed unsustainably. Soil requirements, silvicultural methods, harvesting systems and other best-management-practices need to be investigated fully for all forest types. Rare habitats, imperiled forest types, endangered species, and important cultural elements need to be preserved wherever they are found. Responsible environmental stewardship should be the order of the day, but the important factors in determining sustainability guidelines are ecological and silvical characteristics, not the name on the deed.

Removing the exclusion of federal forests could make a sizable quantity of additional feedstock available. For instance, 1996 million dry tons of forest biomass could be generated as a result of areas indentified as being in need of hazardous fuels reduction on National Forests alone.[20] This does not include any U.S. Department of Interior forestland, such as that managed by the Bureau of Land Management, Fish and Wildlife Service, or National Park Service—which are also excluded in the current definition. Nor does it include any materials that could be removed as a result of wildlife habitat management, pest mitigation, recreational management, or stand improvement thinnings.

I specifically highlight hazardous fuels reduction as a source of biomass because of the urgency and national importance placed on this activity. Large, catastrophic wildfires destroy property, threaten communities, reduce air quality, and contribute to atmospheric concentrations of greenhouse gases. One study estimates that large, stand-replacing fires can emit over 2 tons of carbon per hectare.[21] With wildfires on the rise and fire fighting budgets stretched to their limits, the National Fire Plan has identified millions of acres in need of hazardous fuels reduction. As I said before, however, the simple fact is that thinning is an expensive undertaking. If private landowners, with a few dozen or a couple hundred acres, cannot afford to invest in stand improvement thinning, then the government certainly cannot afford to treat millions of acres on the public dollar.

We frequently hear the argument made that public costs would be less (on a per acre) basis if funds were allocated for proactive fuels reduction as opposed to reactive fire fighting. In the long run this is probably true, but the transition in strategies will not be an immediate one and catastrophic fires will continue to be a major element of the landscape in the near future. After the expenditures associated with fighting the fires that are burning today, not much is left to begin restoring the vast acreage at risk of burning tomorrow. It is going to be a slow process. In the meanwhile we need to find a commercial outlet for thinning materials if we hope to deal with an issue of this scale and size.

Renewable transportation fuels could provide that commercial outlet, but only if the necessary markets and infrastructure are developed. Under current market conditions, only 11.7 million dry tons are accessible and available out of the total 1996

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[20] Oak Ridge National Laboratory (DOE) and USDA. DOE GO-102995-2135, Biomass as Feedstock for a Bioenergy and Bioproducts Industry: Feasibility of a Billion-Ton Annual Supply. April 2005. Table A.5

[21] Finkral, A.J. and A.M. Evans. 2007. The effects of a thinning treatment on carbon stocks in a northern Arizona ponderosa pine forest. Unpublished manuscript. 26 p.

million dry tons of thinning materials on National Forests.[22] In many circumstances, thinning materials must be treated on site or transported out of the forest to reduce the possibility of wildfires and the spread of insect infestation. Transportation costs and low market value for this material are limiting factors to its removal, so the majority of thinning materials are chipped in the field or burned in open piles. These open fires are still generating renewable energy, but it is energy that is being wasted instead of being put to productive work in vehicle engines.

A number of projects are trying to move forward, such as the Pacific Ethanol Facility, partially funded by DOE, that will be using wood from BLM land to produce cellulosic ethanol for its new 10% scale facility in Oregon. Projects like this are promising, but they are not enough. The RFS could help to provide a solid, nationwide incentive for this important industry.

Federal forests are not evenly distributed across the nation. In total, they encompass about 43% of the national forest resource or approximately 323 million acres. Of these 323 million acres, 78% are concentrated in Alaska (91 million acres), the Rocky Mountain States (108 million acres), and the Pacific Northwest (55 million acres).[23] These are some of the regions that are most threatened by catastrophic wildfire and are most in need of hazardous fuels reduction treatments. By excluding these forests from the RFS, however, the Congress is essentially removing a necessary economic incentive to conduct these treatments. This could effectively make it impossible to reduce wildfire damage in landscapes strongly dominated by federal forests no matter how thoroughly the small private and state land components are treated.

Another possible side effect of excluding federal forest feedstocks from the RFS is that it may indirectly increase the intensity of feedstock production on non-federal forests, increasing the chance that unsustainable and environmentally-degrading management practices may be used on private and state forests. This could lead to soil erosion, reduced productivity, compromised habitat, and reductions in water quality.

In some locations, residues from sawmills and pulp operations that source materials from both federal and non-federal forests may be ineligible to be used towards the RFS if separating residue streams proves difficult or prohibitively expensive. This problem would also exist in biorefineries—where a number of additional biobased products are produced in addition to renewable transportation fuels as well as heat and power. The biorefinery is a desirable industrial model, as utilization of waste from one process as the feedstock for another minimizes waste, increases sustainability and greatly increases economic viability. These facilities would very likely source from a number of different ownerships.

In addition to the exclusion of federal lands, a good deal of biomass from private lands is excluded from the renewable biomass definition. In essence, the definition includes all biomass from planted trees and tree plantations, but only slash and precommercial thinnings from private forests regenerated from natural regeneration or sprouting. This definition results in a very substantial problem. It draws an arbitrary distinction between, for example, the 20" pine that is planted versus the 20" pine that grows from a seed. This detail has no relevance to species composition, forest structure, habitat value, or ecological functioning. Eligibility should be determined by these and other objective, meaningful silvical characteristics.

Additionally, this language unfairly favors industrial forestry and single-species plantations over diverse, mixed woodlands and nonindustrial private forest land. Not only do these forests generally boast higher biodiversity, but the periodic income from selective harvesting on these properties is often the only thing standing between these forests and the very real pressure to sell out to real-estate developers.

As more and more acres of forest land are bulldozed to make way for suburbia or burned in massive conflagrations, more and more environmental organizations are beginning to see the value in sustainable, multiple value forest management for helping to ensure the perpetuation of diverse, vibrant forest ecosystems and the many values that they offer—clean water, wildlife habitat, recreational opportunities, and diverse forest products, including renewable fuels. A number of NGOS, including the Oregon Environmental Council (". . . if renewable fuels are produced sustainably, they can generate substantial reductions in greenhouse gas emissions and improvements in air and water quality . . . Thinning and removal of biomass from these forests [at risk from fire] would improve forest and provide a substantial supply of biomass for energy production. While there are clear environmental bene-

[22] Oak Ridge National Laboratory (DOE) and USDA. DOE GO-102995-2135, Biomass as Feedstock for a Bioenergy and Bioproducts Industry: Feasibility of a Billion-Ton Annual Supply. April 2005. Table A.5

[23] Mila Alvarez. "The State of America's Forests." Society of American Foresters: 2007.

fits to greater utilization of forest biomass, there are also real sustainability concerns."[24]) and the Pinchot Institute for Conservation (". . . wood energy could help address several longstanding challenges in sustainable forest management: treating hazardous fuels accumulations to minimize future threat of wildfires, creating economic outlets for small-diameter and low-grade wood to reduce forest degradation, and strengthening community economic development on the basis of sustainable use of local forest resources.")[25] have come out with statements identifying the potential value in renewable energy to make possible a better and more sustainable form of forestry.

Both of these organizations have also stressed that without proper sustainability guidelines, a market for woody biomass could have some negative repercussions on forest resources. Sustainability is Essential. This can not be stressed enough, but sustainability standards must be based on ecologically-meaningful criteria, not arbitrary exclusions based on ownership and regeneration methods. What is and what is not sustainable depends on local conditions, such as forest type, climate regime, ecosystem function, and other specific location-based characteristics. In locations where it is appropriate, hazardous fuels reduction could provide a huge percentage of available woody feedstocks. In areas where this type of management is not appropriate, woody biomass can be harvested as part of habitat management or stand improvement activities. Biomass harvests must be integrated into comprehensive forest management strategies that aim to satisfy multiple needs and values sustainably. In this lies good forest management. A number of organizations, including EESI and the Pinchot Institute, currently have initiatives under way to investigate how extraction of biomass for renewable energy can be soundly integrated into existing goals and strategies for sustainable management.

In summary, the RFS is a very aggressive mandate, but it is not an impossible one, as long as we do not exclude any of those feedstocks that can be produced sustainably and that meet important direct and indirect emissions screens. With conversion technologies still in the works, we must keep our options open and strive to produce renewable fuels that meet objective and appropriate standards of sustainability.

In closing, I feel that it is important to stress that renewable fuels are one piece of the solution to transportation emissions, but not a complete solution. Renewable fuels will be ONE part of a larger strategy, but so will increased vehicle fuel efficiency, expanded public transit, and "smart growth" practices (enabling more transit, biking and walking). In addition, technologies such as E85 engine optimization and plug-in hybrids will allow us to get more out of each gallon of fuel. It would be extremely wasteful try to replace petroleum fuels gallon for gallon with biofuels. This approach would not be effective at reducing total greenhouse gas emissions and, in fact, would probably increase opposition to renewable fuel production. There already is a backlash against substantial increased production of renewable fuels. Concerns over the fuel vs. food debate and ecosystem degradation would be bolstered if the United States were to try to replace the 140 billion gallons of gasoline and 9 billion gallons of diesel used annually. Instead, a vision of integrated low-carbon sustainable renewable fuels production must be combined with other technologies to reduce the amount of transportation fuel needed for a long term solution to climate change.

I would like to thank the committee once again for the opportunity to speak before you. Let me also extend my gratitude for your part in creating and passing this important renewable fuels standard and recognizing the role it plays in our climate protection and national security efforts.

The CHAIRMAN. Thank you very much. Mr. Drevna, go right ahead.

STATEMENT OF CHARLES T. DREVNA, PRESIDENT, NATIONAL PETROCHEMICAL AND REFINERS ASSOCIATION

Mr. DREVNA. Thank you. Thank you, Mr. Chairman, and Ranking Member Domenici for the opportunity to share our thoughts today about the implementation of the 2007 Energy Bill.

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[24] Gilman, Dan. Fueling Oregon with Sustainable Biofuels. Oregon Environmental Council. October 2005. p33.

[25] Sample, V. Alaric. Ensuring Forest Sustainability in the Development of Wood-based Bioenergy. Pinchot Institute For Conservation. 2007. Page 6.

As you said in your opening statement, sir, the new RFS creates a number of challenges in the fuel marketplace, and we believe many of which could well be insurmountable. Nevertheless, we stand ready to work with you to ensure a stable and effective fuels policy that utilizes a diversity of resources. Before Congress sent H.R. 6 to the President, the concerns about renewable fuels mandates and the unintended consequences for both American consumers and the environment were fully disclosed by a very cross-sectioned of impacted interests.

Everyone is aware of the reports showing a relationship between rising feed prices and increased biofuel use. This situation, noted many times by a really politically diverse media, translates directly into higher food prices for American consumers. Other recent studies noted the negative impact biofuels mandates are having on the environment. A new memorandum from the U.C. Berkeley researchers to the California Resources Board warns of indirect CO_2 emission increases greater than those of fossil fuels, as a result of land use changes to accommodate larger crops.

Another report from a Nobel laureate warns that the use of crops "for energy production can lead to nitrous oxide emissions large enough to cause climate warming instead of cooling by saved fossil CO_2." As we all know, nitrous oxide is 300 times more potent than CO_2 within the context of climate debate.

Higher ethanol blends also result in increased DOCs, a smog precursor. Given that the upcoming revised 8R ozone max, which I believe the administrator has to get out by March 12 or so, could result in a number of new ozone nonattainment areas for counties across the Nation, for counties of members of every one of this committee, who are right now in attainment will be in nonattainment, it's unlikely that the mandated level of ethanol or biofuels could be distributed without exacerbating smog problems in those areas.

These warnings, and they continue to come, were unfortunately ignored. Secretary Karsner indicated—and I think he used the word "holistic approach." We couldn't agree more. We need a holistic approach to what our fuels policies should look like. Unfortunately for the refining industry, when you add up all the things I just mentioned, and then you throw in the fact that another committee of the Senate is looking at climate change legislation, my industry is looking at potentially conflicting legislation.

Low carbon fuel standards, cradle-to-grave carbon analysis—We don't know where that's going, but this law has already been enacted, and we have to comply. Let's talk for a moment about flex-fuel vehicles. There are approximately 11 million alternative fuel vehicles on the road today, according to the Alliance for Automobile Manufacturers. A small fraction of the 240 million-plus vehicles Americans are currently driving.

The National Ethanol Vehicle Coalition estimates about 6 million of these are FFVs. In addition, over the next several years, automobile makers have indicated that while they intend to produce more FFVs, they will still be producing gasoline-only or hybrid vehicles at a rate of about 7 or 8 to 1, in relation to FFV production. The large volumes of renewable fuels mandated into new law will essentially force fuel blends greater than E10 into our Nation's gasoline supply.

Preliminary analysis indicates these blends must be made by as early as 2010. That's less than 2 years away. The only vehicles capable of running such blends, until EPA, as the questions were asked to Secretary Meyers, are E85 vehicles. The automakers are going to have to warranty anything over those legacy vehicles, the 140 million plus the new ones that I referred to.

Let me turn to the challenges associated with biofuel transportation and distribution. Last February, I appeared before this committee to discuss the infrastructure challenge associated not only with the implementation of EPACT 2005, but also with the potential increases to mandated volumes of renewables. Nothing has changed since then, except the dramatic frontloaded expansion of the RFS in the new law, which will increase strain on already congested transportation infrastructure.

A June 2007 GAO report focused on the lack of infrastructure and the higher cost associated with biofuels. Among several findings, the report noted the cost of transporting ethanol to fueling stations could range from 13 cents to 18 cents per gallon. In contrast, the overall cost of transporting gasoline from refineries to refueling stations is estimated to be 3 to 5 cents a gallon.

The new law mandates blending of 100 million gallons of cellulosic ethanol in 2010. The Food and Agriculture Policy Research Institute estimates a shortfall of 73 million gallons from the 2010 cellulosic target. The safety valve or waiver provision of the RFS is inadequate. It provides for a too-little-too-late retrospective attempt to address potential renewable supply shortfalls.

Despite these challenges I discussed, the refiners and blenders are liable in the new law, regardless of biofuel supply shortages. We are held responsible. But more importantly, the consumer ultimately pays if the renewable industry fails to produce. It's hardly fair, but that's the reality in the new law. Once again, I want to thank you for the opportunity to appear before you today, and I look forward to your questions.

[The prepared statement of Mr. Drevna follows:]

PREPARED STATEMENT OF CHARLES T. DREVNA, PRESIDENT, NATIONAL PETROCHEMICAL & REFINERS ASSOCIATION

Chairman Bingaman, Ranking Member Domenici, and members of the committee, I am Charles T. Drevna, President of NPRA, the National Petrochemical and Refiners Association. NPRA is a national trade association with more than 450 members, including those who own or operate virtually all U.S. refining capacity, as well as most of the nation's petrochemical manufacturers who supply "building block" chemicals necessary to produce products ranging from pharmaceuticals to fertilizer to Kevlar. I am grateful for the opportunity to share our views on the significant, and unfortunately negative, impacts that the recently enacted renewable fuel standard increase will have on energy markets, consumers and the American economy.

There is universal agreement that alternative fuels will continue to be a strong and growing component of our nation's transportation fuel mix. However, as we have stated on many occasions, including last year before this committee, NPRA opposes the mandated use of alternative fuels and supports the sensible and workable integration of alternative fuels into the marketplace based on market principles. Energy policy based on mandates is not a recipe for success. There is no free market if every gallon of biofuels—including those that do not exist—is mandated. Mandates distort markets and result in stifled competition and innovation.

Ethanol is currently used in more than half of U.S. gasoline supplies. And despite the misperceptions, our industry supports the use of renewables. In fact, we are currently the largest consumers of ethanol and will continue to rely on ethanol as a

vital gasoline blend stock. However, we believe that allowing the market to operate is the best way to address consumer needs at reasonable prices.

Before Congress sent the Energy Independence and Security Act of 2007 (H.R. 6) to the President for his signature, the facts about ethanol mandates and the unintended consequences for both American consumers and the environment were fully disclosed. Unfortunately, these warnings were ignored. A June 2007 GAO report highlighted the higher costs associated with biofuels. Among several findings, the report noted: "According to NREL (National Renewable Energy Laboratory), the overall cost of transporting ethanol from production plants to fueling stations is estimated to range from 13 cents per gallon to 18 cents per gallon, depending on the distance traveled and the mode of transportation. In contrast, the overall cost of transporting petroleum fuels from refineries to fueling stations is estimated on a nationwide basis to be about 3 to 5 cents per gallon."[1] The dramatic increase in the biofuels mandate under the new law will increase strain on our already congested transportation infrastructure, which could very likely drive the costs of shipping ethanol up even further. In addition to these costs being passed on to consumers, strained transportation avenues could create fuel supply problems.

Transportation challenges, the costs and strains, are only some of the problems associated with dramatically increased mandates of renewable fuels. Ethanol-powered vehicles also have lower fuel efficiency (due to ethanol's lower energy content compared to regular gasoline), as well as limited availability and infrastructure. According to the Department of Energy's Office of Energy Efficiency and Renewable Energy, flex fuel vehicles (FFVs)—cars that can run on either gasoline or a mixture of 85 percent ethanol and 15 percent gasoline (known as E85)—get "about 20–30% fewer miles per gallon when fueled with E85."[2] Given this situation, AAA releases an "E85 MPG/BTU Adjusted Price" in its daily fuel gauge report. It has not been uncommon for this report to show an E85 adjusted price that exceeds the price of a gallon of gasoline by as much as 80 cents.[3]

The limited number of FFVs is also a problem if significantly larger volumes of renewable fuels are to be forced into the market. The only vehicles that can operate on fuel blended with more than 10 percent ethanol (known as "E-10") are flex fuel vehicles. The Alliance for Automobile Manufacturers' website (www.discoveralternatives.org) notes there are currently 11 million alternative fuel vehicles on American roads—a small fraction of the 240 million plus vehicles Americans are driving today.[4] The National Ethanol Vehicle Coalition estimates about 6 million of these are FFVs.[5] In addition, over the next several years, automakers have indicated that while they intend to produce more FFVs, they will still be producing gasoline-only vehicles at a rate of about seven or eight to one in relation to FFV production. The new ethanol mandate will most likely require fuel blends in excess of E-10 possibly as early as 2010. However, in addition to existing legacy fleets (e.g. cars that have been purchased up to this point in time that run only on gasoline and won't be retired for several years), there will be a new class of vehicles that may be unable to operate on required fuel blends. This is particularly important given the fact engine and fuel pump makers will not provide warranties for equipment if blends greater than E-10 are used with those products. I will address this in greater detail later in my testimony.

Not only are biofuels more costly and less efficient than gasoline from a fuel supply perspective, but several recent studies and reports reveal biofuels mandates have led to price increases for food and unintended environmental consequences. Several trade associations representing grocers to restaurant owners to cattlemen note how biofuels mandates have dramatically increased the price of corn, making feed for livestock and cattle more expensive. This situation translates directly into higher food prices for American consumers. A FarmEcon.com study noted: "The ethanol subsidy program is now increasing the cost of food production though side effects on major crop prices and plantings. The cost increases are already starting to show up in the prices of meat, poultry, dairy, bread, cereals and many other prod-

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[1] U.S. Government Accountability Office, "Biofuels: DOE Lacks a Strategic Approach to Coordinate Increasing Production with Infrastructure Development and Vehicle Needs," GAO-07-713, June 2007, p. 23.

[2] 2U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Fueleconomy.gov, http://www.fueleconomy.gov/feg/flextech.shtml.

[3] For daily price information from AAA, see http://www.fuelgaugereport.com/.

[4] U.S. Department of Transportation, Bureau of Transportation Statistics, "National Transportation Statistics 2007": http://www.bts.gov/publications/national__transportation__statistics/html/table__01__11.html.

[5] National Ethanol Vehicle Coalition website: http://www.e85fuel.com/e85101/faqs/number__ffvs.php.

ucts made from grains and soybeans."[6] The OECD has also expressed concern over the food-vs-fuel conflict that has arisen from biofuels mandates.[7]

In addition to food price and supply effects, other recent studies have noted the negative impacts biofuels mandates are having on the environment. An Environmental Defense report revealed how a dramatic increase in ethanol plants is draining the Ogallala Aquifer, which stretches from Texas to Wyoming.[8] The National Academy of Sciences has also written a report on the negative water supply impacts of increased biofuels production.[9] Press reports from last year described how an increase in farm waste from the corn boom flowing into the Mississippi River has created an area off the Louisiana coast where shrimp and other sea life cannot survive.[10] Finally, several scientists say dramatically increased biofuels production may significantly increase greenhouse gas emissions. Nobel Prize winner Paul Crutzen concluded increased biofuels production is accompanied with a dramatic increase of nitrous oxide (N2O) emissions, which have nearly 300 times greater warming potential than CO_2.[11] The European Union recently passed a law that may essentially ban certain biofuels due to environmental impacts.[12]

While many point to cellulosic ethanol as a potential solution to these problems, that particular fuel poses its own set of challenges. Cellulosic ethanol technology is still very costly and is not commercially available—let alone produced at levels adequate to meet the new mandates in the new energy law. Early last year, the Energy Information Administration noted, "Capital costs for a first-of-a-kind cellulosic ethanol plant with a capacity of 50 million gallon per year are estimated by one leading producer to be $375 million (2005 dollars), as compared with $67 million for a corn-based plant of similar size, and investment risk is high for a large-scale cellulosic ethanol production facility."[13] The report noted that given those costs, no cellulosic plant had been built or was in operation at that time (February 2007). At 5 that same time last year, the Department of Energy announced they were allocating $385 million to help fund six cellulosic ethanol plants that would produce about 130 million gallons annually, but it is highly unlikely those plants will be producing at full capacity in time to meet the new law's 2010 mandate of 100 million gallons, and will not produce enough for the 250 million gallon target for 2011.[14]

The Energy Policy Act of 2005 included a cellulosic ethanol mandate of 250 million gallons starting in 2013. The Food and Agriculture Policy Research Institute (FAPRI), however, projects only about 213 million gallons of cellulosic may be produced in that year.[15] This adds little support to the argument that a mandate will drive the technology and economics of producing a certain product. As previously mentioned, the new energy law mandates 100 million gallons of cellulosic in 2010—less than two years from now. FAPRI's estimate on cellulosic production for that year is only 27 million gallons—27 percent of what is required in the law. That's a lot of ground to make up in a short time frame. Failure to meet these figures will prevent refiners from complying with the law, leading not only to cost increases from unavoidable and onerous financial penalties, but potentially creating significant supply shortages.

The new energy law calls for a Renewable Fuels Standard with not one but four different mandates that will equal 36 billion gallons by 2022. It requires that 9 billion gallons of renewable fuel be blended into the transportation fuel supply this year, ratcheting up to 36 billion gallons in 2022. In addition, it contains three other

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[6] Dr. Thomas Elam, Fuel Ethanol Subsidies: An Economic Perspective, FarmEcon.com, September 19, 2007, p. 2.

[7] Richard Doornbosch and Ronald Steenblik, Biofuels: Is The Cure Worse Than The Disease?, Organisation for Economic Co-operation and Development , September 2007.

[8] Martha G. Roberts, Timothy D. Male, Theodore P. Toombs, "Potential Impacts of Biofuels Expansion on Natural Resources: A Case Study of the Ogallala Aquifer Region," Environmental Defense, October 2007.

[9] National Academy of Sciences, "Report in Brief: Water Implications of Biofuels Production in the United States," October 2007.

[10] Tony Cox, "Ethanol Demand Seen Harming U.S. Fishermen," Bloomberg, July 23, 2007.

[11] P. J. Crutzen, A. R. Mosier, K. A. Smith, and W. Winiwarter, "N2O Release from Agro-Biofuel Production Negates Global Warming Reduction by Replacing Fossil Fuels," Atmospheric Chemistry and Physics Discussions, August 1, 2007.

[12] John W. Miller, "EU is Planning Measures to Protect Biofuels Industry," January 23, 2008, P.A11.

[13] U.S. Energy Information Administration, "Biofuels in the U.S. Transportation Sector," February 2007: http://www.eia.doe.gov/oiaf/analysispaper/biomass.html.

[14] Wong, Jetta, "U.S. Bioenergy Policies: What is Currently Being Done and What Needs to be Done?", Environmental & Energy Study Institute, May 8, 2007, p. 13: http://www.eesi.org/publications/Presentations/2007/jw_swedish_5-8-07.pdf.

[15] Food and Agricultural Policy Research Institute, "World Biofuels: FAPRI 2007 Agricultural Outlook," p. 319.

subset mandates: an "advanced biofuel" requirement of 600 million gallons in 2009, scaling up to 21 billion gallons in 2022; a specific cellulosic biofuel mandate of 100 million gallons in 2010, ratcheting up to 16 billion gallons in 2022; and a biodiesel mandate of 500 million gallons in 2009 moving up to 1 billion gallons in 2012. Each of these fuels has to reach certain carbon reduction targets. We understand that this is the law of the land and you have the commitment of the domestic refining industry that we will do our very best to comply. However, this mandate will have significant detrimental effects to our country and its consumers that extend beyond what could be accomplished through any sort of legislative change short of repeal.

THE PETROLEUM INDUSTRY FACES COMPLIANCE PROBLEMS NOW

The Energy Policy Act of 2005 created the first mandatory Renewable Fuel Standard (referred to as RFS1 later in this testimony). It required 7.5 billion gallons of ethanol to be blended into our nation's fuel supply by 2012, with refiners responsible for showing compliance with the mandate through a credit program. EPA promulgated comprehensive regulations (72 FR 23900; 5/1/07) implementing this law and the regulatory program began on September 1, 2007. It requires that the mandated volumes of renewable fuels for the appropriate compliance year (i.e. ethanol and biodiesel) be used in transportation fuel supply through a credit trading and banking program. EPA created an averaging program with a calendar year compliance period that stipulates what percentage of RFS credits refiners must hand over in relation to their contribution to our country's fuel supply in order to comply with the law.

The new energy bill requires 9.0 billion gallons of renewable fuels in 2008. Assume hypothetically for the moment that 12 billion gallons of renewable fuels actually will be produced and imported in 2008 (at best a problematic assumption). This does not help a refiner's RFS compliance in 2008 unless at least 9.0 billion gallons is actually blended in gasoline or diesel. It is most doubtful there is enough infrastructure available for that to happen.

