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FEDERAL RENEWABLE FUELS PROGRAMS

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

SECOND SESSION

SEPTEMBER 6, 2006

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ONE HUNDRED NINTH CONGRESS
SECOND SESSION

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FEDERAL RENEWABLE FUELS PROGRAMS

Wednesday, September 6, 2006

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The committee met, pursuant to notice, at 9:30 a.m. in room 406, Dirksen Senate Office Building, Hon. James Inhofe (chairman of the committee) presiding.

Present: Senators Inhofe, Jeffords, Lautenberg, Thune, Isakson, Boxer, Carper, Obama.

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. The hearing will come to order. As usual, we will start our meeting right on time. We appreciate everyone being here.

Before we get into opening statements, I do want to introduce Steven Rhines, who is the VP and General Counsel of the Noble Foundation. There you are, back there, Steven. Welcome, and I'm sure you'll enjoy this.

The purpose of today's oversight hearing is to review Federal renewable and biofuels programs. Our witnesses come from three key agencies. We have the USDA, DOE and EPA. All three have some level of jurisdiction in this subject.

This is the first of what will be a series of hearings on renewable fuels, especially given the level of bipartisan interest in the topic and EPA's continued work on renewable fuel standards implementation. We were joking around up here, this is something that even Senator Jeffords and I have some areas of agreement in.

[Laughter.]

Senator INHOFE. It seems that in recent months, traditional opponents to renewable fuels, particularly those on the other side of the aisle, have had a change of heart and can now be found on the stump exclaiming ethanol's virtues. I'm hopeful that they will be able to take the time to study the issue fully and not just declare populist and politically expedient messages, with regard for the reason. I am pleased to see that they have chosen to support the President's biofuels initiatives.

This committee has principal jurisdiction over motor fuels policy, including renewable fuels. I would like to remind my colleagues that the bill that was passed in this committee, S. 606, provided the foundation for the fuels title in the Energy bill, the Energy bill of course which passed. Similarly, any future changes to the renew-

able fuels standard must come through our committee to ensure consistent, flexible and efficient national policy.

In preparing for the 2007 Farm bill, USDA issued a theme paper last month on agriculture and energy. In listing possible options, the USDA acknowledged, and this is a quote, they said "It is unclear how expansive energy provisions could be in the Farm bill, since suggestions require legislation may not be under the jurisdiction of the agricultural committees." And USDA is correct, it's largely in the jurisdiction of this committee.

It's also critical that we consider the effects on other industries before legislating in the renewable fuels arena. Using corn for fuel and feed impacts other agricultural interests, like hog and cattle producers. Further, it could also have serious impacts on consumers. Some proponents have suggested increasing the current 7.5 billion gallon renewable fuels standard to 10 to 12 billion gallons or more.

However, a recent study, and this is pretty fascinating, Senator Jeffords, a recent study showed that food prices would cost consumers an additional $14.5 billion a year at the 10 billion gallon standard or $20.3 billion a year at the $12 billion standard. Several politicians, including the President and other interested groups have stressed the security implications of importing oil from unstable parts of the world. Yet, corn cannot be the answer.

Even under the most extreme hypothetical, if the entire 2005 corn production of 11.1 billion bushels were dedicated to ethanol, the resulting 30 billion gallons of ethanol would represent only 14.5 percent of gasoline use. This came from the Congressional Research Service. Corn ethanol proponents must understand that natural gas is a key feedstock in an ethanol production. Therefore, policy makers could de facto substitute foreign oil for foreign natural gas.

Continuing my earlier example, processing the entire 2005 corn crop of 11.1 billion bushels into ethanol would be approximately 1.5 trillion cubic feet of natural gas. Total current natural gas consumption was 22 TCFs in 2005.

That said, there are certain bright spots in the horizon when it comes to the renewable fuels: cellulosic, biomass ethanol an important part of addressing the domestic transportation fuel needs. If commercially developed, this technology could produce new bioenergy crops that do not compete with food and feed, not compete with those components that make up fertilizer, as well as those components that are used for consumption.

Further, many of the crops are perennials and can grow on marginal lands. I'm proud that some of the research is conducted in my home State by Samuel Roberts Noble Foundation, represented here today, in Ardmore, OK, an organization founded by oil man and philanthropist Lloyd Noble. The foundation is involved in vital research to both increase potential energy crop yield and reduce the biological barriers that increase costs for bio-refiners.

This committee is familiar with the cellulosic biomass ethanol. Again, S. 606, the bill that became renewable fuels standards included in the loan guarantee provisions to build commercial scale facilities. So I look forward to the hearing and listening to our distinguished panel of guests.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

The purpose of today's oversight hearing is to review Federal renewable and biofuels programs. Our witnesses come from the three key agencies—USDA, DOE, and EPA—that have jurisdiction over the subject.

This is the first of what will be a series of hearings on renewable fuels, especially given the level of bi-partisan interest in the topic and EPA's continued work on the renewable fuel standard implementation.

It seems that in recent months traditional opponents to renewable fuels, particularly those on the other side of the aisle, have had a change of heart and now can be found on the stump exclaiming ethanol's virtues. I am hopeful that they will take the time to study the issues fully and not just declare populist and politically expedient messages.

Without regard for the reason, I am pleased to see that they have chosen to support the President's biofuels initiatives.

This committee has principle jurisdiction over motor fuels policy including renewable fuels. I would like to remind my colleagues that the bill that passed this committee, S. 606, provided the foundation for the fuels title in the Energy bill. Similarly, any future changes to the renewable fuel standard must come through our committee to ensure consistent, flexible, and efficient national policy.

In preparing for the 2007 Farm bill, USDA issued a theme paper last month on Agriculture and Energy. In listing possible options, the USDA acknowledged "it is unclear how expansive energy provisions could be in the Farm bill" since "suggestions requiring legislation may not be under the jurisdiction of the agriculture committees."

It is also critical that we consider effects on other industries before legislating in the renewable fuels arena. Using corn for fuel and feed impacts other agricultural interests like hog and cattle producers.

Further, it could also have serious impacts on consumers. Some proponents have suggested increasing the current 7.5 billion gallon renewable fuel standard to 10 or 12 billion gallons or more. However, a recent study showed that food prices would cost consumers an additional $14.5 billion per year at the 10 billion gallon level and $20.3 billion per year at the 12 billion gallons.

Several politicians, including the President, and other interest groups have stressed the security implications of importing oil from unstable parts of the world. Yet, corn cannot be the answer.

Even under the most extreme hypothetical - if the entire 2005 corn production of 11.1 billion bushels were dedicated to ethanol, the resulting 30 billion gallons of ethanol would represent only 14.5 percent of gasoline use (Congressional Research Service).

Corn ethanol proponents must understand that natural gas is a key feedstock in ethanol production. Therefore, policymakers could de facto substitute foreign oil for foreign natural gas. Continuing my earlier example, processing the entire 2005 corn crop of 11.1 billion bushels into ethanol would be approximately 1.5 trillion cubic feet of natural gas. Total U.S. natural gas consumption was 22 tcf in 2005 (CRS).

That said, there are certain bright spots on the horizon when it comes to renewable fuels. Cellulosic biomass ethanol could be an important part of addressing domestic transportation fuel needs.

If commercially developed, this technology could produce new bioenergy crops that do not compete with food and feed. Further, many of these crops are perennials and can grow on marginal lands across the country.

I am proud to say that some of this research is conducted in my home State by the Samuel Roberts Noble Foundation of Ardmore, Oklahoma—an organization founded by oilman and philanthropist Lloyd Noble. The Foundation is involved in vital research to both increase potential energy crop yield and reduce the biological barriers that increase costs for bio-refiners.

This committee is familiar with cellulosic biomass ethanol—again, S. 606, the bill that became the renewable fuel standard included a loan guarantee provision to build commercial scale facilities.

I look forward to hearing from our distinguished panel of experts and asking questions.

OPENING STATEMENT OF HON. JAMES M. JEFFORDS, U.S. SENATOR FROM THE STATE OF VERMONT

Senator JEFFORDS. Thank you, Mr. Chairman.

I want to extend a welcome to the witnesses. I appreciate the time they have taken to appear before us today. I deeply appreciate it. Today's hearing examines the State of Federal renewable fuels programs. It is an important and needed examination. Though pump prices have eased somewhat in the last month, America has seen record gasoline prices this year. Our lifestyle and economy in this Country is based on an abundant supply of gasoline and diesel.

However, nothing lasts forever. And we are seeing plentiful, secure global trade in oil and low prices disappear. What we need is a future based upon the abundant supply of domestically produced clean and low carbon fuel. What's more, our Federal policy needs to directly shape that future. We need to push for the development of stable, clean, domestic transportation fuel supplies at affordable prices.

I have worked toward this goal throughout my entire Congressional career. Nearly two decades ago, I introduced legislation that would have required the Secretary of Energy to establish a program to replace gasoline as a motor fuel with renewable fuels. That bill, the Replacement Water Fuels Act of 1979, would have directed the Secretary to find the most suitable raw materials and set a goal of replacing 20 percent of the gasoline with renewable fuels by 1992.

I introduced similar legislation in nearly every Congress since, until we adopted the renewable fuels standards as part of last year's Energy Law. I regard the RFS as the first step and one that only produces transition fuel on our way to more a climate-friendly future.

There are incredible complexities involved in forming a well-rounded and flexible approach to meeting the Nation's fuel requirements while at the same time protecting our environment. But I know we can do the job if we have the national will to do so. When I visited Iceland in 2004, I rode on a fuel cell bus and saw first-hand the promise of this technology. That bus contained hydrogen from water.

The fuel cell holds the possibility of marrying low or non- polluting engines with renewable fuels. This opens the possibility of a future that is free of the constraints of limited fuel and pollution. It is exactly this kind of environment-friendly solution I have always advocated. These innovations have the potential to move us into an era when driving a car or truck will no longer mean causing dangerous, global-warming pollution or using up scarce resources.

Thank you again, Mr. Chairman, and I look forward to hearing from our witnesses.

[The prepared statement of Senator Jeffords follows:]

STATEMENT OF HON. JAMES M. JEFFORDS, U.S. SENATOR FROM THE STATE OF VERMONT

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I regard the RFS as the first step, and one that only produces a transition fuel on our way to a more climate-friendly future. There are incredible complexities involved in forming a well-rounded and flexible approach to meeting the nation's fuel requirements, while at the same time protecting our environment. But I know we can do the job if we have the national will to do so.

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These innovations have the potential to move us into an era when driving a car or truck will no longer mean causing dangerous global warming pollution or using up scarce resources.

Thank you, again, Mr. Chairman, and I look forward to hearing from the witnesses.

Senator INHOFE. Thank you, Senator Jeffords.

Senator Isakson.

OPENING STATEMENT OF HON. JOHNNY ISAKSON, U.S. SENATOR FROM THE STATE OF GEORGIA

Senator ISAKSON. Thank you, Mr. Chairman, and thanks very much for calling this hearing.

My State, Georgia's number one industry is agriculture, and we are a huge consumer of energy and not a producer of energy. But I noticed in my travels during the last month that those things are changing. In Mitchell County, Georgia, the local community there, a number of local business people in the past year have raised $66 million, $60 million of which locally, to build our State's first ethanol plant, which obviously is appropriate to discuss at this particular hearing. So I think next year's Ag bill is probably going to be the Ag-Energy bill.

Recognizing your point, Mr. Chairman, about the cost impact on food as you use corn and other agricultural products for renewable energy, we have to have a diversified energy program. I'm so pleased that in my State also we have a company with a process which provides power generators with cost effective, efficient methods of renewable energy requirements. This high efficiency biomass gasification process converts biomass, waste and renewables into clean energy by producing a fuel capable of directly replacing natural gas.