Gasoline is a hydrocarbon. When gasoline is combusted in a vehicle, a portion of the exhaust emissions that come from the tailpipe consist of hydrocarbons. Hydrocarbon emissions also evaporate from a vehicle's gasoline tank on a hot day. Such emissions are a precursor to the formation of ground-level ozone, or smog. One strategy to reduce ozone concentrations is to limit hydrocarbon emissions from the combustion of gasoline. This can be accomplished by a maximum standard on the Reid vapor pressure (RVP) of summer gasoline. RVP is an indicator of gasoline's volatility. Lower RVP reduces 7 gasoline's hydrocarbon emissions. Summer RVP standards are usually a per-gallon maximum 9.0, 7.8, or 7.0 pounds per square inch (psi). EPA and states have controlled summer gasoline RVP for over 15 years.

When ethanol is added to gasoline, the gasohol blend has a higher RVP than gasoline without ethanol. Therefore, adding ethanol to gasoline can exceed RVP limits. Section 211(h)(4) of the Clean Air Act provides a 1 psi RVP waiver (i.e. fuel blends can be 1 psi higher than the applicable maximum 9.0, 7.8, or 7.0 psi) for conventional gasoline with 9–10 vol% ethanol. This means that gasohol can exceed the applicable RVP limit by 1 psi if the blend contains between 9 and 10 vol% ethanol, leading to the formation of more smog-creating emissions.

If a delivery truck pulls up to a retail station in the summer with a load of gasohol (E10—10 percent ethanol, 90 percent gasoline) and the underground retail tank has had no E10 deliveries before, then the RVP regulation may be violated because the retail tank would have less than 9 vol% ethanol (the average of summer conventional gasoline without ethanol still in the tank and the new delivery of E10 could result in less than E9 after the new delivery). Therefore, if the retail station starts the summer with conventional gasoline without any ethanol, it cannot convert to E10 until the summer season ends and the summer RVP regulation does not apply. This obviously constrains the conversion of conventional gasoline retail stations to E10 this summer.

As previously noted, the RFS program includes credit banking and trading. RFS credits are called renewable identification numbers (RINs). Each volume of renewable fuel produced is assigned a RIN that is separated from that physical volume when it is blended into the fuel supply. Refiners then buy that RIN credit from the terminal doing the blending and use it for RFS compliance. Sometimes refineries detach the credits themselves if they blend ethanol onsite (which only happens for an extremely small percentage of the fuel supply) or if they own the terminal doing the blending (which isn't always the case). RINs cannot be used for compliance by a refiner until it is detached from a barrel of ethanol or biodiesel (usually when it is blended with gasoline or diesel).

One RFS compliance option for refiners in 2008 is carryover of a 2008 RFS deficit to 2009. However, that refiner cannot carry over a deficit for two consecutive years (see Clean Air Act section 211(o)(5)(D), inserted by the Energy Policy Act of 2005, and RFS1 regulations at 40 CFR 80.1127(b)). It is not clear that that refiners can fully comply in 2009 with 2009 RINs and purchase additional RINs in 2009 to also meet its RFS deficit for 2008. The RIN supply in 2009 may not be large enough. Lots of ethanol may be produced and imported in 2009, but not all of it may be blended in gasoline in 2009 and release RINs that be used by a refiner to demonstrate compliance.

Certainly it is possible that some refiners will meet their RFS obligation in 2008 without a deficit carryover. However, it is unlikely that all refiners will meet their RFS obligation in 2008 without one. It may also be unlikely that all refiners will be able to meet out year obligations given the limitations on deficit carryovers.

RINS COULD BE INVALIDATED BY EPA

Section 202(a)(1) of H.R. 6 states: ". . . and, in the case of any such renewable fuel produced from new facilities that commence construction after the date of enactment of this sentence, achieves at least a 20 percent reduction in lifecycle greenhouse gas emissions compared to baseline lifecycle greenhouse gas emissions." This is repeated in section 210(a)(1) with explicit guidance for this year: "For calendar year 2008, transportation fuel sold or introduced into commerce in the United States (except in noncontiguous States or territories), that is produced from facilities that commence construction after the date of enactment of this Act shall be treated as renewable fuel within the meaning of section 211(o) of the Clean Air Act only if it achieves at least a 20 percent reduction in lifecycle greenhouse gas emissions compared to baseline lifecycle greenhouse gas emissions."

These two legislative provisions raise doubts about the validity of RINs generated by plants that commence construction after enactment in December 2007. That new facility will produce ethanol or biodiesel with RINs that could be declared later by EPA as invalid because the new facility does not comply with EPA's new RFS rules (not yet promulgated and hereafter referred to as RFS2) to implement these legislative provisions. The refiner is required by the existing RFS regulations (hereafter referred to as RFS1) at 40 CFR 80.1131 to replace invalid RINs with valid RINs, "regardless of the party's good faith belief that the RINs were valid at the time they were acquired." The existing provision relating to RIN validity and lack of clarification on whether or not RINs will be good under RFS2 will contribute to market instability this year because of the lack of certainty that all RINs are valid.

Section 210(a)(1) states: "For calendar years 2008 and 2009, any ethanol plant that is fired with natural gas, biomass, or any combination thereof is deemed to be in compliance with such 20 percent reduction requirement and with the 20 percent reduction requirement of section 211(o)(1) of the Clean Air Act. The terms used in this subsection shall have the same meaning as provided in the amendment made by this Act to section 211(o) of the Clean Air Act." This does not apply to new biodiesel plants. Furthermore, this legislative provision ensures that new ethanol plants "fired with natural gas, biomass, or any combination thereof is deemed to be in compliance" in 2008 and 2009, but does not guarantee that they will be in compliance after 2009. Therefore, this legislative provision also creates the possibility that RINs from new plants could be declared invalid later by EPA.

This uncertainty will contribute to RIN market instability this year and in out years because of the lack of assurance that all RINs are valid.

MARKET SPECULATORS COULD ADVERSELY INFLUENCE RIN SUPPLIES

Given the lack of supply, infrastructure and the mandate's aggressive schedule, the RIN market will be extremely tight this year and for the foreseeable future, creating more impetus for speculators to try to profit through creating RIN scarcity. Such an occurrence could contribute to an increase in RIN prices and impact prices consumers pay at the pump.

In 40 CFR 80.1128(b) of the RFS1 regulations, EPA permits any party that has registered with the Agency to hold title to an unassigned RIN. Therefore, a speculator who is not a RFS obligated party can buy RINs for later resale. This situation could take RINs off the market for a while and contribute to perceptions of short-term RIN shortages. In other words, speculators could hoard RINs for the sole purpose of trying to drive up their price.

NEW CELLULOSIC BIOFUEL WAIVER PROVISIONS PROVIDE FOR LAST-MINUTE REGULATORY CHANGES

The new energy law added a waiver provision for cellulosic biofuel (see Clean Air Act section 211(o)(7)(D)). EPA can reduce the applicable regulatory volume of cellulosic biofuel if the projected volume is expected to be lower than the statutory volume. If the Agency makes this decision, then it must notify obligated parties "not later than November 30 of the preceding calendar year." In addition, "For any calendar year in which the Administrator makes such a reduction, the Administrator may also reduce the applicable volume of renewable fuel and advanced biofuels requirement established under paragraph (2)(B) by the same or a lesser volume."

The provision, as currently written, obviously does not give RFS obligated parties much lead time for compliance planning. They may not have more than 30 days notice of what the final regulatory volumes will be for the following calendar year.

Promoting "on ramps" is a preferable approach to this sort of policy; where the Administration promulgates a short-term regulatory forecast with a high degree of confidence and sets a mandate level two years out according to that projection. A few years later, the Administration promulgates another short-term regulatory forecast with a high degree of confidence and sets out year mandates accordingly. In this case, the Administration does not have to reduce the regulatory targets with an "off ramp," while still achieving the goal of promoting alternative fuels and maintaining market stability. Such a policy provides regulatory and market certainty. It allows for an honest assessment of logical options. It will not limit the amount of renewable fuels available, but rather ensure all renewables that actually exist will be used while preventing a situation where refiners are faced with the choice of using something that is not available or paying a hefty penalty.

THE NEW RFS MANDATE WILL REQUIRE MID-LEVEL ETHANOL BLENDS, BUT THERE ARE SEVERAL BARRIERS AND PROBLEMS ASSOCIATED WITH GETTING THESE BLENDS INTO THE MARKETPLACE AND CONSUMERS' ABILITY TO USE THEM

As previously mentioned, the large volumes of renewable fuels mandated in the recently enacted HR 6 will essentially force fuel blends greater than E-10 (10 percent ethanol, 90 percent gasoline) into our nation's gasoline supply. Preliminary industry analysis indicates these blends may need to be produced to meet the mandate by as early as 2010—less than two years away. The only vehicles capable of running such blends are E-85 vehicles. As discussed earlier, these vehicles represent only 6 million out of over 240 million registered vehicles on the road. The rest of the gasoline-only vehicles currently in the marketplace, and the approximately 16 million that will be produced annually over the next several years, cannot run on blends greater than E-10. The corrosive nature of ethanol eats away at automotive pipes and creates engine problems in these vehicles. In order for blends between E-10 and E-85 (i.e. blended gasoline that contains somewhere between 10 and 85 percent ethanol, called "mid-level ethanol blends") to be viable in the fuel supply, automakers will have to certify that cars can run on these blends and warrantee those vehicles.

Ethanol infrastructure presents another barrier to RFS implementation. Existing fuel pumps and underground tanks cannot accommodate fuel blends greater than E-10 for reasons similar to those relating to cars. In order for the volumes of renewable fuels mandated in the new energy law to make it into the market place, tank and pump makers have to certify and provide warranties for all the equipment needed to handle mid-level ethanol blends. This could be a timely process and the new mandate schedule fails to provide the market with that sort of time. Without certification and warrantees, the infrastructure to accommodate mid-level ethanol blends won't get built. Refiners may then may find themselves in a situation where they won't be able to comply with the law because of their inability to blend the requisite volumes of renewable fuels into the fuel supply. This could create a significant number of supply problems.

THE PRIMARY RFS COMPLIANCE FUELS, BIODIESEL AND ETHANOL, MAY CONTRIBUTE TO INCREASES IN OZONE LEVELS (SMOG) DURING THE SUMMER

EPA has concluded that biodiesel increases NO_X emissions and reduces fuel economy because of its lower energy content. See http://www.epa.gov/otaq/models/analysis/biodsl/p02001.pdf. This will be a problem because NO_X emissions are a ground-level ozone precursor.

As previously discussed, ethanol increases the Reid vapor pressure (RVP) of the fuel. Higher ethanol blends results in higher volatile organic compound (VOC) emissions, another ozone precursor, in the summer months. Also, given that the upcom-

ing revised 8-hour ozone National Ambient Air Quality Standards (NAAQS) could result in many new ozone non-attainment areas, it is unlikely that the mandated level of ethanol can be distributed in summer 9.0 psi RVP conventional gasoline areas without exacerbating ozone problems in non-attainment areas or creating new non-attainment areas. The expansion of non-attainment areas will impose constraints on the usage of ethanol that will result in increased costs because the distribution system will be pushed away from the low-cost solution. These additional costs will be borne by consumers. In addition, the de facto result of expanding non-attainment areas is the creation of a significant conflict between NAAQS and the new RFS.

CONGRESS SHOULD SUSPEND THE TARIFF ON IMPORTED ETHANOL

Given the problems discussed above and the significant strain on our nation's fuel supply system associated with the dramatically increased ethanol mandate in HR 6, Congress should suspend the tariff on imported ethanol in order to maximize the supply of renewable fuels. This is not a new position for NPRA; NPRA advocated this position in testimony before the Senate Commerce, Science, and Transportation committee in May 2006. Removing the tariff is critical to providing refiners more flexibility that will be desperately needed to comply with the newly expanded ethanol mandate.

CONCLUSION

NPRA members are dedicated to working cooperatively at all levels to ensure an adequate supply of clean, reliable and affordable transportation fuels. We stand ready to work with the Senate and House to ensure a stable and effective fuels policy that utilizes a diversity of resources to improve our national security, assist our consumers and protect our environment. As my testimony indicates, the new RFS creates several problems in the fuels marketplace—many of which may be insurmountable. In addition to consumer impacts, backlash from potential negative impacts of this law could ultimately end up threatening the availability of alternative fuels in the marketplace. I appreciate this opportunity to testify today and welcome your questions.

The CHAIRMAN. Thank you very much for that testimony.

Mr. McAdams.

STATEMENT OF MICHAEL J. McADAMS, EXECUTIVE DIRECTOR, ADVANCED BIOFUELS COALITION

Mr. MCADAMS. Thank you, Mr. Chairman, ranking member, and members of the committee. My name is Michael McAdams, and I'm testifying on behalf of the Advanced Biofuels Coalition. It is a great privilege and responsibility to appear before you today to discuss last year's legislative accomplishment, and the impacts in the area of renewable fuels and their markets.

In a world where technology and every molecule counts, you should be commended for your bipartisan effort to initiate and enhance a renewable fuels program in this committee. The leadership that this committee demonstrated is one which our coalition supported from the beginning, and continues to support moving forward.

I also want to applaud the efforts of the first generation renewable fuels producers, both ethanol and biodiesel, for their market accomplishments, as well as the efforts of the refining industry, which has made significant investments to make more environmentally friendly fuels we use today, in which my members will blend with in the future. This needs to be an effort of partnership, with a goal of meeting America's growing need for energy demands.

As Secretary Karsner previously testified before this committee, it is a matter of silver buckshot, not a silver bullet. The Advanced Biofuels Coalition is a group of companies whose second-generation

technologies hold great promise to deliver significant quantities of high-quality renewable fuels. Our core policy goal focused on technology neutrality, feedstock neutrality, and subsidy parity. The theme, "Every Molecule Counts," is a good starting place to describe what is occurring in the biofuels marketplace.

Our coalition represents many of the various technology types which are defined as advanced biofuels in the new law. Most of the companies will make molecules which can be used in heating oil, diesel, jet fuels, or gasoline. Some make a molecule which could be utilized in the refining process and made into a fuel product. Many of the ABC companies are striving to produce a molecule that can and will be blended with today's fuels, and would be totally fungible in today's engines and pipelines.

These molecules vary chemically and have different characteristics fromour first-generation brethren. They are not ethanol. They are not biodiesel. The legislation signed into law recognizes this in many of the specific definitions. For example, we have three biotech members who would be able to utilize sugars to make fungible renewable fuel products. Another company, Virant, would use a thermochemical process that converts sugar into renewable fuels. Still other companies can use a range of food oils, animal fats, or biomass, using Fischer-Tropsch, hydro-treating, cellulosic, or bio-emulsion processes to produce diesel or jet fuels.

Utilizing America's vast cellulosic resource, from agriculture waste to sustainable forest biomass, many of these technologies either directly or in partnership can produce superior performance and fungible fuels. Several of the biotechnology process companies are working on a solution which could utilize an existing ethanol facility to make diesel or jet fuel. Others could partner with enginatic cellulosic companies in a second phase of the process, in taking sugar and making an entire range of products.

I have provided several slides in my appendix to the testimony. The first slide describes the size and shape of the new RFS program, which each of its various volume requirements by technology type. As you can see, the RFS program creates multiple fuel types and assigns volumes. One of the key objectives for our coalition is the ability to contribute to the overall 36-billion gallon mandate set for 2022.

As currently designed in the legislation, some ABC companies would be included in the advanced biofuels pool which allocates 4 billion gallons, or biomass diesel pool of 1 billion gallons. Others would participate in the cellulosic pool of 16 billion gallons. In the event certain technologies as allocated under the RFS falls short, we would argue that other technologies be allowed to help meet the overall 36-billion gallon mandate. This clarity and neutrality will help these companies move forward and compete in the investment and capital funding marketplace to build their plants.

The new law calls for specific life cycle reductions for each of the various types of fuels. We would urge that EPA be very deliberate and provide flexibility in order to meet these requirements. Given the current state of disagreement about life cycle models and components, EPA needs to provide clarity and consistency over what models will be used to evaluate the performance of all renewable

fuels. We would suggest that additional credit be given to those fuels which exceed the requirements.

In a worst-case scenario, a bright line standard may exclude a number of renewable fuels from the marketplace, making it more difficult to reach the volume levels desired. The new law provided a strong signal to markets around the world that America is serious about our mission to bring renewable fuels content into the market. But many questions remain about just how these provisions will be implemented.

We urge the Senate to continue to promote tax, feedstock, and technology neutrality in pursuit of this ambitious and important national goal. Thank you, again, for the opportunity to be before you today, and I'll look forward to answering your questions.

[The prepared statement of Mr. McAdams follows:]

PREPARED STATEMENT OF MICHAEL J. MCADAMS, EXECUTIVE DIRECTOR, ADVANCED BIOFUELS COALITION

Mr. Chairman, Ranking Member, and members of the committee, my name is Michael McAdams, and I am testifying on behalf of the Advanced Biofuels Coalition.

It is a great privilege and responsibility to appear before you today to discuss last year's legislative accomplishment and the impacts in the area of renewable fuels and their markets. In a world were every molecule counts you should be commended for your bipartisan effort to initiate an enhanced Renewable Fuels program in this committee. The leadership that this committee demonstrated is one which our coalition supported from the beginning and continues to support moving forward.

I want to also applaud the efforts of first generation renewable fuels producers, both ethanol and biodiesel, for their market accomplishments, as well as the efforts of the refining industry, which has made significant investments to make more environmentally friendly fuels we use today and which my members will blend with in the future. This needs to be an effort of partnership with a goal of meeting America's growing energy demands. As Secretary Karsner previously testified before this committee it is a matter of "silver buckshot not a silver bullet".

The Advanced Biofuels Coalition is a group of companies whose second generation technologies hold great promise to deliver significant quantities of high quality, renewable fuels. Our core policy goals focus on technology neutrality, feedstock neutrality and subsidy parity.

The "theme every molecule counts" is a good starting place to describe what is occurring in the biofuels marketplace. Our coalition represents many of the various types, which are defined as advanced biofuels under the new law. Most of the companies will make molecules which can be used in heating oil, diesel, jet fuels or gasoline. Some make a molecule which could be utilized in the refining process and made into a fuel product. Many of the ABC companies are striving to produce a molecule that can and will be blended with today's fuels and would be totally fungible in today's engines and pipelines. These molecules vary chemically and have different characteristics from first generation fuels. They are not ethanol or biodiesel. The legislation signed into law recognized this in many of the specific definitions.

We have three biotech members who would be able to utilize sugars to make fungible renewable fuel products. Another company would use a thermal chemical process that converts sugar into renewable fuels. Still other companies can use a range of food oils, animal fats or biomass utilizing Fischer-Tropsch, hydro-treating, cellulosic, or bioemulsion processes to produce diesel or jet fuels.

Utilizing America's vast cellulosic resource from agricultural waste to sustainable forest biomass many of these technologies either directly or in partnership can produce superior performance and fungible fuels. Several of the biotechnology process companies are working on a solution which could be utilized in existing ethanol facilities to make diesel or jet fuel. Others could partner with enzymatic cellulosic companies in a second phase of the process of taking the sugars to a range of products.

I have provided several slides* in the appendix to my testimony. The first slide describes the size and shape of the new RFS program with each of its various vol-

*Graphics have been retained in committee files.

ume requirements by technology type. As you can see the RFS program creates multiple fuel types and assigns volumes. One of the key objectives for our Coalition is the ability to contribute to the overall 36 billion gallon mandate set for 2022. As currently designated in the legislation some ABC companies would be included in the advanced biofuels pool which allocates 4 billion gallons, or the biomass diesel pool of 1 billion gallons. Others would participate in the cellulosic pool of 16 billion gallons.

In the event certain technologies as allocated under the RFS fall short we would argue that other technologies be allowed to help meet the overall 36 billion gallon mandate. This clarity and neutrality will help these companies move forward and compete in the investment and capital funding market place to build their plants.

The new law calls for specific life cycle reductions for each of the various types of fuels. We would urge that the EPA be very deliberate and provide flexibility in order to meet these requirements. Given the current state of disagreement about life cycle models and components EPA needs to provide clarity and consistency over what models will be used to evaluate the performance of all renewable fuels. We would suggest that additional credit be given to those fuels which exceed the requirements. In a worst case scenario, a bright line standard may exclude a number of renewable fuels from the market place making it more difficult to reach the volume levels desired.

The new law provided a strong signal to markets around the world that America is serious about our mission to bring renewable fuels content into our market. But many questions remain about just how these provisions will be implemented.

We urge the Senate to continue to promote tax, feedstock and technology neutrality in pursuit of this ambitious and important national policy. Thank you for the opportunity to testify before you today and I look forward to answering any questions.

The CHAIRMAN. Thank you very much. Mr. Dinneen, go right ahead.

STATEMENT OF BOB DINNEEN, PRESIDENT AND CEO, RENEWABLE FUELS ASSOCIATION

Mr. DINNEEN. Thank you, Mr. Chairman. It's a pleasure to be here, Senator Domenici. Thank you for the invitation to be here, members of the committee. My statement is in the record, I presume, so I'm just going to chat about a few of the things we've heard about already today.

I would note, for example, that the statement that we heard just a few minutes ago is exactly the reason why we need an RFS. Because left to their own self-interest, the refiners will not maximize the potential of renewable fuels. They will find 1,000 different reasons why it doesn't make sense. So Congress was right in 2005 to require for the very first time that some percentage of the fuels that they market be from renewable sources.

That 2005 bill was a tremendous success, and I believe the building upon that success with the bill that passed last December is good legislation, and you should be proud of what you did, and it is achievable. The legislation moves ethanol beyond just grain. It moves ethanol just being a blend component in gasoline to perhaps 1 day being a real alternative to petroleum. It moves ethanol to more sustainable energy technologies, for the very first time introducing the notion that motor fuels ought to have some greenhouse gas metric associated with it.

That's important stuff. It is a tremendous achievement for this congress. This bill is absolutely achievable. There are questions about whether or not we can meet the aggressive targets for supply. Let me tell you—Yes, we can. With conventional ethanol, today there are 136 plants in operation. Each of you have plants in your own states. We are processing about 8 billion gallons of ethanol

today, and 14 million tons of distillers feed that is adding to feed supplies across this country.

But we've got 62 plants that are currently under construction, that'll almost double the size of this industry. There is no question that the 9 billion gallons required for 2008 and the 15 billion gallons ultimately required of conventional biofuels will be met. With regard to cellulosic ethanol, 100 million gallons in 2010, it looks like a really big number here in 2008 with only one plant that is actually producing cellulosic ethanol today. But I will tell you that without the signal that this bill sent to the marketplace to invest in these technologies, it would never happen.

You told the marketplace to finance these technologies. You told our industry to do the research. We are doing it. There is not a company I represent that doesn't have a cellulosic ethanol research program underway. There is cellulosic ethanol production today in Wyoming. Not much, but it's a start, some woody biomass. As has already been mentioned, there is another commercial-sized facility under construction in Georgia with range fuels, but there are many others.

Archer Daniels Midland has a fiber process that they hope to have in operation soon that'll extend their ethanol supplies by 15 percent. Abengoa, which has production in New Mexico, has a cellulosic research facility under construction today. You look at all the other companies, from Bluefire that looks to produce cellulosic ethanol from a landfill outside of Los Angeles, to Poet, which is looking to build a facility in Iowa utilizing corncobs and corn spillover.

I can't tell you whether or not acid hydrolysis or engimatic conversion, or thermochemical conversion is ultimately going to be the most economic way to process ethanol from cellulosic materials, but I can tell you that it will happen, and I believe 100 million gallons by 2010 is absolutely achievable. There's a lot that's going on that we don't even know about. I just learned about this facility that was in production a couple of weeks ago. So I can assure you we will meet those targets.

With respect to logistics, clearly moving 8 billion gallons of ethanol around today is a challenge, but we are doing it. We are building upon the virtual pipeline with rail and barge and some truck. Terminals are adding capacity today. We were at a terminal last Friday up in Baltimore where they will be able to take unitrains of ethanol, and then pipeline-ship it to other terminals in the area.

There is a lot going on. The signal that you had sent to the marketplace has been heard, and we will meet the targets that are involved. It's going to have tremendous benefits. An analysis that we did of the bill that you passed in December suggested we will have $1.7 trillion increased in GVP from 2008 to 2022 as a result of this bill. It'll be responsible for 1.1 million new jobs, green jobs, green-collar jobs. It's going to be critically important.

The most important element, I might add, from the analysis we recently did, that this bill by 2022 will reduce greenhouse gas emissions by 176 million tons. Senators, that's the equivalent of taking 26 million vehicles off the road. That's what you started. It is achievable. Are there some things that probably need to be fixed?

Yes. But fundamentally, this is good legislation, and I thank you for it.

[The prepared statement of Mr. Dinneen follows:]

PREPARED STATEMENT OF BOB DINNEEN PRESIDENT & CEO, RENEWABLE FUELS ASSOCIATION

Good morning, Chairman Bingaman, Ranking Member Domenici, and Members of the committee. My name is Bob Dinneen and I am president and CEO of the Renewable Fuels Association, the national trade association representing the U.S. ethanol industry. I am pleased to be here this morning to discuss the positive impacts ethanol and other renewable fuels are having on our economy and environment, and the tremendous role the Energy Independence and Security Act of 2007 ("2007 Energy Act") will have in moving renewable fuels forward.

Due to the visionary and invaluable work of this committee, the 2007 Energy Act represents a remarkable revolution in energy policy in this country. By coupling increases in vehicle efficiency and renewable fuel use, America is taking the most immediate steps available that will have the greatest impact in securing a more sustainable energy future. The 2007 Energy Act clearly sets forth a path toward greater energy security and environmental sustainability.

BACKGROUND

Today's ethanol industry consists of 137 ethanol plants nationwide that have the capacity to turn more than 2 billion bushels of grain into 7.6 billion gallons of high octane, clean burning motor fuel, and more than 14 million metric tons of livestock and poultry feed. There are currently 62 ethanol plants under construction and 8 plants undergoing expansions. It is a dynamic and growing industry that is revitalizing rural America, reducing emissions in our nation's cities, and lowering our dependence on imported petroleum.

America's domestic ethanol producers are providing significant economic, environmental and energy security benefits today.

In an overall environment of slowing economic growth, the U.S. ethanol industry stands out in sharp contrast. According to a report set to be released in late February from economist John Urbanchuk of LECG, LLC, the American ethanol industry is a job creating engine. The increase in economic activity resulting from ongoing production and construction of new ethanol capacity supported the creation of 238,541 jobs in all sectors of the economy during 2007. These include more than 46,000 additional jobs in America's manufacturing sector—American jobs making ethanol from grain produced by American farmers.

Ethanol is also helping to stem the tide of global warming, today. The use of low carbon fuels like ethanol is reducing greenhouse gas emissions from the more than 200 million cars on American roads. The 9 billion gallons of ethanol we will produce in 2008 will reduce greenhouse gas emissions by more than 14 million tons, or the equivalent of taking 2.5 million vehicles off the road.[1] These benefits will only increase as new technologies, new feedstocks and new markets for renewable fuels are created.

2007 ENERGY ACT—ENERGY SECURITY THROUGH INCREASED PRODUCTION OF BIOFUELS

The 2007 Energy Act provides meaningful incentives for investment in the production and infrastructure for biofuels in the U.S. Expansion of the domestic biofuels industry will provide significant economic benefits in terms of a larger and more robust economy, increased income, new job creation in all sectors of the economy, and enhanced tax revenues at both the Federal and State levels. Increased biofuels production and use stimulated by the expanded RFS will also enhance America's energy security by displacing imported crude oil. Specifically, expansion of the U.S. biofuels industry will[2]:

- Add more than $1.7 trillion (2007 dollars) to the gross domestic product between 2008 and 2022;
- Generate an additional $436 billion (2007 dollars) of household income for all Americans between 2008 and 2022;
- Support the creation of as many as 1.1 million new jobs in all sectors of the economy by 2002;

[1] Air Improvement Resources, Inc., February 2008.

[2] Economic Impact of the Energy Independence and Security Act of 2007, Renewable Fuel Standard, by John M. Urbanchuk, Director, LECG LLC (January 2008).

- Generate $209 billion (2007 dollars) in new Federal tax receipts; and,
- Improve America's energy security by displacing 11.3 billion barrels of crude oil between 2008 and 2022 and reduce the outflow of dollars to foreign oil producers by $817 billion (2007 dollars) between 2008 and 2022.

Finally, the 2007 Energy Act will greatly enhance the climate change benefits attributable to today's renewable fuels industry by encouraging more sustainable technologies and reducing the carbon footprint of future energy production. An analysis conducted for the RFA using the U.S. Department of Energy's existing GREET model shows that increasing the use of ethanol and other renewable fuels to 36 billion gallons annually by 2022 could reduce greenhouse gas emissions by some 176 million metric tons, equal to removing the annual emissions of more than 27 million cars from the road.[3]

THE 2007 ENERGY ACT STIMULATES CELLULOSIC ETHANOL PRODUCTION

By expanding the Renewable Fuel Standard (RFS), requiring 36 billion gallons of renewable fuel be used annually by 2022, and specifically that 21 billion gallons of that goal must come from advanced biofuels, history will look back upon the enactment of the 2007 Energy Act as the moment America chose a new energy policy path. And by requiring that nearly 60 percent of the new RFS be met by advanced biofuels, including cellulosic ethanol, Congress has provided the necessary assurance for ethanol producers and investors that a market for their product will exist. As a result, the commercialization of these important next generation ethanol technologies will develop far sooner than conventional wisdom suggests.

For example, last November, Range Fuels, Inc. broke ground on a commercial cellulosic ethanol plant located in Treutlen County, Georgia. The facility will use wood and wood waste from Georgia's pine forests and mills as its feedstock. Verenium is operating a cellulosic ethanol pilot plant and research and development facility in Jennings, Louisiana, and expects to complete a demonstration-scale facility using plant matter and farm scraps like sugarcane bagasse and wood chips as feedstock to produce cellulosic ethanol in 2008 at the same site. Abengoa Bioenergy operates a cellulosic biomass-to-ethanol pilot plant in York, Nebraska that will research and test proprietary technology for use in commercial-scale conversion of biomass into ethanol. POET Energy with expand an existing corn-based ethanol facility in Emmetsburg, Iowa into a bio-refinery that will include production of cellulosic ethanol from corn cobs and stover. And Iogen plans to build a cellulosic ethanol facility utilizing wheat and barley straw in Shelley, Idaho.

A recent report by the U.S. Department of Commerce's Bureau of Manufacturing and Services, Energy in 2020: Assessing the Economic Effects of Commercialization of Cellulosic Ethanol, noted the commercial viability of cellulosic ethanol will strengthen the competitiveness of many domestic industries and have a positive effect on the U.S. economy. In fact, the report found that annual benefits for American consumers would total $12.6 billion if cellulosic ethanol production increased; U.S. crude oil imports would fall 4.1 percent if 20 billion gallons of cellulosic ethanol were produced in 2020, which is approximately 40 percent of current crude oil imports from Venezuela; and, the global price of oil and the domestic U.S. fuel price would be 1.2 percent and 2.0 percent, respectively, lower than projected.

In addition to the RFS, many of the other biofuels programs authorized by the 2007 Energy Act make the expanded RFS absolutely achievable. The 2007 Energy Act moves ethanol and renewable fuels beyond being just a blending component in gasoline, and guarantees that sufficient volumes of ethanol will be available to support the meaningful expansion of E-85 and flexible fuel vehicle technology.

THE 2007 ENERGY ACT ENCOURAGES GREATER INVESTMENT IN RENEWABLE FUEL INFRASTRUCTURE

As the demand for fuel ethanol grows, the infrastructure available to transport, store and blend ethanol into gasoline has expanded as well. The U.S. ethanol industry has been working to expand a "Virtual Pipeline" through aggressive use of the rail system, barge and truck traffic. As a result, we can move product quickly to those areas where it is needed. Many ethanol plants have the capability to load unit trains of ethanol for shipment to ethanol terminals in key markets. Unit trains are quickly becoming the norm, not the exception, which was not the case just a few years ago. Railroad companies are working with our industry to develop infrastructure to meet future demand for ethanol. We are also working closely with terminal operators and refiners to identify ethanol storage facilities and install blending

[3] Air Improvement Resources, Inc., February, 2008.

equipment. We will continue to grow the necessary infrastructure to make sure that in any market we need to ship ethanol there is rail access at gasoline terminals, and that those terminals are able to take unit trains.

A new ethanol trading and distribution center recently opened in Manley, Iowa, for example, that will help the industry distribute ethanol more efficiently. There will be more than 75 ethanol plants within 275 miles of the Manley terminal in operation by the end of 2009—representing approximately 5.1 billion gallons. The Manley Terminal LLC will have storage capacity for 20 million gallons of renewable fuels. The facility will improve the efficiency of ethanol distribution by consolidating shipment in larger 70 to 95-car unit trains, and by improving utilization of ethanol suppliers' tank cars.

Today, there is limited shipment of ethanol via pipeline. However, several major pipeline owners are considering various ethanol pipeline shipment scenarios. And the U.S. Department of Transportation has initiated a project to work with the industry to overcome barriers to pipeline shipments. Looking to the future, completion of a study on the feasibility of transporting ethanol by dedicated pipeline, as was included in the 2007 Energy Act, from the Midwest to the East and West coasts will be critical.

TECHNICAL CORRECTIONS

As with any new law, there will be technical corrections and other adjustments necessary to allow renewable energy markets to function as intended under the 2007 Energy Act. The RFA respectfully offers for your consideration the following modifications to provisions in the 2007 Energy Act that will allow the markets to work as effectively as possible.

- The 2007 Energy Act provides for public notice and comment in other determinations by the Administrator regarding lifecycle greenhouse gas emission, except for those provided in the definitions for "cellulosic biofuel" and "lifecycle greenhouse gas emissions." Notice and comment should be required for all lifecycle emissions determinations.
- The 2007 Energy Act excludes the possibility for plants using corn starch, which is defined as "conventional biofuel," to qualify as "advanced biofuel." Advanced biofuels must meet a 50 percent reduction in greenhouse gas emissions. However, one pathway for the use of cellulosic feedstocks is for corn stover and other cellulosic material to be co-processed with corn starch. The existing provision could be interpreted as precluding the ethanol produced from such a facility from being considered advanced biofuel. Moreover, with new more sustainable technologies, it is quite possible that corn-derived ethanol may one day meet the 50 percent reduction in greenhouse gas emissions benchmark of advanced biofuels. Corn starch ethanol plants should be incentivized to reduce their greenhouse gas emissions, and reaching the targets established for other processes should be rewarded. One option is to delete the term "conventional biofuel" and the exceptions for corn ethanol from the definition of advanced biofuels. Given the strict requirements in the 2007 Energy Act, there is no reason to preclude any facilities from the benefits otherwise provided for achieving a 50 percent reduction in greenhouse gas emissions.
- To address potential supply issues of cellulosic and biomass-based diesel to meet the required volumes, the 2007 Energy Act includes specific waivers of their required volumes. However, the 2007 Energy Act also states that the Administrator may reduce the overall renewable fuel and advanced biofuel volume requirements, potentially solely in light of the reductions of these particular biofuels. These provisions arguably conflict with the criteria for such waivers under Section 211(o)(7)(A) and appear to be without regard to whether other renewable fuel or advanced biofuels are available to make up the difference. Under these provisions as written, interested parties may also lose the ability to participate in the process. There is no policy reason to allow for reductions of the overall advanced biofuel or renewable fuel requirements if there is more than adequate supply of other renewable fuels or advanced biofuels.

  Any reductions of the advanced biofuel and renewable fuel requirements should be limited to the criteria under Section 211(o)(7)(A) and any amounts of cellulosic biofuel or biomass-based diesel that are waived should be made up with other advanced biofuels or renewable fuels. In other words, any necessary waivers of cellulosic biofuel or biomass-based diesel should not reduce the required volumes for advanced biofuel or renewable fuel if other biofuels can make up the difference. This preserves the incentives for cellulosic biofuels, but accounts for the potential that the industry cannot keep pace, while preserving the over-

all goal of the 2007 Energy Act to require a specific amount of renewable fuel be sold each year to reduce greenhouse gas emissions and dependence on foreign oil.

- In recognition of the need and importance of E-85, the 2007 Energy Act included an expansion of the Petroleum Marketing Practices Act ("PMPA") to ensure that E85 infrastructure could be installed at stations run by franchisees, if they chose to. Specifically, the amendment prohibits restrictions by franchisors on franchisees or any affiliate of the franchisee related to the installation of renewable fuel infrastructure and advertising and sale of such renewable fuel. However, renewable fuel is defined in the amendment to the PMPA to include only E85 and certain biodiesels. Thus, the 2007 Energy Act's amendments to the PMPA do not address mid-level blends of ethanol.

  In addition to E85, fuels with lower ethanol content, such as E15 or E20, may play an important and key role in meeting the new renewable fuel standard requirements. As such, this amendment should be expanded to include all fuels that utilize renewable fuels in any form.

CONCLUSION

The enactment of the 2007 Energy Act is a testament to what we can do when we work together toward a shared vision of the future. By increasingly relying on domestically produced renewable fuels, including next generation technologies such as cellulosic ethanol, we can begin the hard work necessary to mitigate the impact of global climate change, reduce our dependence on foreign oil, and leave a more stable and sustainable future for generations that follow.

The Senate Energy and Natural Resources committee will continue to have an invaluable role to play in making sure our nation successfully increases the use of domestic, renewable energy sources. Without question, more work will be needed and the U.S. ethanol industry stands ready to work with you to assure the journey you embarked upon with passage of the 2007 Energy bill is realized.

Thank you.

The CHAIRMAN. Thank you very much.

Mr. Jennings.

STATEMENT OF BRIAN JENNINGS, EXECUTIVE VICE PRESIDENT, AMERICAN COALITION FOR ETHANOL

Mr. JENNINGS. Thank you, Mr. Chairman, Ranking Member Domenici, and members of the committee. My name is Brian Jennings. I am the Executive Vice President for the American Coalition for Ethanol. We are very grateful for the leadership that this committee established in getting the RFS provisions included in the Energy Independence and Security Act. Implemented properly, this far-reaching RFS will unleash the ability for both grain and cellulosic ethanol to provide the Nation with a meaningful supply of clean-burning, cost-effective renewable fuel for years to come.

According to the National Commission on Energy Policy, by the year 2020, the combination of the new RFS schedule and landmark cafe requirements in the energy bill will reduce by $73 billion annually the transfer wealth to foreign oil suppliers. This new RFS will also, as Bob Dinneen mentioned, support the rapid scalability of cellulosic biofuel technologies and encourage terminal operators to make the infrastructure investments to offload, store, and blend more ethanol.

To the question you had, Mr. Chairman, about the ability of the logistics and infrastructure system to handle this volume, I concur with what Mr. Dinneen said. In fact, in the last 6 months, the blending economics of ethanol—in other words, the bargain price of ethanol—has made it very profitable for petroleum operators and petroleum marketers to make the kind of infrastructure investments that indeed can bring on or saturate this new production. So

we feel very confident about that. Hiccups can occur when you introduce a product into new areas, but the emerging markets and the infrastructure is indeed in place.

This morning, I would like to focus on a significant concern about penalizing corn-based ethanol for so-called indirect land-use changes during the life cycle analysis provisions of the RFS. There is a mounting effort to argue or to claim that the use of grain in the United States to produce biofuel is triggering land-use changes in developing countries, and that the greenhouse gas emissions resulting from these activities should be counted against ethanol in determining its life cycle emissions.

This theory assumes that United States corn ethanol is responsible for causing previously uncultivated land, such as rainforests in Brazil, to be cleared for agricultural production, when clearly other elements and factors are at play. It then calculates the greenhouse gas emissions associated with this activity, and shifts those emissions to the life cycle analysis of corn ethanol. We maintain there is not a direct cause and effect relationship between these events.

The purpose of the Energy Independence and Security Act is to establish a framework for substantially reducing our expensive and risky reliance on petroleum, not to develop an implementation model which would drive a wedge between various beneficial forms of biofuel. Today, corn-based ethanol is the most effective and the primary means we have for achieving the greenhouse gas reduction objectives of the legislation.

Indeed, the law deems that corn ethanol reduces greenhouse gasses compared to baseline gasoline by 20 percent. Very soon, cellulosic biofuel will be able to make even more dramatic reductions in greenhouse gasses. It is unmistakable. Decrease in petroleum use and greenhouse gas emissions in this country will require both grain and cellulosic biofuel. Now, we do recognize that in order to conduct a thorough and fair life cycle analysis of ethanol, domestic direct land-use changes may be considered.

Fortunately, corn and other biofuel crops in this country reduce, recycle, and reuse greenhouse gasses as those crops grow. Nevertheless, if EPA applies an arbitrary indirect land use model which penalizes and undermines the benefits of corn ethanol in the RFS rulemaking, ACE will be forced to oppose the rule. We encourage the committee to clarify, if you take up the technical corrections bill, that the calculation of life cycle greenhouse gas emissions is limited to domestic impacts.

With the little time that I have left, I want to highlight an opportunity that this energy bill indeed does provide, and it's been mentioned by previous speakers. A robust 36-billion-gallon renewable fuel standard necessitates that ethanol will comprise a significant part of the fuel supply, at least one-third of the fuel supply, creating opportunities for new blends of ethanol beyond those available today—E10 and E85.

Based upon preliminary research that my organization co-sponsored with the Department of Energy to look at the optimal blend of ethanol in gasoline, we discovered that new mid-level ethanol blends, such as E20 and E30, have the possibility to outperform gas in terms of fuel economy and tailpipe emissions. Now, more

work needs to be done, but we look forward to working with members of this committee and Federal agencies to identify the additional testing and data necessary to underpin our preliminary findings and create a pathway for the approval of these new and promising midlevel blends.

With that, Mr. Chairman, thank you very much for the opportunity to be here. I look forward to your questions.

[The prepared statement of Mr. Jennings follows:]

PREPARED STATEMENT OF BRIAN JENNINGS, EXECUTIVE VICE PRESIDENT, AMERICAN COALITION FOR ETHANOL (ACE)

Thank you Chairman Bingaman, Ranking Member Domenici, and Members of the committee. My name is Brian Jennings and I am Executive Vice President of the American Coalition for Ethanol (ACE). ACE is the largest organization in the U.S., uniting businesses, organizations and individuals that support ethanol production and use. Nearly 1600 ethanol producers, prospective ethanol producers, commodity and farm organizations, farmers and ranchers, investors, and businesses that supply goods and services to the U.S. ethanol industry comprise the grassroots membership of ACE.

I am honored with this opportunity to address the committee today on an issue of critical significance to the U.S. biofuels industry: implementing the new renewable fuels standard (RFS) provisions of H.R. 6, the Energy Independence and Security Act (EISA) of 2007 (P.L. 110-140). The RFS program set forth in the bill is historic and should help catalyze dramatic growth in the U.S. biofuels industry in general and the cellulosic biofuels industry in particular.

ACE is grateful for the leadership of Senators Bingaman and Domenici and their staffs in 2007 to establish a new, more ambitious RFS schedule. The course you charted in writing, introducing, and approving the Senate RFS of 36 billion gallons by 2022 in June of last year established the framework that was eventually included in the EISA 2007. Enactment of this bill may be the most profoundly important shift toward renewable fuels and away from our risky and expensive reliance on fossil fuels ever taken in the U.S.

The passage of the original RFS as part of the Energy Policy Act of 2005 helped to propel the ethanol industry to extraordinary growth. At the conclusion of 2007, 137 plants were in operation in the U.S. producing more than 6.5 billion gallons of ethanol, far exceeding the 4.7 bgy expected last year from the original RFS. Moreover, ethanol is now blended with more than one-half of the nation's fuel supply. EISA 2007 amended and increased the RFS, requiring 9 billion gallons of renewable fuel use in 2008, stepping up to 36 billion gallons by 2022.

Under the modified RFS, corn-based ethanol (conventional biofuel) is capped at 15 billion gallons by 2015 (approximately 5 billion bushels of corn for ethanol), while 21 of the 36 billion gallons in 2022 must be derived from advanced biofuel such as cellulosic and non-corn-based ethanol. This ambitious 36 bgy RFS will unleash the promise of ethanol as the principal alternative to gasoline in the U.S. and provide the nation with a stable supply of clean-burning, homegrown, renewable fuel for years to come.

IMPLICATIONS OF EISA OF 2007

According to the National Commission on Energy Policy, the combination of the new RFS schedule and landmark corporate average fuel economy (CAFE) requirements in EISA 2007 will achieve numerous economic and environmental benefits:

- Reduction of transfer of wealth abroad of $73 billion per year in 2020 and $129 billion in 2030, using current prices ($90 per barrel oil, $3 per gallon gasoline)
- Reduction in U.S. oil use of 2.8 million barrels a day by 2020, and 5 mbd by 2030.
- U.S. consumer fuel savings of $71 billion per year in 2020, and $161 billion in 2030, using approximate current prices.
- Reduction in U.S. CO_2emissions by 320 million metric tons in 2020, and 675 mmt in 2030.
- Reduction in passenger vehicle emissions by 15 and 30 percent, respectively, under what they otherwise would be.
- Reduction in 2020 of approximately 4 percent of projected total net U.S. CO_2 emissions versus what they would otherwise be.

Numerous additional positive effects will result from the 36 bgy RFS in EISA 2007. It will attract additional investment in the production of corn-based ethanol. Furthermore, it will drive private and public research entities and entrepreneurs to partner and rapidly scale-up cellulosic ethanol production technologies. And finally, it will give confidence to the petroleum industry that ethanol will be a more consequential component of the U.S. fuel supply, encouraging terminal operators and others to make the infrastructure investments to off-load, store and blend more ethanol. These infrastructure investments will compliment the progress already made by petroleum marketers due to ethanol's recent favorable blending economics, which have made it profitable for petroleum marketers to make infrastructure investments for storing and distributing ethanol.

Since the new RFS was enacted we have reviewed it thoroughly and compared its requirements with the on-the-ground practical reality of producing biofuels to meet its goals. The timing of today's hearing is pivotal because EPA is beginning to consider how it will implement the RFS, and this hearing will help inform that process.

There are a few provisions in the final bill that merit scrutiny, as they may inadvertently undermine efforts of the industry to meet the new RFS schedule. I wanted to take this opportunity to address one significant issue that we have identified which, unless addressed, will make it nearly impossible to achieve the full economic and environmental potential of this new biofuels program: concerns about penalizing corn-based ethanol for so-called "indirect land use changes" during implementation of the lifecycle analysis (LCA) provisions of the RFS. Following a comprehensive discussion of this primary concern, I will also note other issues of importance to ACE members.

LIFECYCLE ANALYSIS OF GREENHOUSE GAS EMISSIONS—INDIRECT LAND USE CHANGES

The new RFS schedule provides various carve-outs for renewable fuels based on their ability to reduce lifecycle greenhouse gas (GHG) emissions:

Conventional Biofuel.—is ethanol from corn starch, and conventional ethanol facilities that commence construction after the date of enactment of EISA 2007 must achieve a 20 percent reduction in lifecycle GHG emissions compared to gasoline.

Advanced Biofuel.—is renewable fuel (other than from corn starch) from biomass that reduces GHG emissions by 50 percent compared to gasoline. Cellulosic ethanol and biomass-based diesel qualify as advanced biofuel under the RFS.

Cellulosic Biofuel.—is renewable fuel derived from cellulose, hemicellulose, and lignin, and achieves a 60 percent reduction in GHG emissions compared to gasoline.

We are concerned that the definition of lifecycle GHG emissions in the bill may be construed by EPA in a manner that unfairly penalizes domestic grain-based ethanol, based on dubious linkages made to land clearing and agricultural practices in developing countries. There is a growing effort on the part of some interests, including EPA, to argue that the use of grain in the U.S. to produce ethanol is contributing to land use changes in developing countries and that the resulting GHG emissions should be counted against ethanol in determining its lifecycle emissions.

The theory behind this indirect land use link goes as follows: First, a flawed presumption is made that the rise in U.S. corn prices is caused entirely by the demand for corn-based ethanol. Then, it is assumed that increased demand for corn in the U.S. is causing previously uncultivated land in developing nations, for instance rainforest in Brazil, to be cleared for agricultural production. This is referred to as an "indirect land use change." It calculates the GHG emissions resulting from indirect land clearing and then assigns those estimated emissions to the LCA of corn-based ethanol in the U.S. There is no logical cause and effect relationship between these events. Moreover, it is inappropriate and impractical to use indirect land use changes to penalize grain-based ethanol in favor of other forms of biofuel. The purpose of EISA 2007 is to substantially reduce our risky and expensive reliance on petroleum and fossil fuel, not to drive a wedge between various beneficial forms of biofuel. Today, corn-based ethanol is the most important alternative available to accomplish the objective of the legislation. In the future, advanced and cellulosic biofuel will make more dramatic reductions in GHGs. But in the final analysis, our nation's effort to reduce petroleum use and GHG emissions will require both grain and cellulosic based biofuels.

We recognize that in order to conduct a thorough LCA of GHG emissions from biofuel crops, direct land use changes may be considered. Market-driven factors which signal U.S. farmers to devote more acres to corn for ethanol and away from other crops are referred to as direct land use changes. While these direct land use

changes may be calculated in LCA, it needs to be noted that corn and other biofuel crops reduce, recycle, and reuse GHGs as those crops grow.

The Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) model developed by Dr. Wang of the U.S. Department of Energy, Argonne National Laboratory, establishes an objective and reliable framework for comparing the lifecycle GHG emissions from various fuels and feedstocks. GREET examines direct land use changes, and recognizes that biofuel feedstock crops such as corn recycle carbon emissions. On a per-gallon basis, GREET indicates that dry-mill corn-based ethanol (from natural gas powered facilities) reduces GHG emissions by 18 to 29 percent over gasoline. It is estimated that biomass-fired dry-mill corn-based ethanol facilities can reduce GHG emissions by as much as 54 percent compared to gasoline. According to GREET, cellulosic ethanol can reduce GHG emissions by as much as 90 percent.

We recognize other models that can be used to analyze LCA GHG emissions of various fuels, but if EPA were to apply arbitrary indirect land use modeling and penalize grain-based ethanol in the RFS rulemaking, ACE will work to oppose the rule and encourage Congress to provide a common sense remedy. Further, ACE is going on record today to state it will vigorously work to oppose any proposed Low Carbon Fuels Standard (LCFS) legislation that attempts to use indirect land use changes in foreign countries in determining the LCA GHG emissions of grain-based ethanol.

We strongly oppose the application of indirect land use changes as the basis for determining GHG emissions for domestic, grain-based ethanol because that method has many shortcomings.

First, land clearing has been going on in developing countries for centuries, driven by population growth and the economic aspirations of farmers and consumers living in those countries. Land clearing occurred long before biofuels were a meaningful part of the energy supply.

Today, agricultural markets are affected by global factors, and land use changes continue as a result of a wide variety of reasons, including but not limited to:

- Global economic growth—especially in nations such as China and India where citizens are acquiring wealth and desiring the lifestyle of Americans, eating more protein, and demanding higher quality foods;
- Population growth;
- Internal land use and land tenure policies; and
- Weather factors

According to the Food and Agricultural Policy Research Institute (FAPRI), the main factor driving crop prices (and as a result land use) in any given year is weather. This is perhaps most clear today in the recent case of wheat, where poor weather reduced yields in Europe, Australia, and North America, caused world wheat prices to rise, and resulted in great interest around the world to increase planted acreage for wheat. Given all these factors that affect crop markets and land use decisions, to base the GHG emissions of a fuel derived from a crop such as corn upon volatile global economics and weather conditions is bizarre, unworkable, and unfair. It is impossible to link with confidence land clearing in any particular country to the use of grain in the U.S. to produce ethanol.

Furthermore, ascribing GHG emissions from land clearing in developing countries to biofuels production in the U.S. would hold the domestic ethanol industry to a uniquely punitive standard, one that no other U.S. industry would face under a national cap and trade program to limit GHG emissions. Under existing cap and trade proposals pending in Congress, including those introduced by Senators Bingaman and Specter and Senators Lieberman and Warner, certain U.S industries such as oil companies will be responsible for obtaining permits for the fossil fuels that they introduce into commerce. Users of fossil fuels and products derived from the use of fossil fuels will be indirectly affected by such regulation as costs for those fossil fuels increases in response to annual rationing of carbon credits under the cap. In no case would a U.S. industry be responsible for indirect effects of its activities on GHG emissions in other nations.

In a global economy, virtually all economic activity in the U.S. will have direct and indirect economic and environmental impacts around the world. Thus, to consistently apply the principle that U.S. entities should be accountable for GHGs emitted in foreign countries, one would need to hold U.S. businesses and individual consumers responsible for all direct and indirect GHG emissions from foreign factories used to produce the goods consumed in the U.S., because those businesses or individuals create the market demand that leads to the foreign economic activity. Similarly, we would need to demand that foreign nations that import grain and other

commodities from the U.S. be responsible for our domestic emissions generated in the cultivation or manufacture of those goods. This makes no sense.