It's very important that as a Congress and as leaders that we emphasize the importance for us to get our dependence on foreign oil as minimum as possible and diversify to the maximum extent the sources of energy in this Country. And although not a renewable energy, one last point relevant to Georgia, and since the De-

partment of Energy is represented today, I join with Senator DeMint, Senator Graham and Senator Chambliss in continuing to work to see to it that we do the recycling and processing of spent nuclear fuels of the Savannah River Plant on the Savannah River between Georgia and South Carolina. Because nuclear energy, although not renewable in the sense of this hearing, is equally important to see to it that we have a diversified, efficient and cost- effective resources of energy for our Country.

And I would ask, Mr. Chairman, unanimous consent that my entire statement be submitted for the record.

Senator INHOFE. Without objection, so ordered.

[The prepared statement of Senator Isakson follows:]

STATEMENT OF HON. JOHNNY ISAKSON, U.S. SENATOR FROM THE STATE OF GEORGIA

Thank you Mr. Chairman for holding this hearing. As I traveled my State during the recess listening to my constituents, one of the things they told me was that we've got good news on the economic front, the economy of our State is growing, but we risk losing all that with the high price of energy.

And the recent high prices, although they have come down some in Georgia, that people are paying at the gas pumps reflect our dependence on oil. Today we get about 60 percent of our oil from foreign countries whereas 20 years ago about 25 percent of our oil came from foreign countries.

Some of the nations we rely on for oil have unstable Governments, or agendas that are in opposition to the United States which puts our Nation in a bind because these unstable countries know we need their oil

And so I have always viewed energy supply as a matter of national security and also a matter of economic security.

What people are seeing at their gasoline pumps reflects the global economy in which we live. When demand for oil goes up in China or India or other fast growing economies it affects the price of oil worldwide.

And when the price of crude oil goes up, because it's such an important part of the price of gasoline, the average citizen sees the price of gasoline go up at the pump. Gasoline price increases are a burden on our farmers, small businesses, and all the American people.

Which leads us to why we are meeting today. We need to ask ourselves, what can we do?

I believe we need to encourage conservation, to expand domestic production, and to develop alternative sources of energy like bio fuels.

And the truth of the matter is our nation's long-term strategy should be to commit to power our automobiles with some energy source other than gasoline, which is derived from oil.

Investment in biofuels like ethanol and other renewables are starting to pay off and become a reality for American consumers. In my State of Georgia, in Mitchell County, $67 million in equity to finance an ethanol plant has been obtained. The facility will be on 268 acres between the cities of Camilla and Pelham. Construction is expected to begin in October, with production of ethanol slated for spring 2008. The facility will produce 100 million gallons a year of fuel-grade ethanol. The plant will also be able to produce 320,000 tons of dry distillers grains, which are a high protein feed that can enhance livestock, dairy and poultry production. Additionally, the plant can capture 160,000 tons of raw carbon dioxide gas annually that will be converted to dry ice and other products.

Another company in my State has a process which provides power generators with a cost-effective and efficient method to meet renewable energy requirements. This high-efficiency biomass gasification process converts biomass waste and renewables into clean energy by producing a fuel capable of directly replacing natural gas.

The president has set an ambitious goal in reducing our Nation's dependence on foreign oil, and I believe the best way and the fastest way to do so is to expand the use of ethanol and other comparable biofuels.

In his State of the Union, The President announced his Advanced Energy Initiative which is focused on three promising ways to reduce gasoline consumption.

One is increasing the use of biofuels.

The second is improving hybrid vehicles.

Third is developing hydrogen technology.

All three go hand-in-hand; all three are an important part of a strategy to help us diversify.

And while ethanol may have the largest potential for immediate growth, we shouldn't limit our research to ethanol alone.

It is vitally important that we explore all potential biofuels.

We need to invest in researching the potential use of alternative feed-stocks such as wood byproducts, grasses, and byproducts from peanut, cotton, and municipal wastes to generate energy.

I also support biodiesel fuel, which is a viable alternative to regular diesel in cars, trucks, buses and farm equipment.

I have seen technology which uses waste products like recycled cooking oil and grease to manufacture biodiesel.

This is one of many examples of how we can address our energy security needs on a variety of fronts. The goal of the United States should be to have a comprehensive strategy to help us diversify away from oil.

We owe it to not only to ourselves but our future generations to promote alternative ways to drive their car so as to make us less dependent on foreign sources of energy, as well as using technology so we can diversify away from the hydrocarbon society.

Senator INHOFE. Senator Lautenberg.

OPENING STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Senator LAUTENBERG. Thanks, Mr. Chairman.

This is a timely hearing, obviously, because as we sit here probably for 2 hours, in that time Americans will pump about 32 million gallons of gas into their cars at an average price of $2.85 a gallon that's worth over $90 million during the course of our hearing. But in addition to price, we also need to think about energy in terms of our health, our environment and our security. To address these challenges, we need clean, alternative fuels to power our vehicles. I agree that we ought to build ethanol into this foundation of our alternative fuels portfolio.

But I believe that we have to move beyond corn-based options and toward cleaner and more efficient options like bio-diesel and P-series fuels. Developed by researchers at Princeton University, the P-series fuel is a product that is mostly renewable, non-petroleum and can help to eventually replace gasoline. And as we are likely to hear today, the technology we need to create and deploy to get these alternative fuels in place in the not-too-distant future, not-too-distant being a few years. But it's an essential factor that we move on this.

So in the meantime, we've got to improve the fuel efficiency standards for cars and trucks. And we've got to do that now. We also need to promote mass transit from buses to subways to trains, light rail choices that get more cars off the roads. For every mile traveled, public transportation uses about half of the fuel consumed by automobiles, according to the American Public Transportation Association.

Mr. Chairman, Brazil, like America, used to rely a great deal on foreign crude oil. But then Brazil turned sugar, one of its biggest crops, into ethanol, that fuels either pure or mixed with gasoline now accounts for a third of what goes into Brazilian gas tanks. So we can learn a lot from our South American neighbors by looking at what they've already done. Sugar may not be our specific answer. But demanding alternative fuels, increasing fuel efficiency

and increasing transit options must be part of the equation here in the United States.

Mr. Chairman, once again, I thank you for calling this hearing and I look forward to hearing from our witnesses.

[The prepared statement of Senator Lautenberg follows:]

STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Mr. Chairman, thank you for holding this hearing.

My guess is that we'll be here for about 2 hours. In that time, Americans will pump more than 33 million gallons of gas into their cars. Those cars and trucks will cough pollutants into the air that will create smog, give people asthma attacks and contribute to global warming. And we all pay for those new pollutants—in higher health care premiums and greater ruin to our natural world.

People most often think about energy in terms of their wallet—which they should. The average price for a gallon of gas is $2.85, which forces workers to choose between filling their tanks and paying their bills. But we also need to think about energy in terms of our health, our environment and our security.

To address these challenges, we need clean, alternative fuels to power our cars and trucks. Our objective isn't just to save Americans money and improve their security by using less foreign oil, but to save our environment by belching fewer greenhouse gases and other pollutants into our air.

We won't find a single fuel to work in every region, for every engine and abundant enough to cover all of our needs. But with our commitment, adequate investment and the right technology, we can develop the best and cleanest options quickly, efficiently and cost-effectively.

I believe we should build ethanol into the foundation of our alternative fuels portfolio—and we should move beyond corn-based options towards cleaner and more efficient cellulosic options. But also I believe we should support research, development and funding for other fuels, like biodiesel and p-series fuels. Developed by researchers at New Jersey's Princeton University, p-series fuels are mostly renewable, nonpetroleum and can help to replace gasoline.

As we're likely to hear today, the technology we need to create and deploy cellulosic ethanol and other fuels are several years away. And even if we had the technology at-hand, deploying it won't be enough to end America's dependence on oil.

While we develop new fuels, we must improve fuel efficiency standards for our cars and trucks—and we must do this now. We also need to promote mass transit, from bus to subway, to train and trolley, choices that get gas-burning, pollution-creating cars off the streets. For every mile traveled, public transportation uses about one half of the fuel consumed by automobiles, according to the American Public Transportation Association.

Last year's energy bill did include some provisions to advance alternative fuels, like fuel standards and tax incentives for ethanol and biodiesel development. But it also—and unfortunately—continues the Bush administration's backwards policies of billions in subsidies and tax breaks for the oil industry and other fossil fuel sectors. At the same time, they've provided little leadership on fuel efficiency standards. They've failed to provide rail and other mass transit with sufficient funds. And their environmental record hurts our natural world more than helps it.

Brazil used to be a lot like America—reliant on foreign crude. But then Brazil turned sugar, one of its biggest crops, into ethanol. The fuel, either pure or mixed with gas, now accounts for a third of what goes into Brazilian gas tanks, according to the New York Times. We can learn a lot from what our South American neighbors have already done. Sugar may not be our answer. But alternative fuels, increased fuel efficiency and better transit options are.

I look forward to hearing from today's panel about the progress we've made in the last year. Mr. Chairman, I thank you again for holding this hearing.

Senator INHOFE. Thank you, Senator Lautenberg.

Well, we'll start with William Wehrum. You've appeared before us several times before, and this is a different type of business that we conducted before, and we're very happy to have you. Mr. Wehrum is the Assistant Administrator of the Office of Air and Radiation of the United States Environmental Protection Policy. Mr. Wehrum, you may proceed, and your entire statements will be

made a part of the record. Try to confine your remarks to five or six minutes if you could.

Mr. Wehrum.

STATEMENT OF WILLIAM WEHRUM, ACTING ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. WEHRUM. Thank you, Mr. Chairman, members of the committee.

I appreciate the opportunity to come before you today to testify on the status of EPA's efforts to develop the comprehensive rulemaking implementing the Energy Policy Act's renewable fuels standard. The Energy Policy Act of 2005, or EPACT, as we call it, required EPA to take a significant number of specific actions that directly affect our Nation's fuel supply and quality. Some of these actions have already been proposed or have taken effect, including the removal of the oxygen standard from the Federal Reformulated Gasoline program, proposal of a new gasoline benzene content standard to control mobile source air toxics, and the proposed listing of State boutique fuel requirements. However, a lot of work remains.

As the agency continues to work on all these actions, the most important and significant fuels requirement established in EPACT is the national Renewable Fuels Standard, or RFS. Since increasing the amount of domestically produced renewable fuels is a key element of the President's energy initiatives and supports his goal of reducing the Country's dependence on imported oil, the agency has placed the highest priority on preparing this major rulemaking.

Under EPACT, the RFS program requires that increasing volumes of renewable fuels be blended into gasoline in the continental United States beginning in 2006. EPACT establishes the years for which the RFS is in effect and the required minimum annual volumes of renewable fuel. The renewable volume begins at 4 billion gallons in 2006 and increases to 7.5 billion gallons in 2012. EPACT requires that EPA annually establish the percentage requirement which will apply to individual refiners, blenders and importers, to ensure the total volume of renewable fuel specified for that year in EPACT is achieved.

The Act provided the agency with less than five months to develop and implement the RFS program by regulation. With the close cooperation and support of our stakeholders, including renewable fuel producers and oil refiners, EPA was able to accomplish this by making use of a default requirement provided in the Act that only applies to 2006. Last December, we promulgated a direct final rule to implement the default standard that allowed the program to operate without all the credit trading and compliance provisions that the full program requires.

Under the 2006 RFS default rule, refiners, importers and gasoline blenders are collectively responsible for ensuring that the amount of renewable fuel volume use nationwide is at least 2.78 percent of the total gasoline used in the United States.

Although the Act prescribed many aspects of the program, including the required renewable fuels volumes, it did not specify certain critical elements, such as defining a renewable fuel credit and

what parties can generate credits. Further, unlike past fuels programs in which credit trading was simply used as a cost savings measure or a way to increase compliance flexibility, for the RFS program it will be a critical aspect of demonstrating compliance. Credit trading also differs under the RFS program because those parties that produce renewable fuels are not typically the same parties that must demonstrate compliance.

To implement a rulemaking of this magnitude, it was imperative for the agency to promptly enter into close dialogue with affected parties to understand how the RFS program would impact the stakeholders in real world applications. EPA directly engaged all the major stakeholders, including the refining industry, renewable fuels providers and fuel marketers and distributors, to gather information and suggestions which were incorporated into drafting the various compliance and credit trading provisions. Completion of a proposed rulemaking in an expeditious fashion was only possible by working closely with these stakeholders on the critical elements. Through close collaboration and cooperation, we believe the proposal will have broad stakeholder support, allowing EPA to move forward quickly with the final rule.

In closing, I'm pleased to report that tomorrow, September 7th, Administrator Steve Johnson will sign this landmark proposal. A press announcement is planned from Meade, Nebraska tomorrow morning. We will be pleased to brief Congressional staff on the details of the proposal over the course of the next few days if requested. Following public review and comment on the proposal, our goal is to promulgate the final RFS regulations early in 2007.

Thank you, Mr. Chairman and members of the committee, for your interest in the agency's progress in developing this important rule. This concludes my statement and I'm happy to answer whatever questions you may have.

Senator INHOFE. Thank you, Mr. Wehrum.

Next we have Alexander Karsner, Assistant Secretary for Energy Efficiency and Renewable Energy, U.S. Department of Energy. Mr. Karsner.

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

Mr. KARNSER. Thank you, sir.

Mr. Chairman, members of the committee, thank you for having me. I appreciate the opportunity to testify today on the subject of bioenergy and biofuels.

To paraphrase President Bush in his State of the Union address this year, addressing America's addiction to oil is an imperative for our time, and the need for a diverse supply of domestic energy sources has never been greater. Biofuels are amongst the most promising near-term replacements for liquid transportation fuels, since they offer a renewable, essentially carbon neutral energy source that can help meet a portion of our transportation fuel needs with domestic production. Biofuels play a significant role in the President's Advanced Energy Initiative, or AEI, a broad program designed to change the way we power our homes, businesses and vehicles by developing cleaner, more affordable and more reli-

able domestic alternative energy sources and technologies. The biofuels initiative, a key component of the President's AEI, seeks to accelerate research and development to make cellulosic ethanol commercially competitive by 2012 and to engage industry to increase production of biofuels that will reduce the Nation's dependence on foreign oil.

Today I'd like to give you an overview of the Department of Energy's programs in biofuels, specifically research and development of cellulosic ethanol. While almost all ethanol produced in America today is derived from corn and other starch based feedstocks, corn represents only a small fraction of biomass feedstock that may be used for ethanol. Ethanol can also be produced from cellulose, lignin and hemi-cellulose, the non-starch components of many plants.

Many materials currently regarded as waste, such as corn stalks, straw, wood chips, could be converted to ethanol with dedicated energy crops, including a number of fast-growing trees and grasses. However, while making cellulosic ethanol would dramatically expand the types and amount of available biomass feedstock that can be used to make ethanol, it is more technically challenging and consequently, presently more expensive than producing ethanol from corn.

The Department of Energy is working in several key areas under the biofuels initiative to accelerate our ability to produce cost effective cellulosic ethanol. First, we're creating regional biomass feedstock partnerships to evaluate and work with localized feedstocks all over the Country. Different regions of the Country could potentially support different feedstock crops, for example, switch grass in the south central region, and willow in the northeast. Second, together with the DOE's Office of Science, we're addressing the basic research challenges in developing biomass feedstocks that are more amenable to ethanol production. Secretary Bodman recently announced, for example, that DOE will spend $250 million to establish and operate two new bioenergy research centers to accelerate basic research on biofuels.

Third, a component of our ongoing work is the broad range of collaboration with stakeholders as we pursue the best ideas and strategies to accelerate the production and distribution of cellulosic ethanol. For example, to obtain key industry and academic stakeholder input for successful strategies to develop biofuels, Energy Efficiency and Renewable Energy, our office within DOE's biomass program last month held a 30x'30 workshop. The 30x'30 refers to the possibility of replacing 30 percent of current U.S. gasoline consumption with ethanol or producing about 60 billion gallons of ethanol by the year 2030.

Over 130 experts from agriculture, the automotive industry, fuels, chemicals and other related industries came together to map out R&D and policy strategies for achieving the biomass program's 2012 cellulosic ethanol cost goal and to consider pathways to maximize biomass usage by 2030. The results will be integrated into a planning tool with input from other Federal agencies involved in biomass R&D, describing the technical and infrastructure challenges that need to be overcome and to map out each agency's role across the Federal Government in addressing them.

To this end, our biomass program co-chairs with USDA a multi-agency initiative. This initiative supports DOE's biomass program R&D activities as well as some of the DOE's Office of Science and USDA's bioenergy related R&D in accordance with the Biomass Research and Development Act of 2000.

Consistent quality standards for biofuels, such as those that might be developed through the American Society for Testing and Materials, ASTM International, will also enhance consumer acceptance and market penetration. DOE is interested in working with others in Government and across the private sector to accomplish these ends. The Department is working diligently to meet the President's goals for 2012 and beyond, fostering biofuels technology with a balanced yet focused program of research and development and deployment. We will continue to work collaboratively with our partners in Congress, partners in academia, in the national labs across the Federal agencies and in private industry, putting our research dollars into the most promising areas to address critical technical and economic barriers.

With clear goals and strategies to achieve them, we believe that greater quantities of cost competitive liquid biofuels are today in sight. My complete testimony will be entered into the transcript of the hearing, and I would be pleased to respond to any questions the committee may have. Thank you again for having me.

Senator INHOFE. Thank you, Mr. Karsner.

Dr. Keith Collins is the Chief Economist for the U.S. Department of Agriculture, and you're recognized.

STATEMENT OF KEITH COLLINS, CHIEF ECONOMIST, U.S. DEPARTMENT OF AGRICULTURE

Mr. COLLINS. Thank you very much, Mr. Chairman and Senator Jeffords, committee members. Thanks for the invitation to discuss the implications of the growing biofuels industry on U.S. agriculture.

This year, ethanol production is expected to rise three-fold over what it was in 2000. Biodiesel production is expected to be up over 100-fold from 2000. Even with such growth, as the Chairman noted in his comments, biofuels remain a small share of U.S. transportation fuels. However, ethanol's economic importance for agriculture is very significant.

In 2000, about 6 percent of our corn production was used to produce ethanol. Last year that was up to 14 percent. This year we think nearly 20 percent of corn production will be used for ethanol. For the first time, corn used in ethanol is expected to equal the amount of corn expected by the United States.

Similarly, the oil in about 8 percent of this year's soybean production is expected to be used for biodiesel, up from negligible levels in 2000. The increase in crop production used for biofuels is expected to have a major impact on the farm economy. The rising demand for corn to supply ethanol plants will have implications for all over our major commodity markets.

Because of these potential significant effects, we've been monitoring the amazing pace of ethanol plant construction, based on reported construction and the expectation that ethanol will remain profitable over the next couple of years. It appears likely that eth-

anol production would exceed 7.5 billion gallons during the next couple of years and could reach more than 10 billion gallons by the 2010 crop year. With relatively high ethanol prices, ethanol plants can pay high prices for corn and still remain profitable. For example, with ethanol prices at $2.25 a gallon, which has been a typical Chicago futures price this summer, a dry mill plant could pay up to $5 a bushel for corn and still cover operating costs. That's well above the all time record high corn price of $3.24 a bushel set back in 1995.

As new ethanol plants come online, higher demand for corn will likely lead to higher corn prices as corn for ethanol must be bid away from other uses like feed and exports and land for corn must be bid away from other crops. Expanding ethanol production over the next several years is likely to push corn prices to record highs, especially if weather is adverse. Substantial increases in corn acreage will likely be needed to prevent exports from declining and livestock profitability from falling.

Fortunately, several factors could ease the market transition to tighter corn supplies. First is corn yield or production per acre. That trends up every year. And the trend appears to have gotten stronger over the last 3 years.

Second, acreage can shift to corn from other crops, like soybeans, where there are other nations that can provide exports to the growing demand in the world marketplace.

Third, about 30 percent of the corn used in ethanol can return to the livestock sector as animal feed as distilled or dried grains or other co-product feeds.

And fourth, we currently have about 36 million acres set aside from production in the long term Conservation Reserve Program, some of which could return to production in future years.

Even so, with corn prices increasingly tight and corn prices higher, ethanol plants and other corn users will likely be operating in a riskier environment in the future. It seems clear that corn ethanol alone cannot greatly reduce U.S. dependence on crude oil imports. Cellulosic ethanol production appears to be the best renewable alternative for achieving sizeable reduction in crude oil imports and its successful commercialization would allow many other feedstocks besides corn to be used for ethanol.

USDA sees renewable energy as an opportunity to stimulate economic growth and agriculture in rural areas. We have a range of grant, loan and research programs supporting renewable energy. This year we will spend over $250 million under these programs. For example, we have 60 USDA scientists working in 14 USDA laboratories on biofuels research, including genetic research on biomass such as switch grass. We also coordinate joint biomass research with the Department of Energy and other agencies and work closely with them on their program implementation and our own.

We're optimistic that biofuels will create many new opportunities for rural America and make an important contribution to diversifying the Nation's fuel supplies. Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Dr. Collins.

Mr. Wehrum, in your opening statement, you announced, is it tomorrow in Nebraska you will be announcing the rule implementing RFS?

Mr. WEHRUM. Yes, Mr. Chairman.

Senator INHOFE. All right. Could you tell us to what extent does the EPA consider price to consumers and the cost to stakeholders during the development of this rule?

Mr. WEHRUM. As is usually the case, the proposed rule will be accompanied by a regulatory impact analysis, in which we attempt to estimate the cost impacts of the regulation and the benefits derived by implementing the regulation.

But I would say at the end of the day this regulation is very closely prescribed by the Energy Policy Act. It specifies how much renewable fuel must be blended into the fuel supply in any given year and it specifies the mechanism by which that should be accomplished. So our regulation largely is an exercise in implementing what the statute pretty clearly provides.

Senator INHOFE. Do you think tomorrow that will be discussed during the announcement?

Mr. WEHRUM. I'm sorry, Mr. Chairman?

Senator INHOFE. Some of the extent to, as I asked you about considering the price to consumers, to stakeholders, is that going to be discussed tomorrow?

Mr. WEHRUM. I expect that it would be, Mr. Chairman, yes.

Senator INHOFE. All right. Mr. Wehrum, we hear quite often the proponents State that ethanol is good for air quality, noting that it reduces some toxics, such as benzene, and then others say, well, while it does reduce some of that, while that's accurate, it promotes other toxics. Would you address this?

Mr. WEHRUM. Yes, Mr. Chairman. The effect of blending renewables or ethanol into the gasoline supply depends on the pollutant that you focus on. For instance, for pollutants such as carbon monoxide, which is a typical component of exhaust gases from motor vehicles, we would expect ethanol in the gasoline supply to reduce the amount of CO or carbon monoxide that's emitted.