In summary, ascribing indirect effects associated with land clearing in foreign countries not only singles out the U.S. biofuels industry for uniquely unfair treatment, it establishes an unworkable precedent for regulation of other U.S. industries under future GHG control programs. The consideration of land use effects in LCA of GHGs should be limited to domestic direct impacts associated with growing grains for ethanol production. ACE hopes that the committee will clarify in a technical corrections bill that the calculation of lifecycle GHG emissions is limited to domestic impacts.

OPPORTUNITIES FOR MID-LEVEL BLENDS OF ETHANOL

Enactment of EISA 2007 with an ambitious new RFS guarantees that ethanol will comprise more than 10 percent of the U.S. fuel supply, creating opportunities for new blends of ethanol beyond those available to motorists today; E10 and E85.

To further the probability of new mid-level blends such as E15, E20, or E30, ACE and the U.S. Department of Energy cosponsored an Optimal Ethanol Blend Level Investigation, conducted by the Energy and Environment Research Center of the University of North Dakota in conjunction with the Minnesota Center for Automotive Research of Minnesota State University-Mankato. We released the findings of this scientific study in this very committee hearing room on December 5, 2007, with the assistance of Senators Dorgan and Thune, Assistant Secretary Karsner of the Department of Energy, Undersecretary Dorr of the Department of Agriculture, and key environmental and consumer advocates.

The purpose of the scientific investigation was to utilize EPA and automaker test procedures to identify if mid-level blends of ethanol could have a beneficial application in standard autos. The research indicates that we haven't begun to recognize the value of ethanol—in energy conservation and environmental terms. If the U.S. were to be able to use 20 or 30 percent ethanol, it would result in an extraordinary reduction in our reliance on fossil fuels and dramatically extend the nation's fuel supply.

The investigation revealed unprecedented data that E20 and E30 blends can provide better fuel economy than regular gasoline (even in standard, non-flex-fuel cars), with fewer harmful tailpipe emissions. That shatters the myth about ethanol's fuel economy "penalty" that has been based solely on the energy content of ethanol.

Even though this was a preliminary study we are encouraged that intermediate blends of ethanol could have positive implications for fuel efficiency, cleaner air, and energy security. ACE intends for our study to provide a catalyst for further analysis and research to support our results. Already, this additional research is underway with E20 in the State of Minnesota, providing further support to our findings and effort to make these blends a reality. Approving the use of blends such as E20 and E30 will be a top priority for ACE in the future, and we look forward to working with Members of the committee on creating a pathway for the approval of these blends.

One way to help ensure the availability of mid-level blends of ethanol, is to guarantee the rapid implementation and funding of Title II, Section 244 of EISA 2007, which creates a new grant program within the Department of Energy to assist petroleum marketers by installing "blender pumps" that enable consumers to choose to fill up on blends such as E20 or E30. We encourage the committee to help ensure this program is implemented and funded.

OTHER ISSUES OF CONCERN AND CONCLUSION

Another significant issue that I would like to raise is the need to provide incentives for the corn ethanol industry to become more efficient in terms of lifecycle GHG emissions in the future. Technology innovations are driving the future of the U.S. ethanol industry. Corn ethanol plants are becoming more efficient in their use of energy and water, in many cases cutting use of these inputs by half compared with rates only a few years ago. And there are dozens of new companies in the process of commercializing technology to convert a range of cellulosic feedstocks to ethanol and other cutting-edge biofuels. In the original Senate-passed version of the new RFS program, there was a 1.5 credit for every gallon of ethanol produced from plants that used at least ninety less fossil fuel inputs than conventional plants. That provision provided important encouragement to the ethanol industry to continue to seek innovative ways to reduce fossil fuel inputs and GHG emissions associated with those fuels. ACE recognizes the need for ethanol plants to become as efficient as possible in the coming years with respect to the use of both energy and water and we are proud of the work being undertaken currently to the develop technical

advances necessary to achieve those goals. We hope that the committee would consider restoring this provision in a technical corrections bill.

Finally, we are concerned that the discretion granted to EPA in implementing the advanced biofuels portion of the RFS could be used liberally by the agency, thus undermining the achievement of the program milestones set by Congress. Inappropriate use of the waiver authority by the agency could create future market uncertainty and hinder efforts by this emerging segment of the industry to gain access to needed capital investment.

In conclusion, I would like once again to express my profound thanks to Senators Bingaman and Domenici and your staffs for your work to design and enact the new RFS. Thank you also for the opportunity to offer our views today, and, on behalf of the members of ACE, I commend your leadership on ethanol issues. This historic program has the potential to revolutionize the American biofuels industry, help reduce our dependence on foreign oil and dramatically reduce emissions of greenhouse gases from transportation sector. I look forward to your questions.

Thank you.

The CHAIRMAN. Thank you very much. I'm told Senator Craig has a question he wanted to put to one of the witnesses related to a particular issue, and he will have to leave after that. So go right ahead.

Senator CRAIG. Thank you very much. I'll ask only one question, and it's a refinery question. The small refinery extension that was included in the Senate RFS, but left out of the final RFS, can this be fixed through rulemaking, or do we need to think this will require a legislative fix?

Mr. DREVNA. Senator, to answer your question, NPR already prides itself in addressing almost all issues, and we confront them directly, and we think we confront them forcefully. Unfortunately, this is one that we politely take a pass on. We have members who are the largest of the large, and the smallest of the small, and everyone in between. So on small refinery exemptions, we have no position. So I'm sorry I can't give you the answer you're looking for.

Senator CRAIG. That's not your style at all to duck a question. All right.

Mr. DREVNA. I'm learning, Senator. I'm learning.

Senator CRAIG. All right. Thank you very much. Appreciate it. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much. Let me ask a couple of questions, and then defer to Senator Domenici and Senator Salazar. Let me ask about this RINs credit market, as people understand it. I think you talked about it in your testimony, Mr. Drevna, and one of the suggestions is that these RFS credits or RIN might be—the time that they could be usable might be extended beyond 12 months to make compliance easier in the early years of this mandate.

I'd be interested in your thoughts as to whether that's a useful thing to think about, or if that's needed, or do you see any problem with this RINs market?

Mr. DREVNA. I can answer your second question first, Senator, the problem with the RINs market. We have the same position on RINs going forward in the Bill of 2007 as we did in EPACT 2005. We believe that only obligated parties should be the ones who can separate with RINs and who have the ownership of these things once the ethanol or the biofuel is delivered to us.

We talked about our concerns about the system being skewed or the system being rigged. If we open this up to an open market—let me suggest that NPRA is always for an open market. We think

that's the way to go. Unfortunately, this bill is not an open market, so I think those RINs have to be carefully controlled and understood exactly who has ownership of them and where they can go. That being said, the timeframe for holding on or to be able to use a RIN is critical to the industry, and to the consumer. I mean, ultimately, it's going to end up figuring out we're going to work all this at the pump.

Mr. Dinneen talked about a virtual pipeline. Unfortunately, I can't come forward to this committee and say, "Well, we virtually comply." We have to have certainty. Extending the RINs to some level—right now, we're going to have to sit down and figure out what that is. But given the fact that even though there's a potential for 9 billion gallons to be produced—I think it was Senator Domenici in his opening remarks who stated that even if it's produced, can we get it to where it has to be? If we can't, we're noncompliant. That's why we're looking at how the life cycle of the RINs are very important. Twelve months may not be long enough.

The CHAIRMAN. Mr. Dinneen, did you have a thought on that?

Mr. DINNEEN. I do. Actually, I think the way that EPA implemented the rule gives a great deal of flexibility already to refiners, because the way they defined the 2005 Act and all the implementation from 2005 will extend to the new RFS is that the RINs have a life of essentially the year in which they are created, and in addition get up to 2 years.

RINs will have a value, depending on what the relative market is with respect to ethanol and gasoline. Right now, RINs are trading for about 3 cents a RIN, because the price of ethanol is so much cheaper than gasoline. It's just better for refiners to purchase the ethanol than to purchase a RIN. But nobody believes that there's going to be a shortage of them. Nobody believes that it's going to be a hassle. There are probably 800 million RINs that can be used for 2008 already.

So I think the system is working exactly as intended. It is providing refiners with the flexibility Congress wanted them to have. We can only market the RINs to an obligated party. So if they then go to a broker or something that might influence the market in some way, it's because refiners then traded or sold them to them. So I think the system is plenty flexible for refiners and is working just fine.

Mr. DREVNA. Senator, may I comment?

The CHAIRMAN. Yes, please.

Mr. DREVNA. When you look at the total number of gallons that are, again, frontloaded on this thing, 2008 is going to be very problematic. 2009 is going to be very problematic. There may not be enough RINs out there when we're going to essentially double the EPACT 2005 mandate of 2012. So I think that is a very valid concern of the refiners. Just not the refiners—all obligated parties, that are refiners, blenders, and importers. Thank you, sir.

The CHAIRMAN. All right. Let me stop with that, and defer to Senator Domenici for questions.

Senator DOMENICI. I guess I am kind of wondering as we see all of you and who you represent, am I correct that we don't have any witnesses that represent the businesses that are currently large

and big in transportation and pump delivery at the car level right now in the United States? They're not at this table.

How come? Are they not playing in this game? All this infrastructure that we've got now across America, by the hundreds of millions of dollars, or billions, is it going to be used? Are we going to substitute for it? How does all of that work? Shouldn't there be a witness here telling us what the delivery systems that are out there think about this? Are they represented? No. Why not, Mr. Drevna? I don't mean why are they not at the table. Why are they——

Mr. DREVNA. If I may speak for what I call the combined fuels industry, just not the refiners, but refiners, pipelines, terminals, and marketers, we've worked very closely together over the years. Implementation of the ULSD program, implementation of the RFS EPACT of 2005. I can't answer why they weren't invited here, sir, but we are working very closely, and we will work with them, because the pipelines, the terminals, as someone mentioned, we've got the 1500 terminals throughout the country putting——

Senator DOMENICI. But the question is, are they working with the government? Are they hard at work trying to be part of getting——

Mr. DREVNA. I think as Mr. Meyers mentioned in this testimony, EPA is holding various stakeholder meetings, and I am very positive that those groups either are or will be part at the table.

Senator DOMENICI. Mr. Dinneen.

Mr. DINNEEN. I would just say, the refiners are the obligated parties here. I mean, they're the ones that are responsible for making sure the fuel is ultimately used, and they will have contractual relationships with gasoline marketers to make sure that occurs. The Society of Independent Gasoline Marketers of America and NACS, the convenience store folks, they certainly have been very well-represented throughout the rulemaking process. We work with them. I know Charlie's group works with them very closely to make sure that they are part of this whole program.

Senator DOMENICI. Mr. Drevna, you note in your testimony, "limited infrastructure for transporting ethanol is an immediate problem." I just went over that, and spoke as if you were moving and the whole system was working. If we can't get ethanol transported now, how are we going to get the rest of this in play?

Mr. DREVNA. Sir, that again, that's one of the problems I wanted to highlight both in our written testimony and oral testimony is that this thing is so frontloaded. Nothing's really changed. People have been working and thinking about this, but nothing has really changed since I testified in front of you last year about the concerns we have on infrastructure.

If you look at the removal of MTBE, and the addition of ethanol, that wasn't without its problems, but it wasn't insurmountable in the fact that it was RFG area, we knew we had to get things to it. This bill, as currently constructed, is going to require ethanol in every gallon of gasoline throughout the country. There are certain areas throughout the country where you have to sit and think, "Is that the right thing to do?" because of summertime problems of fuel blends.

The pipelines are going to have to say—and we're going to have to potentially make two or three different blends of product to ship in the pipelines, which are already having too many separate kinds of products being shipped. That's what we talked about, the infrastructure. It's not easy to get blending facilities permitted at 1500 terminals throughout the country, especially in some areas of the country where we can't get anything permitted.

Mr. JENNINGS. Senator Domenici, thankfully we're not having to rely upon the refiners to get our product to the terminals, and we are doing so pretty effectively today. About 60 percent of the ethanol that moves around the country is shipped via rail, and we are increasingly using unitrains, which is 90 cars, 30,000 gallons a car, so you have about essentially 3 million gallons of ethanol moving all over the country all the time.

If you were to move all 36 billion gallons of renewables by train—which you won't—but if you would, that would take 14 million unitrains. That seems like a really big number, and it seems insurmountable, until you consider that that's less than 4 percent of the rail traffic today.

We can do this. We're going to do it by continuing to use barge where it makes sense, rail where it makes sense, and in the future, potentially pipelines where it makes sense. All of the pipeline companies are looking at whether or not it makes economic sense, because you can do it physically, but whether or not it makes economic sense to do that. The bill that you passed indeed requires the Department of Energy to investigate those potential opportunities, as well.

The infrastructure issues are not trivial, but there's certainly nothing that cannot be overcome. Our member companies can read MapQuest as well as anybody else. We'll get product to wherever it needs to be.

Mr. JENNINGS. Senator Domenici, if I could add something to that.

Senator DOMENICI. Sure.

Mr. JENNINGS. I stated earlier that the blending economics, the value of ethanol, the price of ethanol in the last 6 months sent a signal to the marketplace. What I meant by that is it sent a signal to terminal operators and petroleum marketers to make the kind of infrastructure investments so that they can profit from ethanol, and they're doing that all around the country and they have been. A lot of this activity took place in the Carolinas, in Georgia, particularly in Atlanta, and increasingly in Florida.

What we will see as a result of both those market-driven factors and with this new RFS and the signal that it sends is that those will become important in emerging markets over the first quarter of this year and throughout 2008. So, we do feel confident that those partners that you mentioned that need to be at the table have been when it comes to making some of those infrastructure investments and that we can get this done.

Will it happen seamlessly without hiccups? We can't say that. There are offloading issues when you unload rail cars, but we feel very good about the possibilities of making this happen in a very consistent, seamless way.

Senator DOMENICI. One more, Mr. McAdams.

Mr. MCADAMS. Senator Domenici, I just want to, again, make a medium-term comment. Many of the companies that I represent are developing technologies that would alleviate this whole infrastructure requirement. Many of these technologies could literally partner in a standing ethanol facility, making fungible product. It wouldn't be in ethanol. It would be a hydrocarbon molecule. That's why I went through the molecule piece in my testimony.

Senator DOMENICI. Right.

Mr. MCADAMS. It would literally be able to use the current infrastructure in place, in the current engines. Now, I'm not going to suggest that they're going to be able to help in the 2008/2009 timeframe, but from 2012 forward, these technologies hold a lot of promise, and would significantly reduce cost to the consumers.

Senator DOMENICI. I understand. Thank you, Mr. Chairman, thank you, witnesses.

The CHAIRMAN. Senator Salazar.

Senator SALAZAR. Thank you very much, Chairman Bingaman and Senator Domenici. It's always an honor to be a part of this committee and working with both of you on these issues. For us, the passage of this 36-billion-gallon RFS was, I think, was one of the major achievements of this Energy committee, and I'm very proud to have been a part of that effort.

My two questions really relate to how we arrived at what some people have said is an ambitious goal. I hear all of you saying that it's a doable goal, how we get there, and I have one technical question and then one that's a broader question. My first one is a technical question for you, Mr. McAdams, and that is I believe that the language that we used in terms of the kind of feedstock that can be used was a much better definition of what frankly came up at conference and what got into this committee.

For me, when I look at the plant being constructed in Georgia, or I see the massive multimillion acres of beetle kill that we have in the State of Colorado today, I looked at woody biomass as one of those things that we ought to be looking at, and that fits the feedstock utility that you were referring to. So would you be in agreement that that's one of the technical fixes that we ought to be making to the RFS as we move forward in examining where we are?

Mr. MCADAMS. I spoke to several of my cellulosic companies that would use the very material that's been excluded. By the way the definitions were written, some of them will sign a letter that will be going to the Act committee on Friday. I would request, Senator Bingaman, on November 27 of last year, the Advanced Biofuels Coalition wrote a letter to you, Speaker Pelosi, and Members of the House, raising some of the issues that we saw with the original House draft.

If you would like to put that in the record, I'd be delighted to provide that for the record. But, yes, the short answer would be, yes, sir.

Senator SALAZAR. I would be very interested, and I'm sure the members of this committee would be, to get that kind of information, because I think we have a vision and agreement of where we want to go with respect to biofuels. But the reality is that there are

some technical issues that I think need to be addressed to help us get there. Let me ask a second, more generic question, to all of you.

We in this committee and on the Finance committee, which Senator Bingaman and I sit on, as well as the Agriculture committee, have been working very hard on advanced biofuels and cellulosic ethanol. You know I have a tax credit provision in title 9 of the Farm Bill that will help us move forward, I think, with opening up new opportunities with cellulosic ethanol.

We had legislation that went to the floor of the United States Senate last year which would have garnered 59 votes that would have been a very significant finance package that would have been a part of the energy bill that would have gone forward. There were major incentives in that legislation to help us create this new frontier of renewable energy for America.

If you will just each of you take 30 seconds, and I'll start with you Mr. Jennings, and we'll just go across the table, and talk to me about the importance of that finance part of the package for this energy future that we're dealing with, starting with you.

Mr. JENNINGS. Thank you, Senator Salazar. You're correct. That sort of incentive is critical to help launch these new technologies. The entrepreneurs that are looking at cellulosic biofuel, whether it's range fuels in your home State or the dozens of others that are scattered around the country, need a little confidence from the lending community, and frankly, the lenders do, as well, that they can take the risk to dive into these technologies. The lenders are going to need to see those sort of incentives from the public sector, and those entrepreneurs, those businesses are, as well.

So, I concur with you. It's a critical component to getting cellulosic ethanol off and running, and so we would support that.

Senator SALAZAR. Mr. Dinneen.

Mr. DINNEEN. I will uncharacteristically take less than the 30 seconds you've allotted me and say, yes, we supported that enthusiastically.

Senator SALAZAR. Thank you.

Mr. McAdams.

Mr. MCADAMS. Not only do we support that effort. We also compliment you with your amendment on the Farm Bill which clarified that the cellulosic language should not be cellulosic alcohol, but cellulosic biofuels, to allow this new partnership of technologies to take place in the future. So absolutely.

Senator SALAZAR. Thank you.

Mr. Drevna.

Mr. DREVNA. Senator, we support and always have supported RND for industries that are up and coming. What we don't support is having other industries pay for that, through punitive taxes. I believe we should be putting a lot of effort, as our member companies are, putting into cellulosic research and have been. But I think it should be done on an equitable basis, not a punitive tax——

Senator SALAZAR. Where do you think we should get the money then to——

Mr. DREVNA. I think government or public partnerships are fine. But we can't penalize one industry and help another one. We've got to make sure all homegrown industries in this country are, I believe, are treated fairly.

Senator SALAZAR. Ms. Werner, do you have a comment on that?

Ms. WERNER. Yes. We support the tax provisions to help move the new technologies forward, and in fact, this will be part of a congressional briefing that we're doing next week. We'll be looking at budget and tax issues facing renewables and energy efficiency technology.

Senator SALAZAR. Just a closing quick comment to the panel. I think this is an agenda that is here for us. At least, for this Senator and I know for a number of my colleagues, for a long time to come. It's not a fad that's going to pass in a month or 2 years or 5 years, and there's going to be a lot of learning in the process, whether it's technical fixes with respect to how we define the feedstocks and neutrality, or how we as a national government deal with this huge issue of national security and how we incentify this reality to occur. I look very much forward to working with your associations and your members. Thank you very much.

The CHAIRMAN. Senator Wyden.

Senator WYDEN. Thank you, Mr. Chairman, and my apologies to you and the witnesses for being late. This is one of those times where you're trying to be everywhere, and you can't do it. Thank you all. I want to ask you a question, if I could, Ms. Werner, about biomass, which of course is extraordinarily important in the rural West, where we see this as an opportunity to take steps that are good for the environment and good for rural communities, and especially a significant economic bonanza for a lot of our rural areas.

The key is to really do it right. Here in the Senate, we have wrestled in particular with the definition of biomass, both in our committee and on the floor. We have tried to strike a balance so as to ensure that there would be adequate material, particularly from the Federal lands, and we would be sensitive for the protection for old-growth. We did it in a bipartisan way, and we felt that it was well-received, frankly, by both folks in the forest products industry and from the environmental community.

Unfortunately, the House went a different direction, and that is what emerged in the final legislation, and I find it very troubling, and I think quite a few other members of the Senate do, as well, on a bipartisan basis. We've got literally millions of acres of overstocked forests in our country that badly needs thinning, and we need these forest health projects, as I mentioned. This is something that is good for the environment, and good for the economy.

I chaired a hearing in the Subcommittee on the Forests recently where witness after witness raised questions about this, and every Western member hears about it. So now, we've got to figure out how to get this definition changed, and come up with something that strikes a more realistic balance. I want to get your sense of why this is an important issue, and what your thoughts are on how the Congress ought to move forward with development of biomass fuel by thinning and approaches that are sensible on Federal forestland.

Ms. WERNER. Thank you very much, Senator Wyden. I must mention that just last week I was at a conference, the Harvesting Clean Energy Conference in Portland, Oregon, and this whole issue at this 600-plus conference was talked about very, very greatly, because of so many concerns about the huge amount of woody bio-

mass that is available that would not be allowed under the terms of the current definition.

So, as I try to do in my written testimony, is to lay out a lot of the rationale for why this exclusion, we believe, is inappropriate and, in fact, that if we really are concerned about sustainable forest management and all of the other attributes that it can really mean for communities across the country, certainly in the West, where people are dealing with enormous challenges in terms of the need for thinning, which makes sense for prevention of catastrophic wildfires, where it makes sense for overall restoration forestry, that it is a really critical and diverse feedstock that should be tapped. Therefore, we would very much hope that the Congress would see fit to rectify this omission.

Senator WYDEN. I appreciate your testimony and advice on this, and we're going to want your counsel in the days ahead. I know Chairman Bingaman has great interest in this, and Senator Domenici. What happened, we had this come up at length in the committee and under the leadership of Chairman Bingaman's staff, we spent a lot of time thrashing through that definition, we were able to improve it further as it went forward in the Senate, and I think what we've got now as a result largely of the handiwork of the House of Representatives is a definition that is actually going to block needed forest management and thinning and biomass work going forward.

When what we need is to be significantly more proactive, and at least in Senate, we've done it in a way that's brought the environmental community and the forest products sector together. So we thank you for your counsel. We'll be back to ask for additional counsel and your expertise as we go forward.

Ms. WERNER. Thank you, Senator Wyden. If I could just amplify one issue, as well, and that is I had also mentioned in my testimony that we were concerned about—and I know you share this concern—in terms of the need to make sure we really reduce greenhouse gas emissions. But by the risk of not thinning, that we actually when we think about catastrophic wildfires, the amount of carbon that goes into the atmosphere is also catastrophic to our atmosphere.

Senator WYDEN. Thank you, Mr. Chairman.

The CHAIRMAN. Let me ask one other question, and then we'll terminate the hearing. But Mr. Dinneen, I asked this question of the first panel. Regarding the Range Fuels cellulosic ethanol plant that is being constructed down in Georgia, could you give us your opinion as to whether the cellulosic ethanol that's produced from that would count toward the RFS?

The way I understand the legislation, it is that the biomass that's going to be used in that plant in Georgia is coming from private forests, and the legislation does not allow biomass from those sources to be considered as part of renewable fuel under the definition. Do you have that concern, or am I wrong about that?

Mr. DINNEEN. I'm not sure that the definitional implication there is really a factor. I think if they're producing ethanol from wood waste, which is what their plan is, it should most certainly qualify under the greenhouse gas metric that is established in the bill.

Now, having said that, the reason everybody assumes that that is the case is because they look at DOE's existing GRET model.

If you plug in their process in that model, it would suggest between an 80 and 90 percent reduction in greenhouse gasses. The issue that Mr. Jennings raised earlier, however, about indirect impacts leaves some uncertainty. Until EPA promulgates a rule and gives a little bit more direction as to exactly how they intend to implement the greenhouse gas thresholds in that element of the bill, nobody really knows. But I think it's a safe bet that cellulosic ethanol will be able to meet those targets.

The CHAIRMAN. The concern about this biomass coming from private forests that are not allowed to be considered under the renewable fuel definition, that's not a concern?

Mr. DINNEEN. If you would indulge me, let me get back to the committee on that specific question. I am not aware that that issue had been raised, but I will look into it and get back to you.

The CHAIRMAN. All right. Thank you all. I think it's been useful testimony. We appreciate you being here, and that concludes the hearing.

[Whereupon, at 11:29 a.m. the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

RENEWABLE FUELS ASSOCIATION,
Washington, DC, February 21, 2008.

Hon. JEFF BINGAMAN,
Chairman, Energy and Natural Resources Committee, United States Senate, Washington, DC.

Hon. DANIEL AKAKA,
U.S. Senate, Washington, DC.

Hon. JOHN BARRASSO,
U.S. Senate, Washington, DC.

DEAR CHAIRMAN BINGAMAN AND SENATORS AKAKA AND BARRASSO: The Renewable Fuels Association (RFA) appreciates the opportunity to respond to follow up questions from the February 7, 2008 hearing on the positive impacts ethanol and other renewable fuels are having on our economy and environment, and the tremendous role the Energy Independence and Security Act of 2007 ("2007 Energy Act") will have in moving renewable fuels forward.

As I stated in my testimony before the committee, the enactment of the 2007 Energy Act is a testament to what we can do when we work together toward a shared vision of the future. By increasingly relying on domestically produced renewable fuels, including next generation technologies such as cellulosic ethanol, we can begin the hard work necessary to mitigate the impact of global climate change, reduce our dependence on foreign oil, and leave a more stable and sustainable future for generations that follow.

Attached please find the RFA's responses to questions from Members of the committee. If there is any additional information you would like the RFA to provide, please do not hesitate to ask.

Sincerely,

BOB DINNEEN,
President & CEO.

RESPONSES TO QUESTIONS FROM SENATOR BINGAMAN

Question 1. Could you comment on whether the cellulosic ethanol produced from the Range Fuel facility in Georgia would count toward the RFS? We understand that the feedstock is intended to come from commercial wood waste and private forests, which do not qualify as "renewable biomass."