As you point out, the same would be true for benzene, which currently is a significant component of most gasolines in this Country. Increasing the amount of ethanol blended into the gasoline supply will reduce the amount of benzene that's emitted for motor vehicles. Also, blending ethanol or other renewables into the gasoline supply would have the effect of increasing the emissions of other hazardous air pollutants and primarily a compound called [inaudible]. And again, our proposed rule, which will be available tomorrow, includes a rough assessment of what that balance would be. But our sense is that the balance is a favorable one as it relates to air toxics, because benzene is a known human carcinogen and reducing benzene emissions is certainly a favorable aspect of the regulation.

Senator INHOFE. Good. Mr. Karsner, would you agree that the cellulosic biomass ethanol offers a better long term option for domestic renewable fuel products production than traditional sources that compete with fuel and feed crops?

Mr. KARNSER. Yes, sir, I would. I think that cellulosic ethanol is superior over the long term just by the very nature that there

would be more dispersed and widespread availability of feedstocks that at present wouldn't be calculated to be any competition in the food supply.

Senator INHOFE. And considering that natural gas is the second most important feedstock in ethanol production, just second to corn, would you agree that opposing policies to increase domestic gas production while claiming to support increased renewable fuels is inconsistent?

Mr. KARNSER. Well, by nature, supporting renewable fuels is about supporting domestic production of American energy. And so it's entirely consistent that one should support all supplies of domestic energy resources.

Senator INHOFE. I would agree with that, and I know that sometimes this has been discussed. It's been debated. In fact, you can't really have one without the other. I just think it's important that we kind of hold that together.

Senator Thune, did you come here with an opening statement? Would you like to be recognized for an opening statement?

Senator THUNE. I will wait until I have a chance to ask questions. I want to thank you for holding the hearing. I think it's important to evaluate where we are relative to the policies we put in place last year. In my State of South Dakota, this is a great success story, obviously. I'd be happy to speak to that.

But I'm happy to yield until such time as I have a chance to ask questions.

Senator INHOFE. All right. We'll go ahead, the first round, we'll probably have two rounds of questions. Senator Jeffords, you're recognized.

Senator JEFFORDS. Thank you. Mr. Wehrum, a major challenge facing EPA is securing the resources needed to successfully develop and implement the renewable fuels standard, or RFS. I have a few questions on that topic.

I have heard anecdotally that in fiscal year 2006, EPA has deferred or delayed work on several other Clean Air Act regulatory programs in order to reduce these funds to implementing the RFS. Is that the case?

Mr. WEHRUM. That's true, Senator Jeffords.

Senator JEFFORDS. Again for Mr. Wehrum, I understand that fiscal year 2007, the President's budget proposal for EPA contains a request for $11.8 million in contract dollar support for the RFS program and associated reporting requirements. The House recently passed its version of the EPA 2007 appropriations bill and this funding was not included in the House bill.

I understand that the Senate bill fails to provide this funding also. What will be the effect of the RFS if EPA does not receive these funds?

Mr. WEHRUM. Senator, the President's 2007 budget request did in fact include a request for funding that would be directly associated with our efforts to implement the various responsibilities that we now have under the Energy Policy Act. The figures in the President's budget were based on our realistic assessment of the time and the effort required to satisfy all our responsibilities according to the time provided. And if Congress chooses not to fully fund the amount that we have asked for, then we would have to prioritize

our activities and our actions in an effort to satisfy all of our obligations. But it would certainly make it much more difficult for us, Senator, there's no doubt about that.

Senator JEFFORDS. As you may know, International Paper is seeking a permit to burn tires at its facility in upstate New York. This facility, located just a mile downwind of Vermont, could become a dangerous source of air pollution if it burns so-called "tire-derived fuel." IP refuses to put on the same pollution controls that it has installed in other facilities around the Country.

I have introduced legislation to require EPA to establish uniform standards and controls for such facilities. An EPA decision on this permit is pending in less than one week.

My question is this. Will EPA fulfill its responsibilities to protect public health and the environment by making an active an informed decision regarding the permit before September 11th? Hopefully you will agree with me that the other members of the Vermont delegation, Douglas and the Governor and thousands of our constituents, that the permit should not be issued. But in any event, would you report back to me in writing by the end of this week?

Mr. WEHRUM. Senator, I would be pleased to report back to you on our progress in working on the permit. This is an issue that you and I have discussed many times in the past.

Senator JEFFORDS. Yes.

Mr. WEHRUM. What I would say today, and I'm sure you well know is that we currently are in the process of reviewing a draft proposed permit that's been developed by the State. And our strategy in this for a while has been to proceed in a step-wise fashion. So the purpose of this proposed permit would be to allow what we call a test burn, a short term test. Our goal as the agency would be to allow that to proceed, but in a way that doesn't create environmental detriment.

So our intent is to look at the permit closely to, if the permit is approved, follow the test burn very closely so that we gather good information that allows all of us to know whether this fuel can be burned in an environmentally appropriate manner.

Senator JEFFORDS. Thank you. That's very nice to hear.

Mr. Wehrum, let me ask you a question about climate change. The Administration released a fact sheet on the Asia Pacific Partnership. It contains the following statement, and I quote: "We know the surface of the earth is warmer and an increase in greenhouse gases caused by human activity is contributing to the problem." Do you disagree in any way with that statement?

Mr. WEHRUM. No, Senator. I agree with that statement.

Senator INHOFE. All right, thank you, Senator Jeffords. Senator Thune.

OPENING STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Senator THUNE. Thank you again, Mr. Chairman, for holding the hearing. I appreciate the opportunity to, after we've had a year now since the passage of the renewable fuels standard, take a look at what's going on out there in the marketplace. As I said earlier, South Dakota is a great success sorry when it comes to ethanol

production. We currently have ten plants, three more under construction, and we're number one in the Nation in terms of farmer-owned plants, which is a great story in and of itself, because it enables farmers to have ownership in an industry that I think is growing and gives them an opportunity to add value to their income and to create jobs in rural areas like South Dakota and other States around the Country where ethanol production is a very viable opportunity.

I'm also very excited about the prospects for producing ethanol from other biomass products, cellulosic ethanol. I had the opportunity this last week to tour a lab in Rapid City, South Dakota, under the supervision of the South Dakota School of Mines and Technology, that is currently look at making cellulosic ethanol from the slash piles and that sort of thing that are out in the Black Hills of South Dakota, being able to convert those types of materials into energy as well.

So I think there is tremendous up side in this industry, and so many different uses. I know they are making it in other places in the Country. California has now entered the ethanol business as well, bringing in corn from the midwest to do it.

I guess what I would like to do is perhaps ask a couple of questions of our panelists today, and I thank you for your testimony and observations about this as well. But Dr. Collins, there are a number of what I think are inaccuracies floating around about the so-called food versus fuel debate in the Country. You stated in your testimony that USDA has projected a farm sector that adjusts fairly readily to higher corn demand. Could you elaborate on USDA's analysis on how growers will continue to supply markets for corn in the future?

Mr. COLLINS. Sure, Senator Thune. I think if you look at agricultural markets over their long history, there have often been supply events or demand events that have caused big changes in the market. The historical adjustment has been a return to generally average or even low prices in many cases. That's because of the productivity and the flexibility that exists in agriculture. Surpluses have been the rule more so than scarcity.

But because of the rapid growth in ethanol, there has been concern that this time will be different and the demand will outstrip production and will lead to some kind of a crisis event. I don't particularly see that. I think it's a situation that bears watching closely and that's why I identified and walked through it in some detail in my witness statement.

But I think first of all, looking at corn, which is the vehicle for the concern that people have, because so much of it's going into ethanol, productivity is growing about two bushels a year. We know from seed companies that they believe we're on the threshold of some very bigger changes in corn yields in coming years. Our typical yield right now is about 150 bushels per acre. Theoretically, corn could produce 300 bushels per acre. Genetic engineering and biotech varieties, particularly stacked varieties, have resulted in higher than expected yields the last 2 or 3 years. Very hard to project this in the future. We tend to use trends, long term trends. But if you look at what's going on in the last couple of years, I think there is some cause for optimism.

Secondly, I would point to the Conservation Reserve Program that I mentioned in my opening statement. We do have 36 million acres in the United States set aside from production for environmental reasons. We only farm about 325 million acres in principal crops. So we're talking about 10 percent of our crop land is set aside in the Conservation Reserve Program. Some of that land can be farmed economically and sustainably. We have about 22 million acres of that land under contracts that will mature between 2007 and 2012. So if agricultural markets start to rise in price because of demand for biofuels, for producers it will be more economic to take that land out of the CRP and return it to crop production and farm it sustainably with the techniques that we know can be done.

So I think that's one of the reasons why, those are a couple of the reasons why I think I have been under the belief that markets will adjust, markets can adjust. There will be some cost. There's no question about that. But I think they can be manageable, given the objective of trying to reduce crude oil imports.

I want to, if I can, just zero in on the comment you made in your testimony that you just alluded to about CRP providing a source of additional crop acreage. You mentioned, I think, that corn ethanol alone cannot greatly reduce U.S. dependence on foreign oil. I would like to get to the point, I think all of us would in this Country, where we have American energy and we get rid of our addiction to foreign energy.

I know that one of the things you talked about is being able to put that into corn production. Is it also possible that some of that CRP acreage could be converted into cellulosic ethanol, producing acres like switch grass which is, we're not there yet, but the whole, I think, arena of alternative types of materials, biomass and materials that could be included in the production of ethanol, like switch grass, may even open a lot of other additional doors in States where we have those types of grasses in abundance.

We don't want to take everything out of CRP because we have to keep a pheasant population in South Dakota. Obviously there are going to be a lot of competing and conflicting demands. But it seems to me at least, as you said, 36 million acres in CRP today, some of which could be used, whether it's for corn production or other types of biomaterials, like switch grass. Is that a possibility as well?

Mr. COLLINS. Absolutely. I think cellulosic ethanol is the relief valve for a tightening corn market. As you probably know, we already have a six pilot projects in the CRP program in which biomass is being harvested for various uses. Those projects have been pretty successful. The producers have to take a reduced rental rate in CRP when they harvest the biomass for its use. But I think that would be something that we ought to take a hard look at in the 2007 Farm bill, to see if we can expand that kind of access to the CRP. Because of course, closely cropped perennial grasses do provide substantial environmental benefits. So you can get a lot of the environmental benefits you get in the CRP and still be able to produce biomass and harvest it.

Senator THUNE. Thank you.

Mr. Chairman, my time has expired. I have a question for Mr. Wehrum I can either get to on a later round or I can submit.

Senator INHOFE. There will be a second round. If you'd like to go ahead and use part of that second round now, feel free to do so.

Senator THUNE. Thank you.

Mr. Wehrum, on May 8th of 2006, this year, EPA issued or started to begin a comment period, should say ended the comment period on the proposed rule regarding the treatment of corn milling ethanol facilities. I understand that you're currently evaluating those comments and that a final determination can be expected later this year.

I of course weighed in on that process, along with a whole large number of members of Congress from both the House and the Senate, both sides of the political aisle, in support of moving in the direction that I think that this rule is headed, and the way that dry mill ethanol plants are treated relative to the way wet mill ethanol plants are treated. Of course, as you are familiar, the issue goes back to the Clean Air Amendments of 1977, when at that time, EPA arbitrarily classified dry mill ethanol plants similar to chemical processing plants that are subject to 100 ton per year major source threshold without statutory direction or through a formal rulemaking process.

I guess what I would like to do is just get your assessment of where that process is and when we might expect some final determination from the EPA.

Mr. WEHRUM. Senator, the final rule in our regulatory schedule is queued up for early next year. But this issue is a priority for us. We appreciate your support in allowing us to understand the importance of the issue and support in getting the proposed rule out. So my goal is to move that rule along as quickly as we can and hopefully get it out before the end of the year, but certainly no later than its scheduled issuance, which is early next year.