Answer. Cellulosic ethanol produced using feedstock from commercial wood waste and private forests may count toward the RFS if the feedstock meets certain conditions. The restrictions seem overly broad for the intended purpose. Because these limitations may substantially restrict qualifying feedstock, it is possible that Range Fuels may find it difficult to produce cellulosic ethanol that would qualify. It is the RFA's understanding, however, the conversion system employed by Range Fuels at the Georgia facility will be able to convert a broad range of feedstocks, depending upon quantity and availability, into cellulosic ethanol.

Question 2. There seem to be some differences of opinion on how much authority the Administrator has to reset the mandate. Is it your understanding that the Administrator will have the legal authority to set all the applicable volumes required in the RFS to zero after 2016? Does this concern you?

Answer. The RFA is not concerned for the following reasons. The 2007 Energy Act constrains any initial waiver of the mandate with two very high hurdles that the RFA does not expect to come into play. Under Section 211(o)(7), waivers are limited to situations where implementation of the requirements would "severely harm the economy or environment of a State, a region, or the United States" or where "there is an inadequate domestic supply." Furthermore, the statute states that the waiver may be in whole or in part which the RFA reads as indicating the waiver as limited to the extent necessary to alleviate whatever adverse effect is found or to compensate for the supply level that is missing and no more. Thus, it would be very hard to envision a situation where the initial waiver takes the RFS level to zero.

Any additional modification under the new provision, Section 211(o)(7)(F), would more likely involve an increase and must comply with the factors in Section 211(o)(2)(B)(ii), application of which could not reasonably lead to a zero RFS level. Section 211(o)(7)(F) only applies if the initial waiver is a substantial one—greater than 20 percent in two consecutive years or greater than 50 percent in a single year. In such an event, the 2007 Energy Act refers the Administrator back to the original list of factors to set the mandate level—the same factors that apply after 2022. So, in essence, this provision merely accelerates the 2022 determination. The Administrator could decide in that rulemaking to increase the RFS levels to make up for any initial waivers that were issued to alleviate hiccups during the startup of the program. In the unexpected consequence of severe environmental harm, it could involve a decrease but again any such decision would be made through rulemaking and would be bounded by the factors in paragraph (2)(B)(ii).[1]

RESPONSE TO QUESTION FROM SENATOR AKAKA

Question 1. During today's testimony, you gave some interesting facts regarding how expansion of the U.S. biofuels will benefit the economy and the Gross Domestic Product (GDP), as well as create new jobs (particularly for green-collar workers). You also mentioned that distribution, particularly to rural/remote areas, should not be a problem, as presently, distribution is facilitated by railcars. Having more fuel to distribute implies that there will be more railcars used in transport.

Do your calculations and observations include remote areas with limited, renewable biomass that are not on the continental U.S., e.g., Hawaii and the US territories? Will distribution costs be a limiting factor for these areas, especially for Hawaii, which does not benefit from railcar transport? If so, what suggestions would you have for Hawaii to limit or reduce these costs?

Answer. The RFA's analysis covers all 50 United States, including Hawaii, but does not include U.S. territories (e.g. Guam, American Samoa, USVI, etc). Distribution costs are not expected to be a major problem or impediment for the biofuels industry in these areas for several reasons. First, their geographic isolation from the Continental United States suggests that biofuels will be produced from locally available feedstocks (sugarcane, molasses, bagasse, or agricultural waste in Hawaii) and supplied to local markets. Second, these biofuels industries are likely to be self contained with production located near feedstock supplies. The relative small geography and few concentrated markets for biofuel in Hawaii will utilize existing transportation modes (largely truck) with little need for extensive new rail infrastructure. It is also worth noting that while 60 percent of ethanol is transported via rail today, a growing percentage of ethanol is now traveling via barge—a method of transportation that will benefit markets such as Hawaii. Further, the smooth implementation of Hawaii's own ethanol program and investments by companies such as Gay & Robinson Ag-Energy LLC in a 12 million gallon ethanol plant in West Kauai are further proof that transportation and infrastructure issues are not a barrier to the use of biofuels in Hawaii.

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[1] The factors are:

(I) the impact of the production and use of renewable fuels on the environment, including on air quality, climate change, conversion of wetlands, ecosystems, wildlife habitat, water quality, and water supply;

(II) the impact of renewable fuels on the energy security of the United States;

(III) the expected annual rate of future commercial production of renewable fuels, including advanced biofuels in each category (cellulosic biofuel and biomass-based diesel);

(IV) the impact of renewable fuels on the infrastructure of the United States, including deliverability of materials, goods, and products other than renewable fuel, and the sufficiency of infrastructure to deliver and use renewable fuel;

(V) the impact of the use of renewable fuels on the cost to consumers of transportation fuel and on the cost to transport goods; and

(VI) the impact of the use of renewable fuels on other factors, including job creation, the price and supply of agricultural commodities, rural economic development, and food prices.

RESPONSES TO QUESTIONS FROM SENATOR BARRASSO

Question 1. What is your organization's best projection for the amount of corn-based ethanol that will be available for sale in 2008?

Answer. To the best of our information, the RFA projects more than 9 billion gallons of grain-based ethanol will be available for sale in the U.S. in 2008.

Question 2. When, during the year (preferably by month) do you anticipate the amount of corn-based ethanol will be available for physical delivery?

Answer. The RFA does not collect monthly ethanol production and demand data. The RFA relies on monthly ethanol production and demand data from the Energy Information Administration. The RFA does, however, track the approximate online dates (by quarter) of new ethanol production facilities. In response to Question #3, we have attached a chart that show anticipated ethanol plants coming online through the first quarter of 2009.

Question 3. Would you summarize the current construction trends within the ethanol plant industry and provide the committee with a plant-by-plant assessment that is anticipated to be coming online over the course of 2008?

Answer. Attached please find a chart* that shows anticipated ethanol plants scheduled to come online (by quarter) for 2008 and the first quarter of 2009.

RESPONSES OF BRIAN JENNINGS TO QUESTIONS FROM SENATOR BINGAMAN

Question 1. In your written testimony, you point out that there is no incentive for increased energy efficiency in corn ethanol plants. Could you elaborate on what kinds of efficiency gains might be achievable?

Answer. The ethanol industry is constantly innovating and developing new and more efficient technologies to convert corn to biofuel. The most well-known example is the E3 Biofuels plant in Mead, Nebraska. This plant employs a conventional ethanol plant, a cattle feedlot, and a biodigester to produce ethanol. The cattle feedlot collects cow manure, which is then converted to methane by the biodigester to provide fuel for the ethanol plant. The DDGS are not dried, and are fed to the cattle on the plant site, further saving energy. In all, this configuration results in a savings of more than 90 percent of the fossil fuel used in a typical ethanol plant.

Another company, ICM of Colwich, Kansas, is implementing a dry fractionation technology, which separates the husk or bran from the corn kernel prior to fermentation. This material is gasified and used to fuel the plant, potentially reducing fossil energy demand by up to 60 percent. As with the E3 Biofuels plant, even higher energy efficiencies can be gained if such a state-of-the-art ICM plant is located close to cattle feedlot and the DDGS are not dried prior to feeding them to the cattle.

ACE believes that the ethanol industry will continue to innovate, and additional gains in energy efficiency will be achieved in the future. These energy efficiency gains will have important greenhouse gas benefits. However, unless the incentives are provided in federal law to reward this innovation, it is unlikely that plant developers will invest the capital necessary to deploy these energy-saving technologies. ACE hopes the committee will consider adding incentives for corn ethanol plants to achieve a sliding scale of efficiency improvements up to100 percent reduction in fossil fuel use.

Question 2. I understand that you are concerned about your industry's ability to meet greenhouse gas reduction targets that include indirect emissions from land use changes. We believe that the EPA Administrator has sufficient flexibility to accommodate new calculations of greenhouse gas reductions that take these indirect emissions into account. Is the flexibility given to the Administrator insufficient to mitigate your concerns? Why?

Answer. For a number of reasons ACE believes that the flexibility provided to the Administrator is not sufficient to mitigate our concerns. Moreover, we believe that the entire concept of including indirect greenhouse gas emissions in the calculation of lifecycle greenhouse gas emissions for the purposes of determining regulatory compliance with the greenhouse gas reduction criteria in the Energy Independence and Security Act is so fraught with problems that it cannot be fairly or accurately implemented.

As you know, the recently passed Energy Independence and Security Act of 2007 includes a new renewable fuel standard schedule that requires new ethanol plants whose construction begins after December 19, 2007 to achieve a 20 percent reduction in lifecycle greenhouse gas emissions compared with petroleum.

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*Chart has been retained in committee files.

The law defines "lifecycle greenhouse gas emissions as:

> the aggregate quantity of greenhouse gas emissions (including direct and significant indirect emissions such as significant emissions from land changes), as determined by the Administrator, related to the full fuel cycle, including all stages of fuel and feedstock production and distribution, from feedstock generation and delivery and use of the finished fuel to the ultimate consumer, where mass values for all greenhouse gases are adjusted to account for their relative global warming potential.

This must be compared with the "baseline lifecycle greenhouse gas emissions," which are defined as:

> the average lifecycle greenhouse gas emissions, as determined by the Administrator, after notice and comment, for gasoline and diesel (whichever is being replaced by renewable fuel) sold or distributed as transportation fuel in 2005.

There are several problems with this approach that cannot be overcome given the current construction of the law. The effect of these provisions could be to penalize corn ethanol inappropriately and thus disqualify corn ethanol plants constructed after December 19, 2007 from participating in the RFS, thereby preventing the attainment of the 15 billion gallon per year RFS target:

There are several problems with this approach that cannot be overcome given the current construction of the law. The effect of these provisions could be to penalize corn ethanol inappropriately and thus disqualify corn ethanol plants constructed after December 19, 2007 from participating in the RFS, thereby preventing the attainment of the 15 billion gallon per year RFS target:

1. The estimation of indirect lifecycle greenhouse gas impacts cannot be done accurately or without the influence of hysteria associated with false claims by those who simply seek to find ways to limit the use of corn ethanol in the nation's gasoline supply.

As we have just seen from the recent publication in Science Express of the fraudulent analysis of indirect greenhouse gas emissions attributed to corn ethanol by Searchinger et al. it is extremely difficult, if not impossible, to accurately determine indirect greenhouse gas emissions. Land clearing occurred long before biofuels were a meaningful part of the energy supply. Today, agricultural markets are affected by global factors, and land use changes continue as a result of a wide variety of reasons, including but not limited to:

- Global economic growth—especially in nations such as China and India where citizens are acquiring wealth and desiring the lifestyle of Americans, eating more protein, and demanding higher quality foods;
- Population growth;
- Internal land use and land tenure policies; and
- Weather factors, including drought like the one that has decimated the Australian grain crop recently.

The refereeing and peer review process used by Science Express to assess the legitimacy of the Searchinger et al. analysis broke down entirely, and led to this seemingly reputable scientific journal publishing wildly erroneous claims of greenhouse gas emissions from land clearing allegedly linked to the production of corn ethanol in the United States. Major newspapers across the country then picked up the story and published articles, thereby lending credence to these unsupportable claims.

Since then, reputable reviewers have demonstrated clearly that this analysis is fatally flawed in numerous ways and in fact land clearing rates are slowing at the same time that ethanol production in the United States is growing rapidly and U.S. grain imports and holding steady. Despite this fact, Alex Farrell, Associate Professor of the Energy and Resources Group at the University of California at Berkeley, recently sent a memo to the California Air Resources Board (CARB) making erroneous allegations similar to those made by Searchinger et al., which will be used to inform the analysis of the greenhouse gas lifecycle emissions for domestic ethanol by CARB.

Despite this recent sad history on this topic, it is likely that efforts will continue to be made by some to make unsupportable claims of indirect greenhouse gas emissions from the production of ethanol in the United States. The handling of these murky and impossible-to-prove claims by EPA in its analysis of lifecycle greenhouse gas emissions may well lead to future litigation by interests on all sides of this issue under EISA and the Administrative Procedures Act.

2. The inclusion of "indirect emissions" as a factor in the regulation of biofuels is wholly inconsistent with existing state and international greenhouse gas control regimes as well as proposals in Congress regulate other U.S. entities under cap and trade approaches.

Despite the fact that all economic activity produced both direct and indirect greenhouse gas emissions, the standard for determining greenhouse gas emissions for biofuels set forth in ESIA 2007 is uniquely punitive and one that no other entity in the world will be held to in regulating and controlling emissions of greenhouse gases; in no other case will an entity be held responsible for indirect emissions, particularly indirect emissions occurring on a foreign country over which the regulated entity has no control.

Under existing cap and trade proposals pending in Congress, including those introduced by Senators Bingaman and Specter and Senators Lieberman and Warner, certain U.S industries such as oil companies will be responsible for obtaining permits for the fossil fuels that they introduce into commerce. Users of fossil fuels and products derived from the use of fossil fuels will be indirectly affected by such regulation as costs for those fossil fuels increases in response to annual rationing of carbon credits under the cap. In no case would a U.S. entity be responsible for indirect effects of its activities on GHG emissions in other nations.

If Congress insists on setting this new precedent, then it should apply it equally to all regulated entities in any legislation to reduce greenhouse gas emissions. In a global economy, virtually all economic activity in the U.S. will have direct and indirect economic and environmental impacts around the world. Thus, to consistently apply the principle that U.S. entities should be accountable for GHGs emitted in foreign countries, Congress would need to hold U.S. businesses and individual consumers responsible for all direct and indirect GHG emissions from foreign factories used to produce the goods consumed in the U.S., because those businesses or individuals create the market demand that leads to the foreign economic activity. Similarly, the U.S. would need to demand that foreign nations that import grain and other commodities from the U.S. be responsible for our domestic emissions generated in the cultivation or manufacture of those goods.

3. EISA includes an inappropriate definition of "baseline lifecycle greenhouse gas emissions."

If Congress insists on retaining the flawed concept of including indirect greenhouse gas emissions in any lifecycle analysis, then the baseline for comparing alternative fuels such as ethanol should not be the average lifecycle greenhouse gas emissions from 2005 gasoline; it should be the fuel that likely will replace ethanol—petroleum derived from Canadian sands and, in the future, coal-to-liquids.

If corn ethanol were removed from the nation's gasoline supply, or if potential future increases in corn ethanol production are disqualified from participating in the RFS program, then gasoline prices would rise relative to the base case where corn ethanol remains in gasoline and the use of marginal, carbon-intense types of petroleum would be further encouraged. As a result, the volumes of gasoline reduced by the elimination of corn ethanol would not be replaced with fuel that meets the definition of "average lifecycle greenhouse gas emissions" set for the in EISA 2007. They would be replaced today with the most expensive and greenhouse gas intensive substitutes, gasoline derived from Canadian tar sands and in the future, coal—to-liquids (CTL), which now is economical at $90 per barrel oil and would become even more competitive as a result of price increases associated with removing five percent of the volume of gasoline now met with biofuels.

In fact, according to a February 12, 2008 article in Greenwire ("Climate: Midwest refinery pollution may soar, as climate and energy policy clash"):

> the industry-wide trend to buy more Canadian crude has a largely hidden consequence of increasing global warming pollution from Midwest oil refineries, which is expected to soar by as much as 40 percent during the next decade. The industry is looking to vast reserves of tar-soaked clay and sand lying underneath Alberta's swampy forests as a profitable and reliable source of oil. But researchers calculated that refining the Canadian petroleum produces 15 percent to 40 percent more carbon dioxide than conventional oil.

4. In conducting comparisons of lifecycle greenhouse gas emissions, EPA should be required to compare apples to apples.

An accurate assessment of all greenhouse gas emissions from biofuels and petroleum should include a number of features that likely will not be performed by EPA as a result of the construction of the legislation. Instead of comparing direct emis-

sions from the average lifecycle carbon content of petroleum in the fuel supply in 2005 with direct and indirect emissions from biofuels, as the ESIA legislation would require, to be credible such an analysis would need to compare direct and indirect emissions from petroleum with direct and indirect emissions from biofuels. This would involve examining all the petroleum-related emissions associated, for example, with the direct expenditure of energy and money related to the hundreds of billions of dollars spent each year through the U.S. military to protect access to world oil supplies in the Middle East and elsewhere, including all the strategically-located bases, the use of the Navy to protect shipping lanes and all the derivative greenhouse gas emissions from all the activity related to this expenditure. As these vast sums of money spent annually to protect access to oil supplies ripple through the world economy, they generate enormous amounts of economic activity and associated greenhouse gas emissions that heretofore have not been included in assessments of the lifecycle greenhouse gas emissions from petroleum use, and frankly probably cannot be accurately counted.

5. Conclusion.

The most appropriate remedy in this case is to revise EISA to require a lifecycle comparison of the direct greenhouse gas emissions from ethanol and from the fuel that would replace it, were ethanol removed from the fuel system.

Question 3. There seems to be some differences of opinion on how much authority the Administrator has to reset the mandate. Is it your understanding that the Administrator will have the legal authority to set all the applicable volumes required in the RFS to zero after 2016? Does this concern you?

Question 3. There seems to be some differences of opinion on how much authority the Administrator has to reset the mandate. Is it your understanding that the Administrator will have the legal authority to set all the applicable volumes required in the RFS to zero after 2016? Does this concern you?

Answer. Under the RFS provisions of EISA, EPA can reset the mandate for advanced biofuels after 2016, potentially even to zero. ACE recognizes that EPA should have some flexibility to reset the standard if cellulosic biofuels technologies are not commercialized as fast as we anticipate. However, to allow the Administrator to waive the RFS after 2016 is potentially very problematic. By then many billions of dollars of additional investment will have been made in existing ethanol plants that will be relying on the market certainty provided by the RFS. Moreover, in light of the fact that the cellulosic biofuels industry will need considerable investment in order to become commercially viable, the degree of uncertainty that the current EISA provisions send to the capital markets for the post-2016 period is troubling. At a minimum, prior to exercising such waiver authority, EPA should be required to weigh carefully the impact of such a step on existing investment, demand for alternative forms of fuel to replace volumes of ethanol that would no longer be required, and obtain the concurrence of the Secretaries of Energy and Agriculture.

RESPONSES OF ROBERT J. MEYERS TO QUESTIONS FROM SENATOR BINGAMAN

Question 1. If the final rule is not ready in January 2009, how will the new biodiesel carve out mandate, which begins in 2009, be handled?

Answer. The Agency is working expeditiously to complete the rule for implementing the 2009 RFS requirements. As part of the rulemaking process, we will issue and provide an opportunity for public comment on a proposed rule. We are also developing several contingency options for giving effect to the EISA 2009 biomass-based diesel standard should the rule not be issued until after January 2009. We are developing these options in consultation with our RFS program stakeholders.

Question 2. How will EPA interpret the federal biomass definition—which includes biomass from federal lands that are "regularly occupied by people"? We are unclear as to what might constitute land "regularly occupied by people," and whether that standard would require permanent residents, or simply an established number of visitors?

Answer. As part of its rulemaking to implement the RFS provisions of EISA, EPA will propose and seek comment on interpretations of key statutory terms, including this aspect of the definition of "renewable biomass." We will decide how to interpret those provisions in light of the public comments we receive in the course of the rulemaking.

Question 3. Could you comment on whether the EISA greenhouse gas regulations give the Administrator sufficient flexibility to ensure the success of the RFS greenhouse gas regulation?

Answer. EISA establishes specific lifecycle greenhouse gas (GHG) reduction thresholds for certain renewable fuel types: renewable fuel from facilities that commence construction after enactment of EISA, advanced biofuels, biomassbased diesel and cellulosic biofuel. The statute also includes provisions that provide flexibility with respect to these GHG threshold requirements. First, the Act gives EPA the discretion to adjust these thresholds downward by the "minimum possible" amount but no more than 10% for each threshold. Second, the statutory definition of "lifecycle greenhouse gas emissions" provides EPA with some discretion in identifying and quantifying the relevant emissions.

EPA is still in the process of interpreting many aspects of the EISA. We also are still in the process of conducting the technical analysis required for the rule. As we move forward with this technical analysis as well as the rulemaking process, we are confident that we can successfully implement the new EISA renewable fuel provisions.

Question 4. You stated in your testimony that this RFS will create new obligated parties compared to the EPAct 2005 RFS. Could you give us some examples of these new obligated parties?

Answer. Under EPAct 2005, the RFS volume mandate applied only to gasoline, so obligated parties were generally limited to producers and importers of gasoline used for motor vehicles and engines. EISA applies the volume mandate to "transportation fuels" (defined to include both gasoline and diesel fuel) used in motor vehicles and engines and nonroad vehicles and engines. Consequently, EISA may affect new parties, including a number of small businesses that have not been regulated under this program in the past.

Question 5. We understand that there are problems with the existing EPAct 2005 waiver authority, which remains in place for conventional biofuel in EISA. Could you comment on how the waiver might be improved? Also, could you comment on how you think EPA might go about implementing the different waivers for the various carve outs, including the credit generation for cellulosic biofuel?

Answer. The Agency believes that EISA addressed any issues with the general waiver provision established in EPAct 2005 by expanding the categories of entities that may petition for a waiver to include regulated parties in addition to States. It also authorizes EPA to consider a waiver on its own motion. No additional modification of the waiver provision appears necessary at this time.

EPA has yet to determine how we will implement the general waiver authority or the specific waiver authorities for the biomass-based diesel and cellulosic biofuel standards, although we believe that these waiver provisions can be implemented within the established RFS program structure by adjusting compliance requirements to conform with any standards adjusted in response to a waiver petition. The Agency also has not made any final determination on how to implement the provisions concerning sales of credits in the event that EPA reduces the required volume of cellulosic biofuels under section 211(o)(7)(D). We anticipate setting the prices of credits based on the criteria in EISA and making these credits available to the obligated parties for purchase so they can meet their compliance obligations.

Question 6. One of our witnesses for the second panel, NPRA, expressed in its written testimony a concern that biofuel facilities that begin construction in 2008, and are therefore not legally obligated to comply with the greenhouse gas emission standards, would then be subject to those greenhouse gas regulations in 2009. Could you clarify EPA's interpretation of when the greenhouse gas standards for new construction will go into effect?

Answer. The Agency has not made any final interpretive determinations pertaining to the GHG requirements established in EISA that would apply to renewable fuel produced by a facility that commences construction in 2008, after enactment of EISA. The transition provisions in EISA provide that a facility that commences construction after enactment must meet the GHG threshold for their product to be considered renewable fuel in 2008 under the current RFS program, although the provisions also stipulate that renewable fuel produced by ethanol plants fired by natural gas, biomass or any combination thereof is deemed to comply with the GHG threshold for 2008. For years after 2008, we expect the GHG threshold would apply from the date our upcoming regulations go into effect. Thus, a facility that commences construction after enactment of EISA should expect that they will be subject to the GHG threshold for any renewable fuel produced in 2008 and for any fuel produced after the effective date of the upcoming regulations. As noted above, EISA's transition provisions separately address compliance by renewable fuel from facilities that commence construction after enactment of EISA and that are

fired by natural gas, biomass or any combination thereof. EPA is currently evaluating the full scope of this provision for determining compliance with the GHG threshold.

Question 7. There seem to be some differences of opinion on how much authority the Administrator has to reset the mandate. Is it your understanding that the Administrator will have the legal authority to set all the applicable volumes required in the RFS to zero after 2016?

Answer. Under certain identified circumstances EPA has discretion to adjust the renewable fuel volume levels in 2016 and later. However, while the statute does not prohibit reducing the levels to zero, there are clear procedural and substantive limitations on EPA's discretion to make such a decision.

If any of the four required volumes are lowered by more than 20% in two consecutive years or more than 50% in one year, EPA is required to issue a rule to change such required volumes for all subsequent years, but not prior to 2016. Further, EPA is required to go through notice and comment procedures prior to issuing such a rule. Any adjustments to the volumes required in the Act would need to be fully supportable as an appropriate exercise of Agency discretion. EPA would need in such a rulemaking to set volumes that, under the then current circumstances and facts, promote the purposes of this provision by achieving a reasonable balance of all of the factors Congress required that we consider in section 202(a)(2)(B)(ii) for setting the standards for the dates beyond those specified in section 202(a)(2)(B)(i).

Question 8. Could you comment on whether the cellulosic ethanol produced from the Range Fuel facility in Georgia would count toward the RFS? We understand that the feedstock is intended to come from commercial wood waste and private forests, which do not qualify as "renewable biomass."

Answer. The Agency is in the process of developing its proposal on various EISA provisions and has not made any final determination on our interpretation of the section defining renewable biomass. Until then, specific determinations on qualifying fuels and facilities are not possible.

RESPONSES OF ROBERT J. MEYERS TO QUESTIONS FROM SENATOR BARRASSO

Question 1. Does the EPA have any position with respect to extending the small refinery exemption to the RFS, included in the 2005 Energy Policy Act, but not included in the 2007 Energy Bill?

Answer. EISA does not modify or include any specific language regarding the possible extension of the small refinery provisions established in EPAct 2005. Nevertheless, in the process of promulgating the regulations required for EISA, EPA is still required to satisfy our obligations under the Small Business Regulatory Enforcement and Fairness Act. In doing so we will be evaluating, as we have for all of our recent fuel rules, the potential impact on small businesses such as small refiners, and we will propose regulatory flexibility as needed to provide appropriate relief.

Question 1a. If small refineries were granted exemption to the RFS, what, if any affects, could be anticipated on the goals of the legislation and on the energy market?

Answer. EISA established specific renewable fuel volume standards which refiners, importers and blenders (other than oxygenate blenders) are required to meet. Each year, EPA is required to publish a RFS requirement for the following year. This standard is established based on the projected production volumes of the gasoline and diesel transportation fuels. This standard is expressed as a percentage and is used by obligated parties to calculate their individual renewable volume obligations. If small refineries were granted an exemption from the RFS, the overall renewable fuel volume standards established in EISA would not be affected, but individual obligations would have to be set at a higher percentage for the larger obligated parties. EPA is currently in the process of analyzing the impacts of the new renewable fuel volumes mandated under EISA. While it is clear that the new RFS requirements may have a significant impact on complying parties' operations and costs, we have not completed the analysis to determine what effect the small refiner exemption would have on energy markets.

Question 2. Some individuals speculate that the ethanol industry is facing a de facto "blend wall" due to the practical limit of a ten percent blend, which some experts estimate to be in the range of 11 to 12 billion gallons. I understand these claims are made in part due to a combination of small engine warranty concerns for ethanol blends above ten percent, and statewide air quality caps, such as those imposed in California. What is EPA's opinion of these potential practical barriers, in terms of increasing and assimilating future ethanol production?

Answer. EPA is aware of the concerns about a practical limit on the total volume of E10 that can be used in the market. EPA is also aware of the potential barriers

to widespread distribution of E85 and use of mid-level ethanol blends (ethanol-gasoline blends with greater than 10 percent ethanol content). EPA's primary concern rests with the effect such mid-level blends may have on the emissions and components of gasoline-powered vehicles and engines. Although modern vehicles and engines are designed to operate on E10, concerns exist that levels of ethanol over 10 percent in non-flex-fuel vehicles and engines might result in durability and performance problems and increases in emissions. There are also specific concerns regarding the use of such blends in small engines, such as those used in lawn and garden equipment, which typically are less able to adjust properly to changes in fuel composition.

Because mid-level ethanol blends are not currently approved for use in nonflexfuel vehicles and engines, such blends will require a fuel waiver from EPA before being sold for use in a gasoline-powered vehicles or engines. A comprehensive test program that provides the data necessary to support a determination on the impacts of the use of mid-level ethanol blends and, subsequently, any waiver application, will require sufficient time to conduct the emissions and durability testing on a representative profile of vehicles and engines. For these reasons, EPA has been communicating with governmental and private organizations studying the effects of mid-level ethanol blends on vehicles and engines, as well as with stakeholders, such as small engine manufacturers, who have concerns that mid-level ethanol blends might cause damage to engines and emission-control devices.

Under the Clean Air Act, emissions of new gasoline fuels such as mid-level ethanol blends are also required to be tested for potential health effects. Results from testing already underway for E10 may be applicable for mid-level ethanol blends if it can be shown that such blends have the same impact on emissions as E10.

With regard to statewide air quality caps, we would defer to the California Air Resources Board (CARB) in that the gasoline emissions models that govern their gasoline composition regulations may have to be revised if they choose to accommodate the modeling of mid-level ethanol blends. We are unaware of any other air quality caps that would act as a barrier to the blending of ethanol at levels greater than 10 percent. However, some states do have laws which require that gasoline meet certain performance standards such as ASTM specifications that may require revisions in order to accommodate such blends.

Finally, in order to accommodate mid-level ethanol blends, the gasoline distribution infrastructure may require some equipment changes in order to be compatible with ethanol blends higher than 10 percent.

Most of the vehicle barriers associated with mid-level ethanol blends could be avoided by the increased sale of flex-fuel vehicles (FFVs), which can operate on up to 85 percent ethanol with gasoline (E85) and the greater use of E85 in these vehicles. The E85 refueling infrastructure is currently limited, and the current market pricing of E85 is typically insufficient to encourage significant numbers of FFV owners to fuel on E85. However, given the proper market signals there could be a significant increase in the use of ethanol in the form of E85.

Question 3a. In the May 1, 2007 edition of the Federal Register (p. 23907), EPA estimates the greater demand for corn as a feedstock for ethanol production, corn prices were expected to rise to $2.32 (in 2004) dollars; soybeans to $5.26 per bushel; and a $12 annual increase in the per capita wholesale food cost. What has been the actual experience with respect to these price levels since the release of those estimates?

Answer. The EPA estimates referenced in this question were provided as part of EPA's rulemaking for the Renewable Fuel Standard (RFS) under EPAct 2005. Thus, these estimates referred to 2012 renewable fuel volumes, as specified by that statute.

Renewable fuel volumes have increased more quickly than the scenarios we modeled; therefore price impacts in recent years have been higher than the prices included in the Federal Register notice for the RFS. In that notice, we predicted a more modest impact on commodity prices, since supplies would have had more time to adjust to changes in demand.

The actual prices for corn and soybeans are as follows:

i. Average nominal corn prices have increased from $2.00/bushel in 2005, to $3.04/bushel in 2006, to $4.00/bushel in 2007. From http://www.ers.usda.gov/data/feedgrains/FeedGrainsQueriable.aspx.

ii. Average nominal soybean prices have increased from $5.66/bushel during the 2005/2006 growing season to $6.43/bushel during the 2006/2007 growing season to a projected price of $10-$10.80/bushel for the 2007/2008 growing season. From http://usda.mannlib.cornell.edu/usda/current/OCS/OCS-02-11-2008.pdf.

It is important to note that a range of factors have impacted commodity prices, therefore the observed price changes may not be directly attributable to the RFS. First, higher levels of production of ethanol above the Renewable Fuel Standard volumes, driven by market forces, raised the demand for edible biofuel crops such as corn. Second, drought in Australia directly increased wheat prices and caused ripple effects throughout the coarse grains markets. Third, higher than anticipated economic growth throughout the world, particularly in China and India, coupled with a weak dollar led to stronger than anticipated demand for U.S. agricultural exports. Furthermore, the adoption of biofuel mandates in other countries outside of the U.S. also contributed to the increase in world commodity prices.

As for food prices, USDA estimates that current total per capita food prices have increased from $3,423 per person in 2005 to $3,616 per person in 2006 (the most recent year currently available.) From http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/table15.htm.

However, because USDA's per capita food expenditures are calculated at the consumer retail level, a direct comparison to wholesale food price changes estimated for the RFS analysis is not appropriate. Furthermore, many factors influence per capita food prices, beyond the ones described above.

Question 3b. Given the experience to date, what are the current estimates for each of the above categories for 2012 prices (in 2004 dollars)?

Answer. We are currently in the process of analyzing the impacts of the new renewable fuel volumes mandated under EISA.

Question 3c. What changes, if any, has EPA made to revise its modeling methodology to ensure the greatest accuracy possible with respect to price impacts from renewable fuels standards?

Answer. EPA, in consultation with USDA, continues to update assumptions in the agricultural sector modeling framework to reflect the most up-to-date information available, given resource constraints. For example, we have added the most recently available crop acreages to better capture recent increases in corn production. Furthermore, we are working to add an international component to our agricultural sector modeling capabilities to capture changes in global trends on the domestic agricultural markets.

Question 4. What predictions does the agency have for grain commodity prices in the intervening years before 2012? How will prices in these years affect implementation of the RFS.

Answer. We are currently analyzing the impacts of EISA on commodity prices and plan to include estimates of those impacts in our upcoming Notice of Proposed Rulemaking.

Question 5a. In your testimony, you referred to waiver authority granted to EPA under the Energy Policy Act of 2005 and the Energy Security Act of 2007. Do you believe that grain commodity price effects would trigger EPA action under this waiver authority? If so, what measure would EPA use as a trigger?

Answer. The general waiver authority established in Section 211(o) of the Clean Air Act authorizes the Administrator, in consultation with the Secretary's of Agriculture and Energy, to waive a RFS volume requirement in whole or in part if, in response to a petition by any person subject to the requirement and after providing public notice and an opportunity to comment, the Administrator determines that the requirement would severely harm the economy or environment or if inadequate domestic supply exists. Should the Agency receive a petition for a waiver, the Agency would need to evaluate any concerns raised with respect to grain commodity price effects and whether such effects are a direct cause of RFS program requirements. The petitioner would need to support their claim that significant harm would occur if a waiver were not granted. EPA is in the process of evaluating various approaches to exercising the waiver authority.

Question 5b. What action would the agency take to modify the RFS implementation if commodity prices triggered waiver authority?

Answer. The Agency would need to evaluate the increased commodity prices and their impact on the economy, and if it were appropriate to grant a waiver, EPA would modify the relevant volume requirements for complying parties.

Question 6a. Will consumer food price effects trigger EPA action under this waiver authority? If so, what measure would EPA use as a trigger?

Answer. Should EPA receive a petition for a waiver, the Agency would need to evaluate concerns raised with respect to consumer food prices, the extent to which any price increases are a result of RFS program requirements, and the impact of the food prices on the economy. The petitioner would need to support their claim that severe harm to the economy exists. EPA is in the process of evaluating the appropriate approaches for exercising the waiver authority.

Question 6b. What action would the agency take to modify the RFS implementation if commodity prices triggered waiver authority?

Answer. The Agency would need to evaluate the increased food prices and their impact on the economy, and if it were appropriate to grant a waiver, EPA would modify the volume requirements for complying parties.

Question 7. Is EPA aware of any preliminary or reviewed academic studies suggesting first generation biofuels could exceed the carbon footprint of conventional gasoline?

Answer. EPA is aware of many studies that have been conducted looking at the carbon footprint of biofuels compared to that of the petroleum fuel they would replace. EPA previously conducted a "well-to-wheel," or life cycle, GHG analysis of biofuels for the RFS regulations issued in 2007. We are now expanding this work and our methodology to meet the requirements in the EISA.

Most existing work, including EPA's RFS analysis for the 2007 rulemaking, indicates a net GHG benefit from the use of biofuels. However, several recent articles (Science 2/2007) have considered the GHG impacts of land use changes that occur with the production of biofuels, and suggest that the conversion of land into crop production may negate the GHG benefits of biofuels. We will evaluate this new research and continue to refine our research on the impact of land use changes to meet EISA language requirements.

Question 7a. What is the conventional wisdom of the science on this issue within the EPA?

Answer. Methodologies exist and are being improved to estimate the life cycle GHG impacts of biofuel production and use, including consideration of the impacts of land use change. However, this type of analysis requires a number of inputs and assumptions that EPA is continuing to evaluate. As suggested by the articles described above, a significant concern is the potential GHG impact of more agricultural commodities (e.g., corn and soybeans) being used to produce first generation biofuels, leading to more worldwide production of these commodities, resulting in land use changes, i.e., acres being converted from existing use into crop production. Some researchers point to the potentially large one-time impact this land use change could have in terms of GHG emissions and highlights the need for more work in this area. This type of analysis is fairly new in its application to biofuels and requires predictions about land use changes that would occur with and without sound land use policies in place, here and in the rest of the world. The recent papers confirm the importance of doing a thorough job of life cycle GHG emissions analysis to assure that policies promoting certain alternative fuels have their intended benefits, and EPA is continuing to evaluate the recent work.

Question 7b. Is EPA conducting any similar modeling on its own with respect to the carbon footprint of first generation biofuels, what are the results, and when will they be available?

Answer. Yes, EPA has developed a methodology to conduct a lifecycle GHG analysis as required by the EISA. The Act requires EPA to determine the life cycle GHG impact of renewable fuels and specifically requires that we include ". . . significant emissions from land use changes." Currently we are in the process of refining this methodology and seeking input from key stakeholders and experts in this area—including consideration of recent studies. EPA plans to provide details on its methodology and seek public comment on its modeling approach, inputs and results as part of the Notice of Proposed Rulemaking for the EISA renewable fuels rulemaking.

Question 7c. To the extent that future analysis and review does reveal a carbon footprint that exceeds conventional gasoline, is it possible for cornbased ethanol achieving the requisite 20 percent LCFS reduction?

Answer. If future analysis shows that the lifecycle GHG emissions of any renewable fuel exceeds the baseline for conventional gasoline or diesel, then it would not meet the 20% or lower GHG threshold for renewable fuel.. However, the EISA 20% lifecycle GHG requirement for renewable fuel only applies to new facilities that commence construction after enactment of EISA. EISA "grandfathers" renewable fuel produced from existing production facilities, which would allow a substantial amount of corn-based ethanol to be an eligible renewable fuel under EISA regardless of GHG analysis results.

RESPONSES OF CHARLES T. DREVNA TO QUESTIONS FROM SENATOR BINGAMAN

Question 1. You state in your written testimony that there is a limit to how much ethanol your industry can absorb. Could you give us a rough idea of how much ethanol refiners and blenders have the capacity to blend into finished gasoline today?

Answer. NPRA is concerned that there will be insufficient infrastructure to use 9.0 billion gallons of renewables in gasoline and diesel this year to meet the statutory requirement. Approximately 6.8 billion gallons of ethanol was supplied in 2007. The General Accounting Office and numerous press reports have detailed the cost implications of blending this quantity of ethanol. Obviously, the petroleum industry must expand infrastructure capacity in every year, including 2008.

The industry is currently assessing the limits of existing blending infrastructure capability as well as trying to make a determination of what additional infrastructure will be needed to meet the dramatic increase in the ethanol mandate for 2008. Obstacles to blending 9 billion gallons of ethanol into the fuel supply this year include assessing available blending infrastructure and ethanol transportation constraints. Similarly, because the ethanol mandate was increased by two-thirds this year (from 5.4 billion gallons in the Energy Policy Act of 2005 to 9.0 billion gallons in the Energy Independence and Security Act of 2007) and did not provide for any time for advanced planning, we must make determinations as to how many markets currently lacking ethanol blending infrastructure may need to be supplied blends of up to E-10 for refiners to comply with the law.

Another handicap discussed in NPRA's testimony is summer RVP regulations. This effectively prevents conversion from E0 to E10 at a retail station during the summer months. This is a handicap because if we wait until late September to begin conversions at retail stations, this could reduce the volume of ethanol that can be blended in gasoline this year.

Question 2. Could you comment on how you see market growth in biodiesel affecting compliance with the RFS? Will increased use of biodiesel increase your members' options for meeting their renewable fuel requirements?

Answer. Market growth in biodiesel can assist in compliance with RFS regulations. The current biodiesel market is very low (a few hundred million gallons in 2007) compared to ethanol (almost 7 billion gallons in 2007). While an increased biodiesel market could improve our ability to comply with the enacted RFS, we believe that there are a number of factors that could impede biodiesel market growth.

First, the lack of warranties on the existing diesel fleet that do not cover blends higher than 5 volume percent biodiesel may constrain biodiesel market growth. The Engine Manufacturers Association (EMA), for example, released the following: "Based on current understanding of biodiesel fuels and blending with petroleum-based diesel fuel, EMA members expect that blends up to a maximum of B5 should not cause engine or fuel system problems, provided the B100 used in the blend meets the requirements of ASTM D 6751, DIN 51606, or EN 14214. If blends exceeding B5 are desired, vehicle owners and operators should consult their engine manufacturer regarding the implications of using such fuel.[1]" This could effectively "cap" the use of biodiesel at B5 in the short-term. B100 also has a significantly higher cold-filter plugging point than petroleum diesel. Therefore, care must be taken in cold weather because biodiesel can gel at low temperatures. Further, biodiesel has approximately 8–10 percent less energy content per gallon than petroleum diesel and this fuel economy impact could also constrain the growth of biodiesel. Finally, biodiesel can also increase NO_X emissions relative to petroleum diesel.[2] Because NO_X is a ground-level ozone precursor, significant biodiesel growth could contribute to air quality problems, especially if EPA reduces the ozone NAAQS in March 2008.

Question 3. Could you comment on the recent progress toward having E10 approved for markets that have traditionally not allowed the fuel, such as the Southeast and California? If these areas allow E10, does compliance with the RFS become easier for your members?

Answer. E10 has never been banned in the Southeast. Some states (i.e., Alabama, Florida, Georgia, Missouri, North Carolina, and Oregon) are revising ethanol blending regulations, but these regulatory changes do not include lifting E10 state bans.

Regarding California, under the current CARB regulations (California Reformulated Gasoline Phase 3), it is very difficult to produce gasoline with 8 volume percent or 10 volume percent ethanol due to limits on NO_X formation. This NO_X limit, along with distribution system complexity and historical availability of ethanol in California, has resulted in a practical state wide standard of 5.7 volume percent ethanol (2003—present).

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[1] To view a press release from EMA: http://www.enginemanufacturers.org/admin/content/upload/106.pdf To view EMA's "TECHNICAL STATEMENT ON THE USE OF BIODIESEL FUEL IN COMPRESSION IGNITION ENGINES:" http://www.enginemanufacturers.org/admin/library/upload/297.pdf

[2] See EPA's analysis of biodiesel emissions: http://www.epa.gov/otaq/models/analysis/biodsl/p02001.pdf

In 2007, CARB enacted a revision to the California Reformulated Gasoline Phase 3 regulation that includes an updated version of the Predictive Model. This regulatory revision will become effective on December 31, 2009. The updated Predictive Model will make it easier to blend 10 volume percent ethanol into gasoline, provided that the gasoline producer can reduce the sulfur content of gasoline to prevent an overall increase in NO_X emissions. This poses challenges and will increase costs for refiners and could have a significant impact on the consumer.

The updated Predictive Model can be used voluntarily in California prior to December 31, 2009, which could result in increased volumes of gasoline blended at 10 volume percent ethanol. However, limitations on fungible gasoline distribution will prevent the industry from taking advantage of this provision on a broad scale. CARB is considering an additional regulatory revision that would provide greater flexibility to increase ethanol use without changes to fungible gasoline specifications. If enacted, this latest revision could become effective in mid-2008.

National E10 may be a compliance strategy, but it will only be part of RFS compliance because already a little more than half of U.S. gasoline contains ethanol. Making the rest of the country E10 will use about an additional 7 billion gallons of ethanol annually, but still leave us short of the rising RFS obligation after 2013. Even if all gasoline is E10 in 2022, then the ethanol use in that E10 will only be 16–17 billion gallons, far short of the statutory requirement of 36 billion gallons of renewable fuels in 2022. We will need to supplement national E10 with massive quantities of biodiesel, E85, and gasoline blends higher than 10 volume percent ethanol if approved by EPA (i.e., E15 or E20).

RESPONSE OF MICHAEL J. MCADAMS TO QUESTION FROM SENATOR BINGAMAN

Question 1. Could you describe to us some of the emerging technologies currently being developed by members of the Advanced Biofuels Coalition, which will not qualify as either biomass-based diesel or cellulosic biofuel, as defined in the Energy Independence and Security Act of 2007?

Answer. As the committee is aware we have a number of technologies represented in the Advanced Biofuels Coalition. One of the Coalitions concerns is that some technologies may use sugars to make a variety of products which could be used in the gasoline pool but not be made from cellulosic material as defined under the law or produce ethanol as its product. These technologies would produce a range of hydrocarbon molecules which would be a renewable fuel, but would not be a biomass based diesel or cellulosic derived fuel. Some of these companies could partner with first generation technologies, such as current corn based ethanol plants. However the output would not be ethanol. In this hypothetical the fuel product might be considered a conventional biofuels fuel not advanced biofuel. Therefore the question arises would it be allowed to count toward the first 15 billion gallon pool under the RFS. The definition of renewable fuels provides that it would be a covered product as an advanced biofuel. Another area that is ambiguous is the area of jet and heating oil. Depending on what feedstock or process would be used might impact which classification the fuels would fall under in the law. These advanced biofuels would bring advantages in terms of performance of the fuels and fungibility in the current system. If the intent of the statute was to bring new renewable fuels to the market place we would suggest that the language be give as broad a reading as possible to enable the language to accommodate these types' of second generation fuels. In the event the committee would seek to change these definitions more specific definitions would provide more certainty for a number of companies and their fuels.

RESPONSES OF CAROL WERNER TO QUESTIONS FROM SENATOR BINGAMAN

Question 1. Do you believe that the EPA Administrator has sufficient flexibility to ensure the success of the greenhouse gas reduction requirements?

Answer. As discussed in my testimony, it is very important that the Renewable Fuel Standard (RFS) in the Energy Independence and Security Act of 2007 (P.L. 110-140) help reduce greenhouse gas emissions (GHG). I identified three main areas where the Administrator plays a significant role in ensuring the success of the GHG reduction requirements: 1) the definition of lifecycle GHG emissions as well as how this is determined for renewable fuels and petroleum-based fuels; 2) the modification of required GHG reduction percentages; and 3) the waivers to reduce the required volumes of renewable fuel. Based upon current knowledge, I believe the language as enacted is sufficiently flexible for the Administrator to implement the RFS in a timely manner to meet the GHG reduction requirements set forth in the law.

MAIN AREAS OF FLEXIBILITY FOR ADMINISTRATOR

Definitions which include Lifecycle Greenhouse Gas Emissions

In Sec. 201 the Administrator is given broad authority to create a methodology for how to determine the Lifecycle Greenhouse Gas Emissions for the different fuels regulated under the RFS program. When determining what to include in the methodology, the Administrator also has the responsibility to determine what is and is not considered a "significant indirect emission." As described in my testimony this could be a very important factor in reducing GHG emissions. Furthermore, the Administrator also may include "any other anthropogenically-emitted gas that can contribute to global warming" as a greenhouse gas. The Administrator has the ability to develop a stringent or lenient methodology for calculating lifecycle GHG as he sees fit at the time while also allowing new information (such as new greenhouse gases) to be added as necessary. This section's flexibility will allow the Administrator to formulate an aggressive methodology to successfully reduce GHG emissions, while other sections mentioned below should ensure that the methodology will not cause significant harm to the developing renewable fuels industry or any of the interconnected industries affected by the standard. Given the Administrator's expansive authority it will be important to have a transparent process with public participation for the development of the methodology and its interpretation.

Modification of Greenhouse Gas Reduction Percentages

In Sec. 202(c) the Administrator may make reductions in the required GHG emissions of the variety of fuels included in the program. The Administrator shall make the minimum adjustment possible and shall not reduce the required percentage by more than 10 percent for each fuel (from 20 to 10, from 50 to 40 and from 60 to 50 percent). The Administrator may make these reductions for each category based on "commercially feasible for fuels made using a variety of feedstocks, technologies, and processes to meet the applicable reduction." The Administrator is also required to review the adjustment in the requirement not later than 5 years after the adjustment was made. This section also gives the Administrator the ability to make subsequent adjustments if he determines that there has been "significant change in the analytical methodology used for determining the lifecycle greenhouse gas emissions."

The flexibility provided by this section allows the Administrator to adapt the RFS program based on the growing and evolving body of information available on feedstocks, technologies and lifecycle analysis methodologies. This is very important because the industry is rapidly changing and must be assessed for its ability to meet the goals (GHG reductions) enacted by the law without the law becoming a barrier to further growth in the industry. Adjustments to the GHG reduction requirements allows the industry to be as aggressive as possible without setting the bar too high and inadvertently capping the industry at its current level.

Waivers to Reduce the Volumes of Renewable Fuel

In Sec. 202(e)(2) and (3) the Administrator shall reduce the volume of cellulosic biofuel or biomass-based diesel given certain circumstances. To reduce the applicable volume of cellulosic biofuel required under the program the Administrator must find that the projected volume of cellulosic biofuel production is less than the minimum applicable volume. The Administrator can reduce the applicable volume of biomass-based diesel required under the program if he determines that there is "significant renewable feedstock disruption or other market circumstances that would make the price of biomass-based diesel fuel increase significantly." The Administrator may also reduce the renewable fuel and advanced biofuels required under the program when reducing the volume requirements for either cellulosic biofuel or biomass-based diesel.

This section gives significant flexibility to the Administrator, possibly too much flexibility. The first RFS (passed in the Energy Policy Act of 2005, PL 109-58) provided many positive benefits for the biofuels industry; some would argue the most significant benefit was a stable and guaranteed marketplace which made investing in biofuels a smart choice. The first RFS as well as the current RFS is a signal to the investment community that the Federal government is committed to a market for biofuels. This is highly attractive for venture capitalists and other investors. To provide this stable market for biofuels the Administrator should show extreme caution when implementing the waiver section of the RFS which would basically reduce the marketplace and the stability for cellulosic biofuel production as well as biomass-based diesel.

Question 2. You make a compelling case that the "renewable biomass" definition as it relates to woody biomass is too narrow. How could the "renewable biomass"

definition be broadened to allow sustainably harvested woody biomass, while still protecting our national forests?

Answer. This question goes right to the heart of the issue at hand. In broadening the definition of renewable biomass to include biomass from sustainably managed woodlands, it is essential that we do not reduce the quality of stewardship that we have come to expect from the managers of our public lands. For biomass harvests to be eligible for the RFS, they should satisfy two important additional criteria: 1) the harvest should improve the stand in which it occurs, and 2) the harvest should be compatible with (and complement) the management objectives outlined in the management plan for the forest in which it occurs. Fortunately, there is an existing definition of 'renewable biomass' that accomplishes both of these objectives—the definition found in the Senate-passed versions of both the Farm Bill and the Energy Bill. This language (Sec. 9001(12) of H.R. 2419 EAS) allows for the inclusion of materials harvested from public lands that are byproducts of preventative treatments prescribed to reduce hazardous fuels, address outbreaks of disease or forest pests, or to restore ecosystem health. By explicitly including these materials in the definition of renewable biomass, the RFS will encourage and incentivize those silvicultural activities that are needed to improve stand conditions across much of the public domain.

The Senate definition included in the 2007 Farm Bill also dictates that woody biomass from public lands will be eligible only if it is harvested in accordance with applicable land management plans. These management plans, required for all management units on public lands, are multiple-value, multiple-use management directives that must address all aspects of the resource, including biological, economic, and social factors. Among these factors, management plans for national forests must "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives . . ." (16 USCS § 1604 g[3][B]). These federal management plans are thorough documents, individually tailored to the unique ecological and cultural conditions found at each national forest or management unit and written by professional foresters, ecologists, and wildlife managers. These documents are far better guidelines for sustainable management at the local level than simple exclusions or attempts at drafting broad, universal sustainability standards. Any forester will tell you a substantive management plan is the cornerstone of sustainable forestry. Even the best plan is only valuable if properly implemented, though. Because there has been so much distrust of federal land management agencies, it is important to begin earnest efforts to rebuild this trust. Public transparency and legislative oversight will be key components of this process.

In addition to requiring compliance with management objectives already in place, the Senate definition incorporates additional requirements for old growth management and large tree retention. These requirements, taken from the Healthy Forests Restoration Act of 2003 (16 USCS § 6512[e][2]), mandate that managers ". . . shall fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaption and watershed health, and retaining the large trees contributing to old growth structure." These requirements have been criticized for lacking an objective definition of old growth, but a universal definition of old growth that is valid for all forest types and ecosystems does not exist. The stand structure and ecosystem functioning of an old growth Douglas-fir forest is different from an old growth aspen forest or an old growth stand of northern hardwoods. These provisions require old growth to be locally defined "based on the structure and composition characteristic of the forest type" (16 USCS § 6512[e][D]).

As you can see, the Senate definition satisfies the two essential criteria that I outlined in the first paragraph: 1) the harvest should improve the stand in which it occurs, and 2) the harvest should be compatible with (and complement) the management objectives outlined in the management plan for the forest in which it occurs.

Although the Senate definition of renewable biomass is an improvement over the current law, there is room for yet more improvement. In Sec. 9001(12)(iii) of H.R. 2419 EAS (the Senate-passed Farm Bill), eligible public lands are defined as National Forest System land or 'public lands' as defined by the Federal Land Policy and Management Act of 1976 (43 USCS § 1702[e]). This definition defines public lands as lands administered by the Department of the Interior (DOI) through the Bureau of Land Management (BLM). This does not include lands managed by other arms of DOI, such as the National Park Service, Fish and Wildlife Department, and Bureau of Indian Affairs. Many of these lands are also in need of ecological restoration or preventative treatments, treatments that are extremely costly (as I discussed

in my testimony). If the definition of renewable biomass excludes these lands than an opportunity to provide a market incentive to do these treatments will be lost.