Senator THUNE. I appreciate that. The proposed rule change would have a big impact and lead to a lot more efficient operation of dry mill ethanol plants when it comes to a per gallon basis. So you know my views on this and I appreciate your consideration of it. As I said, there is a lot of Congressional support up here for moving in the direction that you are. So we welcome your speedy consideration of that and a final decision as soon as possible.

Thank you. Mr. Chairman, I yield back.

Senator INHOFE. Thank you, Senator Thune. Senator Lautenberg, we are going to be having two five minute rounds. If you'd like to take them all at once, you may do that.

Senator LAUTENBERG. How about if I consolidate three or four? [Laughter.]

Senator INHOFE. No, just 10 minutes.

Senator LAUTENBERG. Thank you very much, Mr. Chairman.

Mr. Wehrum, California as we all know has requested a waiver from EPA to allow its limits on greenhouse gas emissions from cars to take effect. My State, New Jersey, is one of a dozen States that is seeking to adopt California's tailpipe standards. Does EPA intend to grant California's request?

Mr. WEHRUM. Senator, as I think you know, we have not begun the process of formally considering the waiver request. And the process would start with a request for public comment and an opportunity for hearing, and then it would be followed by deliberation

by the agency on what we heard during the hearing and a public comment period and then a final action at some future point.

So we have been considering the waiver request for some time now. We have not formally begun the process. But——

Senator LAUTENBERG. Why, Mr. Wehrum?

Mr. WEHRUM. Senator, the issues are complex, frankly. One of the primary issues related to the waiver request and greenhouse gas emissions generally in this Country is the authority that we have or don't have under the Clean Air Act ourselves as the agency to regulate in that area. And then by extension, what effect that determination may have on the request from the State of California with regard to the wavier.

So that's a very complex question, one that's been litigated in the D.C. Circuit already and is queued up for consideration by the Supreme Court. We're focusing a lot of our time and resources——

Senator LAUTENBERG. Well, would EPA make public recommendations before the Supreme Court hears the case?

Mr. WEHRUM. I can tell you, Senator, we've spoken with the Administrator very recently on this topic, and at least for now, we continue to deliberate the proper course of action.

Senator LAUTENBERG. Well, we would hope that there is some energy put into this review and even as it waits for the court hearing that EPA I think ought to show its cards, to use the expression, and tell us what they see thus far in the process, or as quickly as possible.

If EPA's New Source Review proposal to measure hourly emissions instead of annual emissions had been in place 10 years ago, how many of the existing enforcement cases against power plants could have been brought?

Mr. WEHRUM. I can't offer you an exact figure today, Senator. As you know, the enforcement cases were based on the regulations as they stood at the time and the particular activities and maintenance projects or other types of projects that were engaged in. So it's been our position since the beginning of the Administration that we'll continue to pursue those cases vigorously, and we have, all the way up to the Supreme Court. One of the primary cases is being heard by the Supreme Court later this year.

But at the same time, it's been our position since the beginning of the Administration that there is an opportunity to improve the New Source Review program and we've tried very hard to improve it in a way that makes it more efficient, more cost effective and more environmentally effect. And we feel like we've made a lot of progress in those areas.

Senator LAUTENBERG. How long has the program been under review by EPA?

Mr. WEHRUM. There have been debates and discussions about New Source Review since its inception. A fairly formal process of assessing the program and considering some changes was begun in the Clinton Administration.

Senator LAUTENBERG. Right.

Mr. WEHRUM. There was a proposed rule and a supplemental proposal before the end of that Administration. Some of our early actions in this Administration were based on what was proposed

previously. So it's been many, many years that these issues have been in debate and question.

Senator LAUTENBERG. Yes, and as the years pass, so does the quality of our air worsen. I would hope that there is some force put behind these reviews instead of constantly reminding us about how complex these issues are. We've got to resolve them. We know that the environmental conditions, the air quality, worsens as the weeks and the years go by. And it's time to come out and say that we are devoting the resources that we have to resolving the New Source problem, or at least dealing with it in a way that tells us that we are really serious about it.

Dr. Collins, thank you for your comments earlier. Would reducing our, lifting the tariff on imported ethanol likely lower ethanol prices for consumers?

Mr. COLLINS. I think very marginally, at best. We've looked at that issue repeatedly over the past year. There just simply hasn't been enough ethanol on the world market here in 2006, particularly Brazilian ethanol, to make a big difference. I just noticed yesterday or the day before, Iowa State University put out a study on the effects of lifting the tariff on ethanol. And they showed imports from Brazil going up by a couple of hundred percent. But our imports from Brazil run about 80 million gallons a year, compared with our production of now closing in on 5 billion gallons a year. So that's a fairly modest increase. It would help, particularly on the coasts. But I don't think overall it would have much of an impact on ethanol price.

Senator LAUTENBERG. Well, if the production of ethanol has been so small relative to our needs, why wouldn't the economic stimulant bring their energy, the decision to produce more, to come into the American market? Is there a limit on how much they can produce?

Mr. COLLINS. I'm Brazil, you're talking about?

Senator LAUTENBERG. Yes, Brazil specifically.

Mr. COLLINS. Well, they have a limit like we have a limit, only that it takes higher prices to expand their sugar cane acreage. I think my comment was really directed more toward the short and near term. Over the long term, if oil prices were to stay high, if we were to eliminate the tariff, then I think you would see some expansion. That would be an additional incentive, as you point out, to expand sugar cane acreage in Brazil.

The problem that Brazil faces is their sugar cane goes about half into the world sugar market rather than into ethanol. And they have significant competition for their ethanol. They have their own domestic blend mandate of 20 to 25 percent. They actually ran their stocks of ethanol down close to zero in the spring time trying to meet their own mandate. That left very little available to go to the world market. Then there's been increasing demand from Europe and Asian countries for their ethanol, particularly from Kyoto signatory countries.

So there's been a limited supply available. But over time, I agree with you, if the price incentive is there, they could expand production and they could augment our supplies.

Senator LAUTENBERG. I would hope that we would apply the traditional rule of economics and try to encourage, if it's as beneficial

as it appears to be, just looking at Brazil itself, to try to do whatever we can. And we don't want to limit the corn producers' opportunity. But there is room for both. And what we ought to do is try and do what we can to make supplies available. I think the demand certainly is there, demand for improvement is there. And we ought to get on with it.

Mr. COLLINS. As an economist, I believe in the benefits of trade liberalization. And so I do agree with you that a longer term goal ought to be freer global trade in ethanol.

Senator LAUTENBERG. Good.

Mr. Wehrum, can you comment on the relative amount of greenhouse gas tailpipe emissions that might result from cellulosic ethanol as compared to coal to liquid fuels?

Mr. WEHRUM. Yes, Senator. The greenhouse gas emissions on what we call a life cycle basis, meaning not only the emission from the tailpipe but also emissions associated with production of the crop and production of the ethanol.

By way of comparison between cellulosic ethanol and a gallon of gasoline, the greenhouse gas emission from the cellulosic ethanol would be about 85 percent less than conventional gasoline.

Senator LAUTENBERG. That tells us that we ought to get on with the task of increasing the supply, increasing the use of cellulosic materials.

Mr. WEHRUM. Senator, Chairman Inhofe asked the question about environmental impact earlier. And to complete the answer, from a greenhouse gas standpoint, whether using corn based ethanol or cellulosic based ethanol, fuels with ethanol derived by either of those methods has less of a greenhouse gas impact than conventional gasoline. So that would be one of the environmental benefits of implementing the RFS.

Senator LAUTENBERG. Thanks, Mr. Chairman. Thank you very much.

Senator INHOFE. Thank you, Senator Lautenberg.

Senator Boxer, if you would like to use part of your time for an opening statement, that would be fine.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Thanks. I will take my full 10 minutes. And I want to thank you for this hearing. On Tuesday mornings, we have leadership meetings at 9:00, so I can't get here until 10:00. I really apologize, because I didn't want to miss your words, but so be it.

Mr. Chairman, this is so important. There are very few things we can do, it seems to me, as legislators, that could be so beneficial as turning to cellulosic fuel. We reduce pollution, we lower gas prices, we strengthen national security. It's very hard to find any other thing that we could do, any other policy we could embrace, that has such a good payoff. So I'm very much in favor of this. And working with some of you, I wrote the amendment in the Energy Act that gives 2.5 to 1 credit for cellulosic fuel in terms of the Sates meeting the mandates.

So starting off, I know we have to jump start this whole issue. I wonder whether that 2.5 to 1 credit is having any impact out

there. Does anybody know who's on the panel? Are States saying, well, this makes it more beneficial for us to pursue?

Mr. WEHRUM. Senator, I'd be happy to at least start the answer.

Senator BOXER. Sure.

Mr. WEHRUM. Earlier I testified, and as you well know, the Renewable Fuels Standard basically requires specified amounts of renewable fuels to be blended into the domestic gasoline supply on a yearly basis. Our projection, based on information from EIA, is that in fact the amount of ethanol or other renewables blended into the gasoline supply will exceed the amount mandated by the Renewable Fuels Standard, at least for the next few years. And the reason for that is that the economics of ethanol are very favorable right now, given the cost of crude oil and the cost of gasoline.

Senator BOXER. And so you think that the 2.5 to 1 should spur on the development of switch grass and rice straw and all the other things, sugar cane, et cetera?

Mr. WEHRUM. Yes, Senator, I'm sorry I took so long to get to the point.

Senator BOXER. That's okay. I just don't have a lot of time. So you think that is helping out there?

Mr. WEHRUM. The short answer, Senator, is no. The value of the credits under a renewable program will be minimal over the first few years of implementation because of what I just described. So there will be some additional value to those who use cellulosics, because of the one trade-off. And we hope that certainly is a spur for additional development and innovation. But my estimation is it would be minimal over the next few years because of the——

Senator BOXER. So what does it have to be in order for it to be maximized? Because the trouble is, we don't have enough corn to do what needs to be done. So we need to look at these other ways. So what do you think it should be, 10 to 1, 8 to 1, in order to——

Mr. WEHRUM. I will defer to my colleagues here in a moment, but I guess the other thing that I would say is the Energy Policy Act said more about research and development and cellulosic and other forms of renewable fuels.

Senator BOXER. What does it have to be, in other words, to spur this on? Because it's a new industry. I think Senator Lautenberg talked about Brazil, how they're going to be energy independent soon because they've gone to sugar cane. Dr. Collins talked about the problems they face. It seems to me, I'm reading Lester Brown's book, there's just not enough corn out there. So we do need to jump start these others. And if 2.5 to 1 doesn't help make it more attractive, does anyone else have an answer to this question? At what level would it help? Or is it better to just give direct help into the whole development of cellulosic fuel?

Mr. COLLINS. I think the credit would take on a value if the mandate for cellulosic ethanol were binding. If someone had to buy cellulosic ethanol, then the credit would take on a value. As Mr. Wehrum said, at the current point, it looks as if we can meet the 250 million gallon requirement, not just ethanol from switch grass or wood, but even conventional ethanol, because there is provision in the law that allows us to meet the cellulosic requirement if animal manures or other waste are used to replace 90 percent of the energy——

Senator BOXER. But doesn't the requirement go up year after year, sir?

Mr. COLLINS. It does go up. Eventually ethanol——

Senator BOXER. So looking out, then you're saying it's possible that this will have an impact. But right now it doesn't have an impact?

Mr. COLLINS. In my view, that's correct.

Senator BOXER. Thank you.