The Senate definition also allows for the inclusion of any and all organic materials harvested from private lands—with no provisions for sustainable management of these lands. As I have said before, a substantive management plan is the cornerstone of sustainable forestry. Public forests are required to have a management plan in place and private forests should be subject to a similar requirement, if they are to be included in the RFS. The addition of a required management plan (similar to the one required under the Forest Land Enhancement Program [16 USCS § 2103(e)], for instance) to the definition would be an important step in ensuring sustainability as the RFS is enacted. Ideally, this provision would be coupled with assistance funds to aid landowners and state forestry officials with the preparation and review of the large number of management plans that may result from this requirement. In the absence of such funding, however, a management plan requirement is still an important safeguard and a fundamental component of sustainable forestry.

In passing this preferable definition of renewable biomass in two separate pieces of legislation, it is clear that the Senate understands the value of our public lands in providing an important feedstock for production of renewable fuels. Additionally, this definition would do more to ensure sustainability and improve the condition of our public resources than the simple exclusions found in current law.

RESPONSE OF CAROL WERNER TO QUESTION FROM SENATOR AKAKA

Question 1. I read with interest your comments that, given the lack of data regarding the impact of indirect land use effects on the lifecycle of GHG, the wisest course of action would be to focus on feedstocks that do not induce land use changes. You include algae as being one of the favorable alternatives.

Can you provide some information on current science and development of algae, as a renewable fuel source? What are the advantages and disadvantages of using algae, as compared to the other favorable alternatives you mentioned? Are you aware of technology that uses algae to produce a fuel source that can be used, and presumably distributed, within the existing infrastructure?

Answer. Current Science and Development.—The concept of growing high-oil varieties of algae for biofuels is not new, and, in fact, much of what we know is from research completed more than a decade ago. From 1978 to 1996, the National Renewable Energy Lab (NREL) collected over 3,000 strains of freshwater and marine algae, including macroalgae (seaweed), emergents (partially submerged plants), and microalgae from all over the United States as part of the Aquatic Species Program (ASP). Researchers focused their efforts on microalgae for biodiesel (mono alkyl esters) production because those species produce more of the necessary kinds of natural oils.[1]

Compared to terrestrial oilseed crops, these simple aquatic organisms were found to make much more efficient use of solar energy, water, CO_2 and other nutrients. The ASP determined that microalgae are capable of producing 30 times the amount of oil per acre of crop compared to terrestrial plants. Another key advantage over other dedicated energy crops is that those algae-producing acres need not be arable land, thus eliminating competition with food, feed, and fiber crops. Furthermore, algae can grow in saltwater or wastewater, minimizing competition with agricultural, domestic, and industrial needs for scarce freshwater resources.

Two basic systems exist for large-scale algae production: open ponds and closed "photobioreactors". The photobioreactor, where algae grow within specially designed plastic bags, allows for more control over temperature and protects against potentially contaminating species. Performing tests in Hawaii, California, and New Mexico, the ASP focused on the open pond system, which researchers concluded would be the more economically viable method of production due to its relatively cheap capital costs. These shallow ponds consisted of circulating water, to ensure all organisms had equal exposure to sunlight, and utilized waste CO_2 from coal-fired power plants to feed the algae. Absorbing CO_2 from the flue gas emitted by coal-fired power plants represents the third major benefit of using algae as a transportation fuel feedstock; the carbon is essentially used twice for energy production before being released into the atmosphere, thereby increasing the Btu-to-greenhouse gas emission ratio.

Even utilizing the relatively cheap open pond method, the ASP determined that large-scale algae production was cost prohibitive. Using all components of the algal

[1] National Renewable Energy Laboratory (DOE). A Look Back at the U.S. Department of Energy's Aquatic Species Program: Biodiesel from Algae. Close-Out Report. July 1998.

biomass, and not just the 50-60% oil present in high-oil varieties, will likely be the key to a cost effective system. Beta-carotene, nutritional supplements, and other high-value health and beauty products can be derived from algae. The carbohydrate part of the biomass can be used for ethanol production or even co-firing in a coal-fired power plant. Animal feed is another valuable co-product.

In 1995, the Department of Energy eliminated funding for the ASP, focusing its resources instead on ethanol. Research in the area stalled for about a decade, until the last couple of years when private and public investments have accelerated significantly. There are several start-up companies working to commercialize an algae-to-biofuel process; some have partnered with major oil corporations. The Department of Defense has also spurred activity with its BioFuels program, while states such as Texas and Virginia have provided funding as well. Some companies have claimed production numbers in excess of 10,000 gallons of biodiesel per acre of algae, but these have yet to be proven in long-term, real world demonstrations. Conservative estimates are closer to 1,000 gallons per acre, comparable to ASP findings.[2] Some companies are using the inexpensive open pond system, while others believe they can overcome the large capital cost of a closed photobioreactor. Some are building stand-alone production systems, while others are adding to existing systems or building in the capacity to make valuable co-products. It remains to be seen which formula, if any, will yield economically viable production costs that can compete with fossil fuels.

One of the many projects initiated in the last year is run by Cellana, a joint-venture between Royal Dutch Shell and HR Biopetroleum. The partners announced in November 2007 that they will build a pilot facility on the Kona coast of the Big Island in Hawaii to grow non-modified marine algae for biodiesel. They will use an open pond system on a site leased from the Natural Energy Laboratory of Hawaii Authority (NELHA), adjacent to existing algae ponds used for the pharmaceutical and nutrition industries. The Cellana plant will use bottled CO_2 in its demonstration-stage operation.[3]

Vertigro, a joint venture between Valcent Products Inc. and Global Green Solutions*, has been running a demonstration of a closed photobioreactor system since last fall. The facility is located in El Paso, Texas, and is also selling the algal biomass to the food, pharmaceutical, health and beauty industries. The closed system engineered by Vertigro is modular, so future algae producers could increase capacity one acre at a time.

While most of the work with algae-derived transportation fuels has focused on biodiesel, algal oils can be processed into jet fuel as well. In November 2007, Chevron partnered with NREL to identify and develop appropriate strains of algae for use in transportation fuel, including jet fuel.[4] In January 2008, Chevron announced that it will work with California-based Solazyme** to commercialize algae-to-fuel technology.

Massachusetts-based GreenFuel Technologies is working with Sunflower Electric Power Company to test an algae production system that will feed off the flue gases from a Sunflower coal plant in Kansas. Once the production and harvesting is brought up to commercial scale, the company plans to convert the algal biomass to biofuels and animal feed. In 2007, GreenFuel built a similar facility adjacent to a power plant in Arizona, but the project was halted after two weeks because the algae grew faster than the harvesting equipment could handle.

Scientists and engineers from Old Dominion University have received about $500,000 from the state of Virginia to build cultivation tanks to grow algae in wastewater. The facility will only be able to produce around 70,000 gallons of biodiesel per year, but the algae also perform a valuable service for the local waterways by absorbing nutrients such as nitrogen and phosphorous before the wastewater is discharged.[5] Similar research is taking place at the University of Minnesota, where a closed system will utilize the waste heat from a water treatment facility to compensate for the cold climate.[6]

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[2] Correspondence with John Sheehan, Vice President of Strategy and Sustainable Development for LiveFuels, Inc., and lead author of NREL Aquatic Species Program Close-Out Report: February 2008.

[3] Shell Press Release: November 12, 2007.

* Valcent Products Inc. creates and designs consumer and industrial products. Global Green Solutions develops alternative energy and greenhouse gas reduction technology.

[4] Chevron Press Release: October 31, 2007.

** Solazyme is a synthetic biology company, specializing in genetic engineering of marine microbes for the energy, chemical, and pharmaceutical industries.

[5] Old Dominion University Press Release: December 14, 2007.

[6] University of Minnesota Press Release: January 15, 2008.

The Defense Advanced Research Projects Agency (DARPA), part of the Department of Defense, is working to develop economically viable production of biobased military jet fuel through its BioFuels Program. Sandia National Laboratories, in collaboration with UOP, LLC, Cargill, and Arizona State University, is researching algae production and conversion technologies under a $6.7 million DARPA grant. The Energy & Environmental Research Center at the University of North Dakota received about $5 million for a similar project, which should be complete in mid-2008.[7] Grant recipients are expected to deliver a minimum of 100 liters of a JP-8 jet fuel alternative for DOD testing.[8]

ADVANTAGES AND DISADVANTAGES OF ALGAE AS A FEEDSTOCK

Much will be learned in the next 2-3 years as these research, development, and demonstration projects are completed and move toward commercialization. The field of plant genetics has made many advances since the ASP ended, which may help bring down costs. But the fact is that high production costs remain the principal barrier to bringing algae-based biofuels to market. Current estimates run in the $20 per gallon range, which clearly is not competitive with petroleum.

Another possible barrier to large-scale commercialization of biofuels in general is infrastructure. Pipelines are the most cost effective way to transport liquid fuels, but ethanol and biodiesel are currently transported by truck, rail, and barge. Ethanol raises concerns about stress corrosion cracking, while biodiesel may have "trail back" issues, where trace residues left behind contaminate jet fuels later transported in the same pipeline.[9] Meanwhile, the trucking and rail sectors are operating at full capacity and may have trouble meeting the needs of a rapidly expanding biofuel industry. The good news for biodiesel, however, is that once it makes it to the pumps, it can be used in any diesel engine without modification.

Experts agree that the potential for algae-based biofuels to meet a significant portion of our needs is high, but commercial production should not be rushed without careful consideration of all its impacts. For example, recent work on lifecycle analysis has placed a new focus on indirect land emissions—emissions associated with agricultural expansion in another location (either in the U.S. or abroad) directly resulting from the increased demand for agricultural products caused by shifting domestic farmland from food to fuel production. While a standard methodology for life cycle emissions analyses including indirect effects has yet to be agreed upon, a number of studies indicate that the conventional biofuels produced on agricultural land have the potential to increase emissions of greenhouse gases relative to fossil fuels—exacerbating climate change instead of mitigating it. This makes it critical to focus on wastes, residues, and other feedstocks that will not result in land use changes.

Unintended environmental impacts could become an issue with commercial production of algae for biofuels as well, particularly in regards to genetic modification. Invasive aquatic plant species such as Giant Salvinia, Water Hyacinth, and Eurasian Water milfoil have spread throughout many states over the past several decades, causing problems such as crowding out native species, reducing water oxygen levels, blocking sunlight, and clogging water intakes.[10] Microalgae's ability to grow so rapidly, even doubling within a matter of hours, could be devastating if a strain with containing a harmful gene were to spread to wild freshwater or saline populations. Closed algae production systems allow for more safeguards than open ponds, but the potential for transfer of the microscopic organisms would still exist.

Of course, algae are not the only biofuel feedstock that avoids the land conversion issues facing today's corn-and soy-dominated industry. Waste materials*** such as forest thinnings, municipal solid waste, agriculture and animal processing residues, and leftover vegetable oils can all be sourced without putting more pressure on arable land. Some of these feedstocks also have their own unique advantages. For example, providing a market for otherwise low-value woody biomass makes healthy forest management practices more economically viable, thus reducing the potential for catastrophic, high-emitting wildfires. Finding a use for municipal solid waste

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[7] University of North Dakota Energy & Environmental Research Center Press Release: December 6, 2006.

[8] DARPA Biofuels Solicitation: July 5, 2006.

[9] Anduin Kirkbride McElroy. "Pipeline Potential." Biodiesel Magazine: February 2007.

[10] USDA National Agricultural Library. http://www.invasivespeciesinfo.gov/aquatics/main.shtml

*** It should be noted that, as technology stands today, not all of these feedstocks are in direct competition with one another. Cellulosic plant material and municipal solid waste are being developed for the production of ethanol, a gasoline additive. Oils and animal fats are converted to biodiesel, for use with diesel engines. However, thermal conversion technologies may bring about the ability to process cellulose into a diesel substitute in the future.

could potentially alleviate some of the pressure on communities to find more landfill space.

Also, some feedstocks have regional advantages. Woody biomass will be more plentiful in forested states (like the Southeastern United States), while agricultural residues will come from farm states and fish processing waste will come from coastal states. Algae grow best in areas with ample sunlight and warm temperatures. The desert southwest is particularly attractive for algae production because there is plenty of non-arable land and solar energy.

As a group, however, these waste materials do share one clear advantage over algae as a biofuel feedstock: they are available today at low cost. On the other hand, alga has the potential to provide a tremendous amount of energy, many times what you will get out of other types of biomass.

CONCLUSIONS

There are many start-up companies and universities working hard to turn the high energy potential of algae into a commercially viable biofuel. This recent push for research, development, and commercialization of algae-based biofuels comes after a decade of focusing on corn ethanol and soy biodiesel, which have the potential to have serious land conversion and climate change implications. Algae can grow in brackish water on non-arable land, feed off the waste CO_2 from coal-fired power plants, and produce up to 30 times more oil per acre than produced by terrestrial oilseed crops. The main barrier is high production costs that cannot compete with the current production costs of fossil fuels. Another potential problem is the possibility of genetically-modified algae escaping the algae production facilities and harming wild ecosystems. Federal funding of research or oversight of research could accelerate progress in developing commercially viable technologies while also mitigating environmental risks, including those related to genetic modification.

RESPONSES OF ALEXANDER KARSNER TO QUESTIONS FROM SENATOR BINGAMAN

Question 1. I am pleased that DOE is a strong supporter of cellulosic ethanol; however, I am concerned that we might not be doing enough to support other kinds of second generation technologies. Could you comment on how DOE is working to advance other advanced biofuel, such as cellulosic biobutanol and biocrude from algae?

Answer. There are a number of other advanced biofuels that have promising potential as gasoline and diesel substitutes. In recent years, DOE's Office of Energy Efficiency and Renewable Energy has focused almost exclusively on cellulosic ethanol primarily due to the relative volumetric substitution available and the fact that cellulosic ethanol demonstrates the greatest potential for significant near-term commercialization.

However, DOE is increasing and broadening its efforts on next-generation biofuels using a variety of feedstocks and conversion technologies. For instance, on January 29, 2008, DOE announced $114 million in awards for small scale biorefineries that use next generation technologies.

DOE is reviewing a wide range of potential alternative fuels beyond cellulosic ethanol, including algae and biobutanol.

Biobutanol is a liquid alcohol fuel that can be used in today's gasoline-powered internal combustion engines. The properties of biobutanol make it highly amenable to blending with gasoline. For example, recently, DuPont and British Petroleum, among others, have begun investing in R&D to develop more cost-effective biobutanol production processes.

Question 2. Could you comment on whether the cellulosic ethanol produced from the Range Fuel facility in Georgia would count toward the RFS? We understand that the feedstock is intended to come from commercial wood waste and private forests, which do not qualify as "renewable biomass."

Answer. Section 211(o)(1) of the Clean Air Act, as amended by section 201 of the Energy Independence and Security Act of 2007 (EISA 2007), defines "renewable biomass" to include planted trees and tree residues from actively managed tree plantations on non-federal land cleared prior to the enactment of EISA 2007, and slash and pre-commercial thinnings that are from non-federal lands. It is our understanding that the Range Fuel facility will rely on biomass consistent with the statutory definition, and therefore, cellulosic ethanol produced at the Facility would count towards the RFS.

RESPONSES OF ALEXANDER KARSNER TO QUESTIONS FROM SENATOR AKAKA

Question 1. The Environmental and Energy Study Institute testified today that, given the lack of data regarding the impact of indirect land use effects on the lifecycle of GHG, the wisest course of action would be to focus on feedstocks that do not induce land use changes. Furthermore, algae represents a feedstock with great potential for high yields and little or no indirect emissions, because it does not require the use of arable land currently in food production. Therefore, it concerns me even more that Secretary Bodman, when testifying before the Committee on the FY09 Budget, implied that research on algae, as a renewable fuel source, falls under the purview of NOAA, and not DOE. What is DOE's position on algae, as a renewable fuel source? Is it as favorable an alternative as the perennial grasses that you mention in your testimony?

Answer. DOE is committed to targeting its R&D effectively to develop cost effective, clean renewable fuels. To that end, we are investigating the potential of a wide range of feedstocks, including algae, to synthesize alternatives to petroleum-based fuels. The Department is preparing a report for Congress, as required under the Energy Independence and Security Act of 2007, to assess the use of algae as a renewable (biofuels) feedstock. In preparing the report, the Department has discussed ongoing algae research with other Federal Agencies, including the Environmental Protection Agency, and the Departments of Defense and Agriculture.

Perennial grasses and algae offer different solutions to different concerns. Perennial grasses are being developed as a cellulosic feedstock primarily for producing transportation fuels such as ethanol that can be used in gasoline-powered engines, while algae is being considered as an aquatic species that would be grown for its lipid (and therefore hydrocarbon) content and used in diesel engines. Oilseed crops are more similar to algae in that they are also lipid producers that can be used in diesel fuel applications. Currently, biodiesel produced from oilseed crops such as soybeans is commercially produced on arable land while algae is still in the research and development stage.

Question 2. How does DOE plan to work with NOAA in research and development initiatives for algae as a renewable fuel source?

Answer. The National Oceanic and Atmospheric Administration (NOAA) has primarily acted to understand, monitor, and respond to harmful algal blooms (HABs) in our country's coastal and lake regions. Although DOE and NOAA are not currently working together on the development of algae biofuels, it is quite likely that the expertise NOAA has developed in forecasting and monitoring HABs could be of great value to monitoring algal growth in dedicated large-scale cultivation ponds used for biofuels production. Furthermore, based on the advanced sensing technologies and high level predictive models that have been developed, we see a good synergy developing between DOE and NOAA in the algae to biofuels area. Should algae cultivation for biofuels production ever move off-shore to our coastal regions, information maintained at NOAA's National Oceanographic Data Center would be useful in the long-term monitoring of the effects of growing production algae at such a large scale as well as monitoring these cultures for contamination by invading species.

RESPONSES OF ALEXANDER KARSNER TO QUESTIONS FROM SENATOR BARRASSO

Question 1a. Does DOE have any position with respect to extending the small refinery exemption to the RFS, included in the 2005 Energy Policy Act, but not included in the 2007 Energy Bill?

Answer. The Administration has not developed a position at this time with respect to extension of the small refinery exemption. DOE is currently in the process of evaluating the exemption under the EISA 2007 revisions to the program and will make a recommendation as directed by EPACT 2005 by the end of 2008. We believe that the small refineries exemption from compliance of the RFS program in EPACT 2005 was maintained within EISA 2007. Additionally, we believe that the timing of the small refineries exemption, which extends until the end of 2010 under EPACT 2005 was maintained within EISA 2007. However, the provisions for determining an obligated party's RFS requirements have changed to include all manufacturers, blenders or importers of transportation fuel as opposed to gasoline. Additionally, the renewable fuel volumetric requirements have changed significantly from EPACT 2005 to EISA 2007. These changes may alter the number of exempted refineries and complying party's requirements. Under the small refiner's exemption for EPACT 2005, DOE is required to determine by December 31, 2008 whether compliance with the RFS requirements would impose a disproportionate economic hardship on small refineries, and if such a finding is made, the EPA Administrator must extend the exemption from the RFS program for an additional two years.

Question 1b. If small refineries were granted exemption to the RFS, what, if any affects [sic], could be anticipated on the goals of the legislation and on the energy market?

Answer. Since at this point in time DOE has not fully evaluated the small refineries exemption under the EISA 2007 revisions to the RFS program we can not comment on the effects the legislation may have on the goals of the program or energy markets.

Question 2. Some individuals speculate that the ethanol industry is facing a de facto "blend wall" due to the practical limit of a ten percent blend, which some experts estimate to be in the range of 11 to 12 billion gallons. I understand these claims are made in part due to a combination of small engine warranty concerns for ethanol blends above ten percent, and statewide air quality caps, such as those imposed in California. What is DOE's opinion of these potential practical barriers, in terms of increasing and assimilating future ethanol production?

Answer. Today the vast majority of the nation's ethanol is marketed for use in vehicles and engines as a blend up to 10 percent (E10) in gasoline. The only other way of using ethanol is in the form of E85 in specially designed flexible fuel vehicles. However, less than one percent of all ethanol used in U.S. transportation fuel comes in the form of E85. Given the new renewable fuel standard requirements for significant increases in biofuels as well as increased domestic production of ethanol, the El0 market is becoming saturated and may in fact reach the "blend wall" in the next 24 to 36 months—the equivalent of 10 percent of all gasoline sold. There are two paths to increase ethanol markets beyond the 12 to 14 billion gallons (which the "wall" represents), which are being pursued in parallel: Expand E85 markets at a significantly accelerated pace, including maximizing flexible fuel capability across the vehicle fleet amongst all manufacturers that serve the US market as well as E85 fueling stations; and certify intermediate gasoline blends to use up to 15 or 20 percent ethanol (i.e., E15, E20), letting market forces drive ethanol supply distribution (based on successful engine/emissions testing and EPA approval).

While the Department is aware that several state fuel quality specifications as well as air quality caps may currently impede nationwide use of El0 and beyond, we are encouraging several states in the Southeast to modify and/or harmonize their fuel quality specifications in order to facilitate the use of El0 in their respective states.

DOE recognizes that there may be potential engine operational and emission issues, among other concerns, with E15 and E20 gasoline blends. Accordingly, DOE began testing E15 and E20 in summer 2007, on small engines and vehicles.[1] DOE testing of higher ethanol blends on small engines currently covers full life emissions, durability, and temperature on leaf blowers, line trimmers, pressure washers, and small generator sets. An expanded test plan to include marine engines, all-terrain vehicles (ATVs) and motorcycles is under development. The DOE intermediate blends test plan on vehicles is evaluating vehicle exhaust and evaporative emissions, catalyst durability and aging, cold-start operation and drivability, and fuel system and catalyst materials compatibility. Given the new Renewable Fuel Standard as well as anticipated saturation of the El0 market within the next few years, the Department recognizes the urgent need for continued and expanded testing towards evaluating the viability of intermediate blends between El 0 and E85 as an element to achieving the renewable fuels mandates.

[1] Testing will be done against a baseline of E0 and E10.

APPENDIX II

Additional Material Submitted for the Record

STATEMENT OF PATRICK RITA, VICE PRESIDENT, GOVERNMENT AFFAIRS, AMERICAN FOREST & PAPER ASSOCIATION

The American Forest & Paper Association (AF&PA) appreciates the opportunity to share our perspective on the Renewable Fuels Standard (RFS) that was enacted as part of PL 110–140, the Energy Security and Independence Act of 2007. As you may know, the forest products industry is a leader in the generation and use of renewable energy from biomass residue in our mills. On average, the industry uses approximately 60 percent carbon neutral biomass energy and produces about 89 percent of the bio-based fuel generated by industrial sectors. This is accomplished while adhering to disciplined market based standards of accountability that ensures the wood fiber we use is grown in a sustainable manner.

AF&PA is the national trade association of the forest, pulp, paper, paperboard, and wood products industry. The industry accounts for approximately 6 percent of the total U.S. manufacturing output, employs more than a million people, and ranks among the top 10 manufacturing employers in 42 states with an estimated payroll exceeding $50 billion. We support policy efforts to increase our nation's energy security and our member companies are leading the effort to achieve this objective by combining advanced technology and innovative manufacturing practices with responsible stewardship of our natural resources.

AF&PA urges Congress to modify the definition of renewable biomass in the RFS provision of PL 110–140, which currently restricts eligibility based on forest types and successional stage and disqualifies fiber from public ownerships. We also recommend adding criteria to the waiver and study aspects of the RFS that will help balance the resource needs of existing biomass users, the emerging resource needs of the cellulosic biofuels industry, and the health, viability and productivity of our agricultural and forest lands throughout the country.

The definition of renewable biomass in the RFS statute creates a number of implementation challenges and would meaningfully reduce landowner options and raise fiber costs for manufacturers of wood and paper products. We urge Congress to revisit this issue and replace the existing definition of "renewable biomass" with the definition contained in Sec. 102(4) from the version of H.R. 6, the Energy Security and Independence Act that passed the Senate on June 21, 2007.

As written, the definitional approach in PL 110–140 regarding tree plantations established prior to enactment excludes large swaths of timberland and provides a disincentive to prospective market entrants who wish to grow new forests. This language also excludes materials from forests in the Lake States, Northern New England, Central Appalachians, and other regions that are managed to allow natural tree regrowth, with potentially negative effects on jobs and economic growth in these already distressed rural areas. In addition, the renewable biomass definition in the RFS encourages would-be producers of renewable fuel to focus their procurement efforts on existing softwood plantations, which are already intensively managed and supply substantial amounts of fiber to existing biomass users.

Second, the prohibition on the use of "slash and thinnings" from either old growth or forests on any list of imperiled forests is unworkable because of numerous technical ambiguities that make it difficult, if not impossible, to map and apply. We are concerned the prohibition in practice will either exclude large amounts of wood fiber out of confusion or an abundance of caution, or be enforced entirely in the breech because of difficulties verifying the source of the generally low value fiber being used to produce biofuels. In any event, landowner decisions regarding harvest are driven primarily by regional market dynamics which make harvesting old growth timber to produce low-value biomass impractical.

Third, the exclusion of fiber from public lands prevents the utilization of low value materials removed from the forest to reduce fire risk and improve forest health.

There are over 90 million acres of Federal public lands that are at high risk of uncharacteristic fire, insect, or disease outbreaks. Eliminating the biofuels market as a tool to reduce hazardous fuel loads will exacerbate the decline in infrastructure needed to do this work, placing both forests and adjacent communities at increased risk.

In addition to definitional modifications, AF&PA urges Congress to further amend the RFS by adding language that would allow a state to petition for a waiver from the RFS mandate if its implementation would severely harm the long-term agricultural and silvicultural capability of a region of the country. We believe that allowing states to seek a waiver if mandated production levels threaten the ability of natural resources in the state or region to satisfy production levels, in addition to meeting demand from existing biomass feedstock users that rely on the same resource to produce food and manufacture products, would improve the standard. Enhancing the waiver will help maintain a working balance between the resource needs of existing biomass users and the emerging resource needs of the cellulosic biofuels industry. The modification would also help preserve the health, viability, and productivity of our agricultural and forest lands throughout the country as well as economies in rural areas.