Mr. Karsner, I believe we should do more to increase the use of cellulosic ethanol. We know it can reduce greenhouse gases, provide valuable income for our farmers, and increase our energy independence. I just wonder whether or not the Administration is going to ask for all the funds that we in Congress authorize for research and building cellulosic ethanol plants in fiscal years 2006 and 2007? Are there plans to do that?

Mr. KARNSER. Plans to?

Senator BOXER. To utilize the authorization that Congress gave for research and building cellulosic ethanol plants in fiscal year 2006 and 2007. Are there plans on the books to utilize that authorization?

Mr. KARNSER. There are currently multiple implementations of the authorization for that use, Senator. There's the Section 932——

Senator BOXER. Well, I'm just asking about those two things. I don't have time to hear about the other ways. Do you plan to use the authorization for research in building cellulosic ethanol plants in fiscal years 2006 and 2007?

Mr. KARNSER. To the extent they're appropriated, yes, ma'am.

Senator BOXER. Thank you. In your testimonies, Mr. Karsner and Dr. Collins, you noted that there's a limited supply of corn grown in this Country, and therefore corn-based ethanol alone cannot be the whole solution. So would you support legislation that would take us further in the direction of commercial production of cellulosic ethanol? For example, a bill that might provide grants for research and development of cellulosic ethanol and fund pilot programs for the installation of ethanol pumps at gas stations? Would you support such a bill?

Mr. COLLINS. I would say that's a policy call that I would rather leave to Secretary Johanns.

Senator BOXER. All right, that's fair. Have any of you visited Brazil to see what they're doing with their sugar cane, with their cellulosic? No? No, no. Okay.

Mr. Wehrum, I authored a provision in the Energy Policy Act of 2005 that required the EPA to study the health effects of the increased use of substitutes to MTBE, including health impacts on children, pregnant women, minority or low income communities and other vulnerable populations, as well as on air and water quality. EPA has until August 8th, 2007 to complete the study. What is the status of this study and will you meet that deadline?

Mr. WEHRUM. Senator, work on the study is underway. I would have to check on the status to answer the second part of your question as to what our estimated completion date is.

Senator BOXER. Would you do that, and would you write to us? It would be very, very helpful.

Mr. WEHRUM. Yes, Senator.

Senator BOXER. I also authored a provision in the Energy Act that required the EPA to study the amount of evaporation through rubber and plastic car parts with fuels that contain ethanol. And again, this study is supposed to be completed by August 8th, 2007. Could you give me the status of that study and let us know whether you plan to meet that deadline?

Mr. WEHRUM. I would be happy to respond to you as well on that, Senator.

Senator BOXER. Thank you. Mr. Wehrum, I authored a provision in the Energy Policy Act that required the EPA to study the health effects of the increased use——oh, I asked you about substitutes of MTBE. Let me just finally ask you about the GAO study. In June of this year, the Government Accountability Office reported that "While EPA has made some progress in implementing its air toxics program, most of its regulatory actions were completed late and major aspects of the program have still not been addressed. And EPA lacks a comprehensive strategy for completing the unmet requirements or estimates of resources necessary to do so."

The GAO found that "As a result of EPA's limited progress, the agency has not addressed health risks from air toxics to the extent or in the time frames envisioned in the Clean Air Act." Mr. Wehrum, air toxics such as benzene are known to cause cancer. Please explain how EPA is ensuring that required reductions in levels of air toxics are being met, especially from mobile sources of pollution.

Mr. WEHRUM. Senator, we as an agency in this Administration and prior Administrations spend a tremendous amount of time and effort in implementing the air toxics program, including the mobile source provisions. We've established technology-based standards for well over 150 source categories at this time, and we're now embarking on the next round of significant regulation, which is assessing the remaining risk after imposition of those standards and making decisions as to whether more is necessary to protect human health and the environment.

Senator BOXER. Okay, so you do not agree with the General Accounting Office, which is a non-partisan arm, that says as a result of EPA's limited progress, the agency has not addressed health risks from air toxics to the extent or in the time frames envisioned in the Clean Air Act? Mr. Wehrum, does EPA have a plan that incorporated all five GAO recommendations in that study?

Mr. WEHRUM. My understanding, and again I'd have to get back to you on this, is that we're developing a response to the GAO report, Senator.

Senator BOXER. I would greatly appreciate it. When do you expect that response to be ready?

Mr. WEHRUM. I'll figure that out and get back to you, Senator.

Senator BOXER. Well, you've got a lot of work to do, because you don't seem to know about a lot of these issues, and I'm looking forward to your written responses ASAP.

Mr. Chairman, thank you very much.

Senator INHOFE. Thank you, Senator Boxer. I have to observe that before you came in, I talked about the fact there are many areas of this hearing that you and I find in agreement, which is kind of scary.

[Laughter.]

Senator INHOFE. But I think that in fact this is true, however——

Senator BOXER. I'm petrified, as a matter of fact.

[Laughter.]

Senator INHOFE. But it is amusing to me that no matter what hearing we have, and I'm not referring to you, Senator Boxer, that there are members who want to turn everything that we do into a hearing on greenhouse gases. It's just amazing how this always comes up, it's become such a religion in this Country. Yet people fail to look at the reality of recent science and the changes that are taking place of the most recent finding that the ice cap in the Antarctic is actually thickening and we have the Canadians, the 60 Canadian scientists up there now with the statement which was, if we had known in 1997 what we know today and how science has revealed today, we would not have signed the Kyoto Treaty, how the greatest in any period of history of our Country in terms of release of greenhouse gases took place, or CO_2 took place in the late 1940s, and of course that didn't precipitate a warming period, it precipitated a cooling period that everyone said, another ice age is coming, we're all going to die.

So anyway, that wasn't the purpose of this hearing, however, I did at least want to respond to that. I'm sorry that Senator Lautenberg left, because I wrote down the statement that he made. He said air quality worsens as the years go by. I quickly sent for this chart that we used in a previous hearing, it's just not true, if you look at what's happened since 1970 in the case of gross domestic product has increased by 176 percent, vehicle miles traveled, 155 percent, energy consumption, 45 percent increase, population, 40 percent increase, and yet it has resulted in 50 percent cleaner air than we had in 1970. It's a success story, you just look at it, these are the facts that are incontrovertible.

So I don't think it's really necessary to get into a lot of these things. My preference would be to study those issues that are in the area of the agenda of the meetings.

Senator Jeffords, you would have another five minutes, if you have more questions.

Senator JEFFORDS. Yes, I do.

Senator JEFFORDS. Mr. Wehrum, do you believe that the ruling proposed tomorrow will increase the price of gasoline?

Mr. WEHRUM. Senator Jeffords, our regularly impact analysis for the proposed rule includes a prediction on the impact of the price of fuel. In our estimation, our estimation will be it likely will increase the cost of production by a fraction of a cent upwards of a penny. I'm answering your question in terms of the cost of production. In our analysis, we don't attempt to estimate the impact on price. Price is influenced by many factors that go beyond the bounds of this regulation.

Senator JEFFORDS. Thank you. Mr. Karsner, last week your office at DOE issued a press release, calling the RFS moot because of the rapid growth in ethanol production. While ethanol volumes are growing, they surpass what Congress mandated, isn't it the case that the standard was the catalyst for that rule?

Mr. KARNSER. I think that's correct, Senator. It was a useful catalyst and baseline. It stimulated this latest boom that we are experiencing in ethanol and the market has presently outpaced what the standard was set for, so the market's performing very well on its own at this juncture.

Senator JEFFORDS. Mr. Karsner, I applaud your efforts for the advance of renewable energy. Currently non-hydro renewables account for a small percentage of the electricity production. What percentage of our electric power supply will non-hydro renewables account for in the year 2010, 2015 and 2020? What technologies hold the most promise?

Mr. KARNSER. Well, sir, I'd be pleased to report back for the record with a quantitative estimation at those specific points in time. But just off the cuff, we can say that we expect those non-hydro sources of renewable power generation to continue their record expansion, which they've been undergoing for the last half decade, about 30 percent year on year growth. So if you took that trend line straight up through the intervals where you're talking about, you might approximate, say, 6 percent in the furthest out number. But I'd like to report back to you for the record with a more precise estimation.

[The referenced estimation follows.]

"The Department of Energy's Energy Information Administration has made the following projections for the percentage of electricity capacity that will be contributed by non-hydro renewable sources in future years. 2010: 3.1 percent; 2015: 3.5 percent; 2020: 3.6 percent."

Mr. KARNSER. You asked also what holds the most promise. To some degree, "we love all of our children," they all have a place in the American portfolio and a specific niche. So some of the larger scale utility grade renewables that will account, non- hydro renewables that will account for the largest portion of that growth will of course be wind power, which is growing at the fastest pace in terms of utility connection. Solar power, which is much smaller quantitatively, and will account for much smaller load quantitatively, still has a very significant role, particularly as a building-integrated technology and for demand side management.

So each of the renewables has different intrinsic characteristics for power generation that will inevitably find their niche in that growth curve.

Senator JEFFORDS. Thank you very much.

Mr. Collins, you testified that ethanol producers are expanding at an unprecedented rate and that there are 47 plants and 7 expansions under construction today. I want to be clear. Is it correct that this expansion is occurring in compliance with the existing environmental law and with the acceptance of the local communities in which the plants are located?

Mr. COLLINS. I cannot attest to that, because I don't know the particular situations of each of those plants. However, we and other entities do track the pace of construction partially by looking at the permits and other information that have been developed by the plant that's under construction. Perhaps that's a question for EPA to address, Mr. Wehrum, than me.

Senator JEFFORDS. Mr. Collins, you made a number of projections in your written testimony about the effect of ethanol use on corn

prices. Have you made similar projections for soybeans, biodiesel and if so, how does the availability of used soy oil affect the price?

Mr. COLLINS. We have done similar projections as well. The situation with soybeans is a lot more complicated than the situation with corn, because you have a demand for soybean oil for biodiesel, which is growing dramatically. But the increase in corn ethanol is producing byproduct feeds that compete with soybean meal, so you get a decrease generally in the price of soybean meal, which is a protein animal feed. You get an increase in the price of soybean oil.

Then you also have the question of what will happen with soybean acreage as corn acreage expands. I think soybean acreage will go down. So you have two factors to suggest higher soybean prices, less soybean acreage, more demand for soybean oil for biodiesel. One factor that suggests soybean prices will go down, lower soy meal prices because of the competition from byproduct feeds that come out of ethanol plants. All in all, I think we end up with a little bit less soybean acreage and a slightly higher soybean price, but nothing catastrophic or of prices proportions.

Senator JEFFORDS. Mr. Karsner, what do you think about wave pilot?

Mr. KARNSER. Sir, the Department currently doesn't have an active program for wave energy. Having said that, we watch it and I have technology experts attending conferences globally where there is greater expertise, particularly in the United Kingdom right now, developing wave power for tidal basins, et cetera. So there is potential in it. I know that New York State is doing it on a microbasis in the East River with floating buoys. In general, we think that wave and other forms of water energy hold great promise as a renewable fluid technology. But we want to assure that we get to the size and scale that is significant enough to engage it as a program.

Senator JEFFORDS. Thank you.

Senator INHOFE. Thank you, Senator Jeffords. Senator Thune, you have three minutes remaining, if you would like to use any part of that.

Senator THUNE. Mr. Chairman, I would just like to acknowledge that we were talking, of course, about corn ethanol, but also about cellulosic, that there was a lot of good work done last year in the Transportation bill. I appreciate having the opportunity to work with you, Mr. Chairman, as well as with Senator Clinton, in including provisions that would promote biofuels research. That was something that South Dakota State University is in the middle of right now. But I think it's going to play an important role as we look at additional ways to expand the use of alternative fuels going forward.

So the research provision, in addition to the RFS, which obviously was a huge breakthrough in terms of our energy bill last year, but the Highway bill also included some important provisions that promote research, so I appreciate your good work and leadership as well as other members of this committee in helping make that happen.

Just a couple of observations with respect to the whole issue of Brazilian ethanol, because it has been debated about whether or not there is enough supply in this Country to meet the demand out

there. There of course is already a provision that allows for some Brazilian ethanol to come into this Country. Under one of our trade agreements, and they're not anywhere close to the lid or the cap that's allowed there.

But secondly, there is a qualitative difference, too, between the ethanol that's produced in South America and Brazil and the ethanol in this Country. They don't have to comply or meet the environmental standards that we have in this Country. Secondly, I just think that this whole debate really is about American energy. It's about getting away from our dependence upon foreign sources of energy. So we've all concluded that when you can undergo a rise in the price of a barrel of oil from $25 or $30 a barrel to $70 or $75 a barrel, the impact it has on the economy is pretty profound.

To me, there is a qualitative difference as well, or a distinction between, when you start talking about trade and open markets and everything else, a pair of designer jeans that you get from China or a tie that you get from some other Country, those are very different products than energy. And I think we have to do everything we can right now to promote American energy.

That's why I think these policies are so important, that's why I think the RFS was so important last year. And all these other initiatives that are underway right now in terms of developing, whether it's cellulosic ethanol or coal to liquids, whatever it is, we have to get energy independent. And in my view, I'm not sure that we gain when we become dependent upon Brazilian ethanol instead of Middle Eastern oil. We're still dependent upon foreign sources of energy. And energy drives this economy. The economic impact is profound.

So I would just simply say, as we continue to develop policies in this Country where energy is concerned that we continue to look at how we can become energy independent and have American energy meet the needs of our economy rather than having to depend upon foreign sources of energy. So that is more a speech than a question, Mr. Chairman.

But again, I appreciate your leadership on this issue. I know that the renewable fuels standard and the subsequent changes in the Highway bill that encourage the research that's going on right now are going to be critical in achieving that goal and meeting our objective of becoming energy independent and having American energy as our source in this Country.

Thank you.

Senator INHOFE. Thank you, Senator Thune.

Senator Boxer has asked that she be given 60 seconds to respond to something that is not the subject of this hearing. You are recognized for this purpose.

Senator BOXER. Well, just, the record should show I didn't raise it, but you did make a statement about climate change. And Mr. Chairman, I'm really hopeful we can work together on cellulosic fuel. I mean, that's something I think we ought to come together on. And I think Senator Thune made the point beautifully that this is an opportunity for us. I hope we can all finally find something that we can come together on.

But I have to just make a point for the record that the Administration itself has a statement, we know the surface of the earth is

warmer and an increase in greenhouse gas as caused by human activity is contributing to the problem. That's the Administration. We know that 11 academies of sciences throughout the world, including the American Academy of Sciences, has stated that clearly the earth is warming and we need to take steps now.

I think about what you say, I have a great deal of respect for you. But I feel that it's such a risky, you have a risky strategy, which is to do nothing. And if these academies of sciences are right, then in fact the risks are too great, and I just wanted to say that, and hope that we can find other areas we can work together on.

Senator INHOFE. Sure, and I appreciate that, and the record will so reflect that. I will have to respond, however, and say——

[Laughter.]

Senator INHOFE. —— we could throw in the 17,800 scientists of the Oregon Petition, we could talk about the Smithsonian Harvard report, all of which refute the statements you just made. But that's for another hearing another day.

Senator Obama, we were about to conclude, but we certainly welcome you to this hearing. You would be recognized for either your opening statement or questions of the panel.

OPENING STATEMENT OF HON. BARACK OBAMA, U.S. SENATOR FROM THE STATE OF ILLINOIS

Senator OBAMA. Thank you very much, Mr. Chairman. I'll be relatively brief. I apologize for being late. My flight was delayed.

This is an issue that is obviously important to my constituents in Illinois. I think it's important to all the American people. I'm reminded of a quote from the car maker, Henry Ford, who said in 1916, "The world is waiting for a substitute for gasoline. Some day there will be no more gasoline and long before that time, the prices of gasoline will have risen to a point where it will be too expensive to burn as motor fuel." In 1916, Henry Ford's company produced about half a million Model Ts each year. There was enough oil in the U.S. to meet our energy needs. Ninety years later, there are 243 million cars and light trucks in the U.S., and we have to import about 60 percent of our oil from abroad.

I have repeated many times that our dependence on foreign oil is not just an economic security issue but also a national security issue. As long as our economic fortunes are tied to the price of oil our ability to grow our economy and raise the standard of living for our people is threatened. Equally troubling is the fact that about $800 million that we spend on foreign oil each day goes to some of the most volatile regions in the earth. I'm sure many of these issues have already been raised.

I just want to say that I'm pleased to have co-sponsored the renewable fuels standard that passed last year. When fully implemented, the RFS will go a long way toward encouraging production of home-grown fuels. But we have to do more. Senator Cochran and myself introduced a bill to create a similar renewable standard for diesel fuel. Senator Lugar and I introduced a proposal to increase CAFE standards for cars and light trucks. So I think that the same bipartisan spirit that led to the RFS can lead to other legislation to help cut our ties to foreign oil.

And Mr. Chairman, I do have just a couple of questions. And I apologize, some of these may have already been asked. In the three minutes that I have remaining, if I could direct a couple of these first to the Department of Energy, Mr. Karsner.

I am aware of the fact that the National Ethanol Vehicle Coalition has been doing some good work over the last 5 years to help promote E-85. And my understanding is that the Department of Energy awarded NEVC $1.8 million in fiscal year 2005, specifically to help expand E-85 infrastructure. My understanding is only a million dollars of this amount has been paid to the Coalition.

And given the great interest in E-85 and the fact that my flexible fuel vehicle, I can never find a gas station that carries it without driving and using up whatever benefits I would get, I'm wondering why the Coalition hasn't received this funding and whether the Department plans to provide the balance of this award.

Mr. KARNSER. Senator Obama, I will look into that matter. We certainly at the political level don't delve into individual giants into the private sector——

Senator OBAMA. Fair enough. If you don't know, it would be great if you could get back to my office on it.

Mr. KARNSER. I will report back for the record.

[The referenced information follows.]

The National Ethanol Vehicle Coalition (NEVC) has done good work helping to develop E-85 infrastructure. In 2005, the Coalition submitted an application to the Department of Energy for an additional $1.8 million (as a modification to an existing grant which previously totaled $2.9 million) to increase the number of E-85 refueling stations. The Department funded $1.0 million of the $1.8 million request, increasing the grant funding to a total of $3.9 million. However, based on fiscal year 2006 congressional guidance, we are now primarily funding ethanol infrastructure development competitively, through our State Energy Program (SEP) special project grants and other solicitations, and the Department considers our obligation under the NEVC grant to be fulfilled. We have funded E-85 infrastructure in fiscal years 2004, 2005, and 2006 through a combination of the NEVC grant, SEP special project grants, competitive solicitations, and an NEVC congressionally directed project. We will continue to work toward expansion of E-85 infrastructure through competitive solicitations and awards, and look forward to working with all parties interested in promoting the use of biofuels in the future.

Mr. KARNSER. I will also take this opportunity to plug our energysavers.gov web site, and say that there you can find wherever the closest E-85 stations might be geographically.

Senator OBAMA. Yes, I know where they are. They're just too far away. We need more of them.

Mr. KARNSER. We're going to try to put more of them closer.

Senator OBAMA. Absolutely. For Mr. Wehrum, of the EPA, in the last minute that I've got remaining, it looks like U.S. production of ethanol is at about 25 percent above the 2006 RFS level, am I correct about that?

Mr. WEHRUM. That's roughly correct, Senator, yes.

Senator OBAMA. Do we expect the trend to continue in the future, are we sort of moving in that direction where it's increasing at that pace?

Mr. WEHRUM. Senator, we rely on EIA, a branch of the Department of Energy, for projections on energy matters. But in our proposed renewable fuel standard, which will be signed and issued tomorrow, we include projections of what we think ethanol production and consumption are going to be in the Country over the next

few years. Our projections on that ethanol consumption, is that more ethanol is going to be blended into the gasoline supply than is minimally required under the renewable fuel standard.

Senator OBAMA. Okay. Which raises the thought, then, has thought been given about raising the renewable fuel standard to reflect the fact that we're actually doing better than we might have anticipated and maybe we should raise the bar a little bit.

Mr. WEHRUM. Senator, it's not within our authority under the law to raise the amount that's——

Senator OBAMA. I understand that. I'm asking whether there has been a recommendation to Congress along those lines.

Mr. WEHRUM. The Administration has not made such a recommendation.

Senator OBAMA. Okay. Mr. Chairman, if I could just ask one more question of Dr. Collins.

The USDA's August 8th renewable energy analysis paper mentioned the idea of restructuring the Commodity Credit Corporation bioenergy program to focus on cellulosic feedstock. And the program was a success for corn and soybeans. So I'm just interested in whether the USDA has a vision for how a modified CCC bioenergy program for the future of cellulosic feedstock might look like.

Mr. COLLINS. At this point, Senator, we do not. USDA's position on the CCC bioenergy program has been to support its termination. The program expires this year.

What we did with that paper was to lay out what we thought were some areas that we weren't necessarily recommending but some areas that needed some public discussion, some public debate for consideration in the 2007 Farm bill.

Senator OBAMA. Okay.

Mr. COLLINS. We think a possible reinvention of the CCC bioenergy program with a focus on cellulosic ethanol is worth a public debate about. But we have not——

Senator OBAMA. But you haven't issued any recommendations yet, but this is something that your office is investigating, at least, would that be accurate?

Mr. COLLINS. Yes, sir.

Senator OBAMA. And are there going to be public hearings or reports through your office, or are those still in the works, or you're not sure yet?

Mr. COLLINS. I'm not sure.

Senator OBAMA. Okay. Fair enough.

Thank you, Mr. Chairman. I appreciate all the work that all of you are doing and Mr. Chairman, I appreciate your leadership as well as my colleague from South Dakota, who I know cares about this deeply as well.

Senator INHOFE. Thank you, Senator Obama.

[The prepared statement of Senator Barack Obama follows:]

STATEMENT OF HON. BARACK OBAMA, U.S. SENATOR FROM THE STATE OF ILLINOIS

Thank you, Mr. Chairman, for holding this hearing on how the Federal Government can promote the growth of a domestic renewable fuels industry. This is an important issue to my constituents in Illinois.

When I think about this issue, I'm often reminded of a quote from the car maker Henry Ford, who said in 1916: "The world is waiting for a substitute for gasoline. [Someday] there will be no more gasoline, and long before that time, the prices of gasoline will have risen to a point where it will be too expensive to burn as a motor fuel."

In 1916, Henry Ford's company produced about a half million Model T's each year, and there was enough oil in the U.S. to meet our energy needs. Ninety years later, there are 243 million cars and light trucks in the U.S., and we have to import about 60 percent of our oil from abroad.

I've said it many times but our dependence on foreign oil threatens not only our economic security but also our national security. As long as our economic fortunes are tied to the price of oil, our ability to grow our economy and raise the standard of living for our people is threatened. Equally troubling, a large portion of the $800 million we spend on foreign oil each day goes to countries with volatile Governments—places that breed turmoil and terrorism.

For these reasons, I was pleased to have cosponsored the renewable fuels standard that passed last year. When fully implemented, the RFS will go a long way towards encouraging the production of home-grown fuels and reducing our dangerous dependence on foreign oil.