We also propose expanding the study by the National Academy of Sciences to include assessment of the impact of an expanded RFS on users and producers of biomass as well as options for long-term agricultural and silvicultural capability. Cellulosic ethanol production will be derived, at least in part, from woody biomass and we believe examining the impacts on forest landowners and wood and paper products manufacturers would better inform the study. The suggested language regarding agricultural and silvicultural capability will help maintain a working balance as the standard is being implemented.

The forest products industry is a leader in developing innovative energy solutions that decrease our reliance on fossil fuel and is the largest producer of biomass energy in the country. We urge Congress to assist our efforts by supporting an unbiased definition of renewable biomass, ensuring the long-term silvicultural and agricultural capability of regions, and maintaining the current biomass needs of existing facilities.

We thank the committee for creating an opportunity to comment on this important issue and look forward to working with you in the coming months to craft a workable and balanced renewable energy policy.

STATEMENT OF J. PATRICK BOYLE, PRESIDENT AND CEO, AMERICAN MEAT INSTITUTE

Mr. Chairman, Ranking Member, and Members of the committee, thank you for allowing us the opportunity to submit testimony. AMI has provided service to the nation's meat and poultry industry—an industry that employs more than 500,000 individuals and contributes more than $100 billion in sales to the nation's economy—for more than 100 years.

AMI members include 250 of the nation's most well-known meat and poultry food manufacturers. Collectively, they produce 90 percent of the beef, pork, veal and lamb food products and 75 percent of the turkey food products in the U.S. Among AMI's member companies, 60 percent are small, family-owned businesses employing fewer than 100 individuals and some are publicly trade and employ tens of thousands.

AMI commends the committee for holding the hearing. It is very valuable to call attention to the need for greater diversity in biofuels and energy. AMI is very supportive of efforts to develop energy from many bio-based sources including animal fats and byproducts. While this hearing specifically focuses on the effects on the energy markets, it is clear that any development in the energy market for food-based biofuels has profound impacts on our member companies as significant consumers of feed.

AMI member companies are concerned about the short-term and long-term economic consequences of burning more feed and food as fuel on the meat and poultry community. The goal of energy security is commendable and should be considered in relative context to risk posed to domestic and international food security. By utilizing a key food ingredient as the dominant input for biofuels, the program has coupled food prices to fuel prices.

The Energy Independence and Security Act of 2007 (EISA), its predecessor the Energy Policy Act of 2005 (EPAC), and existing biofuel subsidies and trade protections have concentrated the adverse impacts on animal agriculture producers and consumers' food budgets. When the EPAC was signed, food inflation was coincidently at its ten-year average of 2.3 percent. In January 2008, the CPI food

index was 4.9 percent, which is more than twice the ten-year average. Food inflation creates a drag on the economy and reduces the purchasing power of consumers. The consequences of this added inflation contributes to an increased food bill of nearly $200 for a household of four. This increase carefully matches the projections of an August 2007 Iowa State University study, which indicated that per capita impact at $47 per person[1].

In 2007, livestock and poultry producers saw their feed prices rise by more than 65 percent and are expecting an equally difficult environment for 2008. Food-based biofuels production has had an influence on food prices and substantial influence on the prices farmers pay for feed. For many years, the economic well-being of the meat and poultry industry closely tracks that of our most immediate supplier, the animal agriculture producer. The recent red ink in the animal sector may be most pronounced in the cattle sector. As illustrated in the graph below*, cattle producers suffered significant losses through 2007, largely from increased feed costs.[2] On Feb 1, 2008, USDA released figures indicating the beef calf herd for 2007 was the smallest since 1951, an indication of market adjustments due to substantially higher feed costs.

FOOD-BASED BIOFUELS IMPACT ON FEED AND FOOD

The rise in demand for corn has pressed market forces to demand higher corn, soybeans, and all feed prices. Consequently and among other impacts, the change in price and availability has led animal agriculture producers to consider alternatives to their feeding, nutrition, and dietary regimen. These changes can and do impact meat and poultry quality, consumer offerings, livestock and poultry farm efficiency, and the management of livestock and poultry operations.

It is for these reasons articulated in the following testimony that AMI is asking Congress and the Administration through tax, other legislative and regulatory vehicles to consider policies that account for impacts on animal agriculture and food, and ultimately places the U.S. in a more competitive position in terms of energy security, diversity, and availability as well as food security.

Corn is one of the largest components in the diets of livestock and poultry. Swine rations often contain about 60-85 percent corn, poultry rations contain about 65-75 percent, and beef animals often have diets averaging 35 to 65 percent shell corn—although some producers will feed 100 percent corn to beef animals as either shell corn, flaked, or silage. As a result of a significant increase in ethanol production, animal nutritionists are being confronted with a new challenge in attempting to incorporate a significant amount of ethanol's byproduct or distillers grains into existing feed rations and maintain meat and poultry quality and the economic well-being of livestock and poultry producers.

Initial research has demonstrated that animal performance measured by weightgained/ day, meat yield, leanness, environmental impact (manure production), and other factors have provided initial indicators that livestock and poultry on distiller grain rations have underperformed their corn-rationed peers. The very high fiber content, nutrient variability, limited digestibility, and different mineral profile of distiller grains are the key limiting factors of its ability to be used as a substitute for corn.

As domestic feed and food prices have increased, other major grain producing regions have responded to the added inflationary pressures. USDA identifies three main grain production areas in the world, the United States, Argentina, and China.[3] Unfortunately, since mid-2007 Argentina has taxed and limited exports licenses for grains. In November, Argentine Economy Minister Miguel Peirano stated that "increasing the cost of exports also is designed to reduce domestic inflation."[4] On January 1, 2008, China "imposed a 5 percent tax on exports of corn, rice and soybeans and a 20 percent levy on wheat exports. Food prices in China gained 18.2 percent in November. The [Chinese] government has also sought to slow price increases by selling grain from stockpiles and canceling tax rebates."[5] These trade restrictions

[1] Iowa State Univ; Tokgoz, Elobeid, Fabiosa, Babcock, Hayes, Yu, Dong, Hart, & Beghin. "Emerging Biofuels: Outlook of Effects on U.S. Grain, Oilseed, and Livestock Markets," (2007).

[*] Graph has been retained in committee files.

[2] Ibid. Lawrence. (2008).

[3] USDA. Hoffman, Baker, Foreman, & Young. "Feed Grains Background," (Mar. 2007).

[4] Bloomberg.com. Craze & Raszewski. "Argentina Raises Taxes on Exports of Corn, Soybeans," (2007).

[5] Bloomberg.com. Hur."Corn Rises to an Eleven-Year High as China Sets Export Taxes on Grains," (2008).

contribute to added pressure from a food-based biofuels program on domestic animal agriculture producers and food supplies.

As the Environmental Protection Agency (EPA) begins the rule-making process for EISA, we look forward to working with them to develop a rule that provides for meaningful consideration of the consequences of a food-based biofuels program. In EISA, EPAC, and the Clean Air Act and subsequent amendments, Congress provides the Administration and EPA authority and discretion. It will be very critical for EPA to thoroughly examine the issues, utilize their technical expertise, and exercise their discretionary authority to account for unintended domestic and international consequences of food-based biofuels and develop a rule to enhance energy security.

Policy Recommendations

1) Congressional and Administration leaders should develop and implement a plan to decouple the increasing price correlation of food from fuel. They can begin by eliminating the mandate for corn-based ethanol and reducing or eliminating the tax credit for ethanol. As stated by Dr. Thomas Elam, "in light of current gasoline prices the Federal subsidy program is no longer needed to promote ethanol production. The existence of the subsidy is, today, severely distorting crop prices while adding little, if anything, to the stated goals of the renewable energy program."[6]

2) To aid consumer confidence in renewable energy and expand the market, it would be beneficial for Congress to allow the ethanol tariff on imported biofuels to expire in 2008. This would potentially expose consumers to more renewable energy and broaden the diversity of our energy sources.

3) In light of studies concerning ethanol by-products, usability, nutrition, and safety[7], Congress should provide federal research funding into renewable energy byproduct safety, quality, and usability (i.e. storage and transportation). Directing research on these topics will ideally provide animal agriculture producers with nutrition guidance for producing safe and high quality meat and poultry products.

4) Should benefits remain, Congress and the Administration should not discriminate on the basis of feedstocks and bio-based energy. Consumers and businesses can benefit from many new energy sources from such raw materials as animal fats, tallow, and animal byproducts as their feed stocks as long as the law does not prejudge or unduly favor one feed stock or bio-based energy over another.

5) Congress and the Administration should support a working lands environmental program, which would reduce the regulatory and legislative burdens on farmers that elect to grow crops on land currently locked in the Conservation Reserve Program (CRP), but still maintain environmental benefits to the land. Should cellulosic biofuel commercialize, a feedstock will still be needed from an acre of land. Some cellulosic models utilize crop byproducts, but others may need a crop-based feedstock. To minimize consumer inflationary impacts and to preserve the economic well-being of animal agriculture, acres of land that are tied up by regulatory limitations should be made available to farmers to respond to market signals for existing and future biofuels such as cellulosic.

6) Congress should consider expanding the waiver authority from EPAC and EISA requirements to ease the burdens of competing input industries and food consumers. While the waiver authority in the acts is a good start, it should provide greater consideration for domestic or international consumers, the impact on competing input industries, an on-ramp evaluation for new mandates, as well as expedited timelines. While food-based biofuels policies are very costly for our sector of the economy and all food consumers, these costs can be compounded and escalate rapidly by bad crop years, weather events, and other natural disasters. Thereby, making a meaningful waiver policy essential to good food and energy security policy.

The American Meat Institute is committed to working Congressional and Administration leaders to develop policy that balances our energy security and food security objectives. Thank you for the opportunity to submit this testimony. We appreciate the committee's interest in holding this hearing following the passage EISA.

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[6] FarmEcon.com. Elam. "Fuel Ethanol Subsidies: An Economic Perspective," (2007).

[7] University of Minnesota. Shurson. "Testimony before the House Agriculture Subcommittee on Livestock, Dairy, & Poultry," (March 8, 2007); Kansas State Univ. Jacob, Fox, Droulliard, Renter and Nagaraja. "Effects of Dried Distillers Grain on Cattle Fecal Prevalence and Growth of Escherichia coli O157 in Batch Culture Fermentations," (2008).

ALLIANCE FOR A SAFE ALTERNATIVE FUELS ENVIRONMENT,
February 6, 2008.

Hon. JEFF BINGAMAN,
Chairman.

Hon. PETE V. DOMENICI,
Ranking Member, Committee on Energy & Natural Resources U.S. Senate.

DEAR CHAIRMAN BINGAMAN AND SENATOR DOMENICI: As members of the Alliance for a Safe Alternative Fuels Environment (AllSAFE), the undersigned national organizations are pleased to submit their views for the record for your committee's hearing on the national renewable fuels mandate recently signed into law. The members of AllSAFE appreciate the compelling reasons that support expanding the market for renewable fuels, including ethanol. However, any alternative fuels requirements that emerge from the new mandate must fully consider the implications of gasoline blended with higher concentrations of ethanol on existing and new products powered by gasoline fuel.

AllSAFE urges the committee and the federal agencies charged with implementing the new Renewable Fuels Standard (RFS) to carefully consider and respond to the serious concerns of over 200 million Americans that own and operate well over 300 million products, including recreational boats and marine engines, chainsaws, lawnmowers, motor vehicles, motorcycles, ATVs, snowmobiles, generators, and related vehicles and equipment. Mid-level ethanol blends (over 10 percent ethanol) may cause substantial damage to these consumers' engines, equipment and vehicles, which are designed to run on conventional gasoline, as opposed to the new flexible fuel vehicles (FFVs) that are specifically designed to run on much higher ethanol blends (e.g. E85).

Indeed, as part of the Energy Bill that you and your committee ushered through the Senate, Congress included an important environmental safeguard (Sec. 251) which strengthens the Clean Air Act approval process for new fuels, including mid-level ethanol blends. This provision, passed with broad support in Congress and with the backing of industry, environmental and consumer groups, seeks to ensure that any new fuels approved by the Environmental Protection Agency (EPA) are compatible with existing and future engine products and will not contribute to air pollution.

Section 211(f) of the Clean Air Act prohibits the introduction into commerce of a fuel or fuel additive unless that fuel or fuel additive is "substantially similar" to pre-existing fuels or fuel additives in use in the 1975 vehicle model year. In order to grant a "sub sim" waiver under Section 211(f)(4), EPA must determine that the fuel or fuel additive will not: (1) cause or contribute to the failure of any emission control device or system over the life of a vehicle; or, (2) cause or contribute to the failure of a vehicle to meet the emissions standards for which the vehicle has been certified. Until last year, however, Section 211(f)(4) stated that if EPA does not act on a petition for a sub sim waiver within 180 days of its submission, the petition is deemed granted, even in the absence of EPA action or consideration of the petition's merits.

Recognizing this serious flaw, Congress approved a provision which strengthens the Section 211(f) waiver approval process, requiring EPA to ensure that any new fuel blend does not cause or contribute to the failure of an on-road or non-road emission control device. Further, the provision requires EPA to engage in a public notice and comment period in order that all relevant stakeholders, including engine manufacturers and consumers, have an opportunity to have their views heard. In addition, the period is extended to 270 days for EPA to affirmatively approve or deny a Sec. 211 waiver for the introduction of a new fuel, such as mid-level ethanol.

Congress passed this provision because it recognized that there are significant risks and policy concerns with mid-level ethanol fuels when used in conventional products. AllSAFE estimates there are more than 300 million pieces of existing on-road and off-road vehicles and equipment powered by gasoline engines. These products are valued at over $2 trillion. It is imperative that the U.S. Congress and the affected regulatory agencies (like EPA and DOE) make absolutely sure that there will not be any degradation of these existing and new products—particularly as a result of the increased heat and the increased corrosion that may result from mid-level ethanol fuels when used in on-road and off-road engines, boats, equipment, and vehicles.

Currently, there is little available data on the emissions, air quality, public health or safety impacts of mid-level ethanol. To ensure that the approval of such fuels does not cause unintended harm to air quality or risk the safety of consumers, EPA and DOE should transparently and comprehensively examine all of the potential adverse impacts and risks of mid-level ethanol fuel blends, as Congress has now directed them to do. To be sure, the solution to these public policy concerns is not

to ban or undermine the increased use of ethanol fuels. In fact, all the stakeholders (including the associations below) want to avoid consumer rejection of all ethanol blends (including E85) that will occur if mid-level ethanol blends damage consumers, their products, or their environment.

Thank you for your consideration of our views.

Sincerely,

National Marine Manufacturers Association,
Outdoor Power Equipment Institute,
Personal Watercraft Industry Association,
International Snowmobile Manufacturers Association,
Association of International Automobile Manufacturers,
Boat Owners Association of the United States (BoatU.S.),
Alliance of Automobile Manufacturers,
Motorcycle Industry Council,
Specialty Vehicle Institute of America,
Engine Manufacturers Association,
Association of Marina Industries.

STATEMENT OF API

API supports a realistic and workable renewable fuels standard (RFS). Our industry is the nation's largest user of ethanol and is increasing the volume of renewable fuels in America's transportation fuel portfolio. Despite logistical and infrastructurerelated impediments, the industry used approximately 7 billion gallons of ethanol in 2007.

The Energy Independence and Security Act of 2007 (EISA2007) creates a significantly increased RFS containing four interrelated parts. The RFS requires annually increasing minimum volumes of renewable fuels to be included in transportation fuel sold or introduced into the United States. This fourtier approach with various carveouts is very complicated, could lead to boutique blend requirements and inefficient credit markets and will be very challenging to implement. However, our members are dedicated to doing so, and believe the 'advanced biofuel' requirements in the RFS incorporate a balanced approach of technologyforcing requirements with appropriate regulatory safeguards.

The RFS under the Energy Independence and Security Act has been designed to result in significant reductions in greenhouse gas emissions. The "advanced" and "biobased diesel" biofuels mandates require a 50% reduction in lifecycle emissions from conventional fuels beginning in 2009. The "cellulosic" biofuels mandate requires a 60% reduction beginning in 2010. By 2022, the overall renewable mandate is 36 billion gallon. These requirements represent a very significant contribution to addressing global climate concerns by our industry. There are obvious questions about meeting the mandates in out years. If the mandates are met and the fuel complies with the GHG requirements in the legislation, benefit will be created based upon what we know now.

Looking ahead and taking climate and energy security considerations into account, the U.S. will need to develop all economically viable energy sources, including fossil and renewable fuel sources to meet expected demand. By relying, to the greatest extent possible, on market forces, understanding consumer impact and preferences, encouraging development of new technologies to meet environmental goals, and addressing secondary impacts of expanded renewable fuel usage, our industry and the nation will be better equipped to meet the energy challenges in the years ahead.

Biofuels will become a significantly larger portion of U.S. motor fuels with implementation of EISA2007. Petroleumbased and renewable fuels will continue to advance with ongoing environmental improvements. As cellulosic ethanol and other second generation biofuels live up to their promise there will be a very large reduction in carbon dioxide from the transportation fuel pool. Our industry will strive to implement these challenging new mandates.

CONCERNS

In passing EISA2007, Congress has spoken, and the new RFS is now law. Accordingly, API is committed to working with EPA during the rulemaking process to make this program as workable as possible. And, while we have very specific substantive concerns with certain provisions in the Act, none of these can or should be addressed by way of a "technical corrections" bill.

We would like to take this opportunity to reiterate our concerns about certain provisions of EISA that we did not support during the energy bill debate last year and to also identify potential challenges/ramifications.

Lead time

EISA2007 requires almost a doubling of the RFS mandate in 2008. This doubling has occurred with no advance notice and will likely put a strain on the transportation infrastructure. The mandated volume for 2008 far exceeds the industry's projected ethanol blending capabilities at fuel terminals during that timeframe, as well as the current domestic ethanol production capacity.

EPA is required to issue revised regulations by the end of 2008 for the increase in the mandate in 2009 and beyond. This short, one-year deadline may not allow adequate time for EPA to conduct a thorough rulemaking with robust stakeholder input and thus could leave industry with insufficient notice to comply in 2009.

Transportation/distribution infrastructure

By 2012 a total of 15.2 billion gallons of renewable fuel will need to be blended into the transportation fuel pool, approaching volumes requiring up to 10 percent ethanol blending in gasoline nationwide. Between now and 2012, tens of billions of gallons of ethanol will have to be transported out of the Midwest to other regions. This will put tremendous strain on existing transportation and storage facilities such as tankage capacity at terminals, terminal blending facilities, rail spurs at terminals, retail infrastructure, rail tank cars, marine vessels, etc. The need to construct additional blending and other facilities will also stretch state permitting agencies. These large, early year mandates are very high and will be difficult to meet with the existing transportation and blending capabilities even if fuel terminal blending is expanded as quickly as possible.

Cellulosic ethanol

Similarly, longterm RFS mandate levels also may be unachievable. The cellulosic ethanol mandate begins at 100 million gallons in 2010 and grows to 16 billion gallons in 2022. An additional 4 billion gallons of "advanced" biofuels are also mandated in 2022. Cellulosic ethanol is not currently produced on a commercial scale. Significant technology breakthroughs are needed for economic production of cellulosic ethanol. The timing of such technological breakthroughs is highly speculative. Even with breakthroughs in cellulosic ethanol production technology, significant logistical hurdles will need to be addressed. Gathering the feedstock (biomass such as forestry waste and switch grass), processing it, disposing of "waste" products, and delivering ethanol to markets at a cost comparable to gasoline have yet to be demonstrated on a commercial scale.

Thus, the cellulosic ethanol waiver is a critically important feature of the RFS program because it provides flexibility if the volumes are not available to fill the mandated requirements. We strongly support this mechanism as essential to balancing the desire to force second generation technology with appropriate safeguards if the technology does not develop as anticipated.

Antibacksliding

The EISA2007 anti-backsliding provision requires EPA to determine whether the renewable fuel volumes required by the Act will adversely impact air quality. Not later than 3 years after enactment, EPA is required to promulgate fuel regulations to mitigate any adverse impacts on air quality. This provision creates significant regulatory uncertainty for refiners. The use of ethanol will result in increased evaporative, tailpipe and permeation emissions of VOC and NO_X. It is unfair to require refiners to use renewable fuels in increasing amounts and then to penalize them for doing so. Instead, the government should conduct a comprehensive study of the potential crossmedia environmental impacts of widespread use of biofuels and address secondary impacts including the impact on food supplies and the environment.These studies should be commenced immediately, so the air quality, land use and water resource impacts can be addressed as early as possible.

Preemption

State-by-state biofuels mandates create additional boutique fuels and interfere with flexible compliance with the federal mandate. As EISA2007 does not contain federal preemption, compliance with the expanded mandate will be further complicated. States (and their political subdivisions), except California, should be preempted from setting state or renewable fuel mandates or lowcarbon fuel standards. Flexibility is critical for the reliable supply of fuels. The proliferation of state mandates will likely make it much more difficult for our industry to deal with tight supplies and to get fuel to where it is most needed during those times of tight supplies.

State barriers to blending

In the southeastern states, a patchwork of regulatory standards (ASTM volatility standards relating to vehicle drivability) for gasoline impede the sale of gasolineethanol blends (E10), some by failing to accommodate the changes in fuel properties that occur when ethanol is added to finished gasoline and others by adopting differing standards on uncertain timetables. No two states have taken the same approach. As a result, refiner/marketers face potential noncompliance with state gasoline standards if they blend ethanol with fungible conventional gasoline that the integrated regional distribution system must deliver to them. Tailoring the base fuel at the refinery to assure compliance with the toughest standard would reduce gasoline supplies and increases fuel cost, thereby removing the incentive to blend ethanol. States served by common distribution systems should be strongly encouraged to align their gasoline specifications to facilitate blending with ethanol and aid reliability of supply. Our industry is working with individual states to remove these barriers so that 2008/9 compliance with the RFS can be enabled.

Ethanol blending above 10 percent

The most economical and practical use of ethanol is as a 10 percent blend in gasoline, which should be maximized before considering more broadly higher ethanol blends. It requires no modifications to vehicles, no major changes to service station pumps and storage tanks, and has a long history of successful fuel use by consumers.

Beyond 2012, compliance with the expanded RFS will require a ramp up in highconcentration ethanol blends, such as E85, for use in flexiblefuel vehicles, or increasing the level of ethanol in gasoline for all cars beyond 10 percent (E10+). Widespread use of high-concentration blends would require that the major technological and economic hurdles of cellulosic ethanol conversion first be overcome. Consideration will also be given to E10+ blends where research supports them. EPA, DOE, the autoequipment and fuels industry are working together to conduct research on E10+ blends.

CONCLUSION

API is committed to working with EPA during the rulemaking process to make this program as workable as possible. While API has concerns about the provisions contained in EISA2007, none of them are technical in nature. We do not support additional legislative efforts at this time.

AMERICAN FOREST RESOURCE COUNCIL,
Portland, OR, February 6, 2008.

Hon JEFF BINGAMAN,
Chairman.

Hon. PETE DOMENICI,
Ranking Member, Senate Energy and Natural Resources Committee, 304 Dirksen Senate Office Building, Washington, DC.

DEAR SENATORS BINGAMAN AND DOMENICI: I am writing on behalf of members of the American Forest Resource Council (AFRC) to highlight a major concern with the treatment of woody biomass in the recently enacted EnergyIndependence and Security Act of 2007 (PL 110-140). As you conduct hearings to explore the effect of the legislation, I hope you consider making much-needed changes to the treatment of biomass in the renewable-fuel standard (RFS). AFRC represents approximately 90 forest products manufacturing companies and landowners, from small family-owned companies to large corporations, in twelve western states.

AFRC and its members believe that they are part of the solution to restoring and maintaining the health of public and private forests and preventing catastrophic wildfire while also providing sustainable wood products and sources of renewable biomass energy to Americans.

As you know, many areas of rural America are experiencing a major forest health crisis due to unnatural hazardous fuel levels on millions of acres. Wildland fires continue to consume a record number of acres and there seems to be no end in sight. Last year, nearly 9 million acres were lost to wildland fire and this follows 2006's record setting 9.8 million acre total. These fires destroy critical wildlife habitats, key watersheds, and recreation areas, while also placing life and property in harms way. Catastrophic wildfires also account for vast amounts of Green House Gas (GHG) emissions each year. Our nation simply must get serious about thinning these lands to restore forest health.

America also faces great challenges in keeping private forestland owners in the business of practicing forestry, rather than converting these lands to less environmentally friendly uses (i.e., development). Many private forestland owners are under both economic and regulatory pressures that exacerbate these losses. Congress should be taking steps to provide incentives to private forestland owners who chose to continue practicing forestry.

One partial solution to both of these challenges is the development of new markets to utilize woody cellulosic biomass, which can also help to meet our nation's domestic energy needs. There seems to be broad bipartisan support for making this important goal a reality. Unfortunately, the Energy Independence and Security Act of 2007 actually moved our nation in the wrong direction in one critical area.

Definition of Renewable Biomass in Renewable Fuel Standard (RFS) (Sec 201)

The definition included in PL 110-40 excludes wood or woody debris from public lands or National Forests as a source of renewable biofuel. Much of the current management on public land includes the removal of woody debris (for forest restoration, fire prevention, habitat improvements, etc.). This material has little to no value, but biofuel production has the potential to add value and reduce the cost of removal and the dollars needed to treat areas (in addition to supplying consumers with renewable fuel). The impact of this definition will instead drive these materials to landfills or to be burned in slash piles.

The definition also excludes woody debris and biomass from thousands of acres of private forest land that is not managed as "plantation" forests. Many private forestland owners across America don't manage their land as "plantations." Instead, they may prefer their land more closely resemble natural forests and allow the forest to at least partially regenerate following harvest activities. The RFS' requirement that qualifying forests be "planted" and "plantations" means that these naturally regenerated trees will not qualify as renewable biomass. This is nonsensical and results in a major lost opportunity to develop biofuels from forests being responsibly managed in a condition other than plantations and will only drive more forestland owners out of forestry.

The RFS would also exclude private forestland based on its successional stage and forest type. This is extremely unfeasible for forest landowners (especially the small non-industrial forest landowners) and not only discourages the creation of biofuels, but also penalizes private forestland owners who aren't managing their lands as young industrial-type forests.

I hope the Congress will move quickly to amend the biomass definition contained within the RFS in order to remedy the obvious negative environmental consequences. Our industry continues be believe it is an integral part of the solution to the challenges facing our forests and energy security.

Sincerely,

TOM PARTIN,
President.

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