But we can—and must—do more. That's why Senator Cochran and I introduced a bill to create a similar renewable standard for diesel fuel. And that's why Senator Lugar and I introduced a proposal to increase CAFE standards for cars and light trucks. So I hope the same bipartisan spirit that led to the RFS can lead to other legislation to help cut our ties to foreign oil.

Thank you, Mr. Chairman.

Let me just ask, I had asked a question of Mr. Karsner, relating to the relationship between the feedstock, ethanol production and so forth, considering that natural gas is the second most important feedstock in ethanol production, second only to corn. Would you agree that opposing policies to increase natural gas production while supporting the increased renewable fuels would be inconsistent? Mr. Karsner said that he believes that it is inconsistent. I'd like to ask the same question of you, Dr. Collins, and Mr. Wehrum.

Mr. WEHRUM. Senator, I'll admit you took me by surprise. Could you repeat your question, please?

Senator INHOFE. Yes. I was saying that if you're for renewables and at the same time, you oppose increasing natural gas production, since natural gas is the second largest feedstock in renewables, would you say it's inconsistent to be supporting renewables but opposing the production, increasing production or production of natural gas?

Mr. WEHRUM. Senator, I would just say if the goal is to increase the energy independence of the United States, those would be inconsistent statements.

Senator INHOFE. All right, good. Dr. Collins.

Mr. COLLINS. Senator Inhofe, the way you phrase the question it would appear to be inconsistent.

Senator INHOFE. Yes, thank you.

Senator Thune has been kind enough to chair this hearing for the last five minutes Senator Carper will have, so Senator Thune is presiding. Thank you very much, gentlemen.

Senator THUNE. [Presiding.] The Senator from Delaware.

OPENING STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM THE STATE OF DELAWARE

Senator CARPER. Mr. Chairman, you've been here less than 2 years and you're already running the place.

[Laughter.]

Senator CARPER. Mr. Wehrum, this issue is close to our hearts in Delaware. Most people think Delaware is a big agriculture State. We have only three counties, but in our southernmost county, we raise more soybeans, I'm told, than any county in America. The Dupont company is one of the major employers in our State. They're doing great work, including among other projects, on cellulosic ethanol. They're doing a lot of research with corn, and trying to turn the whole corn stalk, Dr. Collins, into ethanol. They're doing that with help from a grant from the Energy Department that our Congressional delegation has sought and supported.

I understand in your testimony you may have mentioned your Department's commitment to accelerate research and development to make cellulosic ethanol commercially competitive by 2012. I just want to ask, if you can give us a little bit more detail and discuss some of the R&D development projects going on that your Department is currently participating. What actual steps are you taking to accelerate this research?

Mr. COLLINS. I'd be happy to, Senator. First of all, let me say that over the past year, we have been reformulating our long term plan for research to focus on cellulosic ethanol. The document for that plan is now in review.

But I would say that we really have four pillars.

Senator CARPER. Dr. Collins, I'm going to ask you to answer very briefly, I want to raise the same question to Mr. Karsner.

Mr. COLLINS. All right. I will just say in a sentence, then, our focus has been on feedstock design, that is trying to develop crops by eco-region of the Country, feedstock production and management, that is to produce and manage so that biomass can be produced year-round, supply ethanol plants year-round for cellulosic feedstocks.

Thirdly, feedstock logistics, harvesting and handling, to do that in a most effective way. And fourth, feedstock conversion, which is to look at both, not just cellulosic, but starch-based ethanol as well, to improve the efficiency of conversion.

Senator CARPER. Good. Thank you.

Mr. Karsner, same question. Again, the Energy Department, I'm told, is supporting what is being done at the Dupont experimental station literally today, as we meet. I think the Dupont folks are 3 years into a 4 year endeavor. I'm encouraged that the Department wants to accelerate R&D to cellulosic ethanol, make it commercially competitive. Let me just ask you, what are you doing to accelerate it? And I'm especially interested in the kinds of dollars that you want to bring to the endeavor.

Mr. KARNSER. Well, the general answer is very similar to USDA in the sense that we are breaking down old stove pipes across the Federal Government and working with USDA and EPA and DOT on a comprehensive strategy with other agencies that involve, as a first step, evaluating the regional biomass energy feedstocks through partnerships that can determine what feedstocks go where for new cellulosic ethanol bio-refining capacity. We're also approaching the basic research and development with the Office of Science through the bio-energy research centers that were just announced, amounting to $250 million over the next 5 years in two separate centers to look at the genomics and the plant genetics to

investigate how to increase the capacity utilization of removing the sugars from the lignin cellulose and hemi-cellulose.

We also, as part of implementing of the Energy Policy Act, have authority for the loan guarantee program which will increase the availability and access to capital and hopefully lower the cost of funds to new entrants and investors for capital formation towards cellulosic ethanol. And finally, we're looking at all the aspects of the economics of the supply chain for the economic development of cellulosic ethanol distribution, transportation and terminal facilities. In this respect, corn-based and conventional ethanol is leading the way with its current growth rates ironing out and bringing new equilibrium to the economics of distributing the ethanol to market. Getting it first as a blend fuel and then hopefully later cross over into E-85 in a more pure retail form.

Specifically in terms of the monetary numbers, we anticipate a few billion dollars at least in the initial rounds of the loan guarantee program. The pre-applications were recently solicited on August 8th. Those solicitations are due back from the pre-applications on November 6th. And in the first quarter of next year, we anticipate the evaluation, and eventually the rewards of the first round of the loan guarantee program, of which there has been great interest by those in the cellulosic ethanol community.

Alongside of that, there is the Section 932 of the Energy Policy Act, where we anticipate up to $53 million that would be a cost share grant in a more typical form of R&D of the type that you've characterized in our partnership with Dupont, for example, to evaluate those technologies that can become commercial and replicable at scale, so that we might begin to proliferate and accelerate them into the economy.

Senator CARPER. Good. I understand some additional monies are going to be needed as a scale-up to maybe build a pilot plant and then to go beyond that, they're probably on their own, or other companies would be on their own. I would encourage you at the Department to continue to support generously this kind of research and development. I think it has a huge payoff.

I'm told that we use almost as much energy to create ethanol, using the ears of the corn, but I'm told that the potential with the cellulosic ethanol is much better in terms of the payoff in energy production. So we're real interested in following that one.

Just north of Dover, Delaware is a little town called Clayton, where earlier this summer we opened a biodiesel refinery. We take just soybean oil and turn it into diesel fuel. And when I was Governor, near the end of my second term as Governor, we started using biodiesel fuel to fuel some of our DelDOT vehicles. It worked pretty well, so we started fueling them all, and now a whole bunch of vehicles on the DelMarVa Peninsula use biofuels.

Those that don't, Mr. Wehrum, use in many instances diesel fuel, and traditionally it's been fairly high sulfur content diesel fuel. I have a related question that I'd like to pose to you if I could. I commend the Administration, we've been critical of the Administration for some of the things that they've done, for some of their sins with respect to a cleaner environment. But one of the areas that I think all of us are supportive of is the Administration's efforts to reduce

diesel emissions by introducing the standards for ultra-low sulfur diesel.

And it's my understanding that the ultra-low sulfur diesel is required to be introduced in the market, I think on October 15th at this time for the new model year cars and trucks, 2007 engines. I think the October 15th date is already the result of a 45 day extension, and it's my understanding that there are again some that are asking for you to delay this transition further beyond October 15th. I am concerned about the environmental impacts of the additional delay. I suspect others are as well.

I just want to know, is EPA considering delaying the diesel standard further beyond October 15th? Are there any real concerns about price increases or supply problems caused by the new diesel fuel standard?

Mr. WEHRUM. Senator, it's our intent to stick with the current deadline of October 15th for retail distribution under the ULSD, the ultra-low sulfur diesel fuel. We have predicted from the beginning that this program would increase the cost of diesel fuel a few pennies per gallon. As I stated earlier in this hearing, we don't attempt to estimate whatever impact it may have on price, because there are many, many factors that influence price that go far beyond just this basic regulatory program.

We——

Senator CARPER. You can stop right there. That's good.

Mr. WEHRUM. Thank you, Senator.

Senator CARPER. You said what I wanted to hear, October 15th.

Lastly, a question if I could for Dr. Collins. I want to ask my entire question, but if I could, we're interested in farmers getting more money for their soybeans, their corn and other commodities that they raise on the DelMarVa Peninsula. It's just, I'm sure they're interested in South Dakota and even Vermont for their commodities.

But does the increased price of corn reduce the amount of farm subsidies being paid out, reducing costs in the Farm bill? If so, how, if not, why not?

Mr. COLLINS. It does, Senator. Let me just give you an example. For the 2005 crop of corn, we had the most costly corn program ever. It was about $9 billion we spent in payments and support to U.S. corn farmers. This year, with higher corn prices, we're estimating that we'll spend $4.6 billion. So there you're talking about a $4 billion swing just in corn program cost alone from 1 year to the next.

So it is true that as corn prices strengthen, as corn demand strengthens, it can significantly reduce taxpayer costs for Federal farm price and income support programs.

Senator CARPER. Good. Thanks very much.

And our thanks to each of you for joining us today and for your testimony, for your responses to our questions. Thank you. Thanks, Mr. Chairman.

Senator THUNE. I want to thank our witnesses for their testimony, and we look forward to discussing further as this process moves along things that we can do to improve the energy situation in this Country, and particularly with regard to renewable energy, which as has been stated repeatedly throughout the course of this

hearing, has all kinds of benefits, from the environment to the economy to our national energy independence. So we appreciate your input and welcome additional suggestions that you might have about things that we as a Congress could be looking at to further the growth of renewable energy in this Country.

Thank you very much. The hearing is adjourned.

[Whereupon, at 11:14 a.m., the subcommittee was adjourned.]

STATEMENT OF HON. JOSEPH LIEBERMAN, U.S. SENATOR FROM THE STATE OF CONNECTICUT

Thank you, Mr. Chairman, for holding this hearing on the Federal Government's renewable fuels programs.

The Energy Policy Act's promotion of renewable fuels is one of the attributes that led me to vote in favor of that law's passage last year. The Act directs the Energy Department to institute a ten-cents-per-gallon financial incentive for the production of cellulosic biofuel. It authorizes the Department to provide loan guarantees amounting to as much as 80 percent of the cost of at least one commercial-scale cellulosic biomass project. It also authorizes the Department to provide up to $250 million in loans to merchant producers of cellulosic biomass and other approved renewable fuels. It authorizes the Agriculture Department to issue $1 million per year in grants to small businesses for the marketing and certification of bioproducts. And, perhaps most significantly, the Act directs the Environmental Protection Agency to mandate the use of at least 4 billion gallons of renewable fuel in this country this year, and at least 7.5 billion gallons in 2012.

In my view, these incentives and mandates in the Energy Policy Act represent a positive and necessary step toward ending this country's destructive oil addiction and curbing global warming. I am glad to hear, then, that tomorrow EPA Administrator Johnson will sign a proposed rule to implement the Act's renewable fuels mandate.

As warranted and impressive as the Energy Policy Act's renewable fuels provisions are, however, I believe they amount to only a first step toward ending our oil addiction and dramatically reducing our transportation sector's contribution to global warming. To carry this country much farther down the road that we need to travel, I joined with Senators Bayh, Brownback, Coleman, and others last November to introduce S. 2025, the Vehicle and Fuel Choices for American Security Act. That bill, which now has the bipartisan support of 28 Senators, would require the executive branch to use means readily at its disposal to save, by 2016, 2.5 million barrels per day from projected oil consumption in that year. That is roughly the amount of oil that we currently import from the Middle East. The bill, which I like to call the Set America Free Act, would go on to require 7 million barrels per day in savings by 2026 and 10 million barrels per day in savings by 2031 (our current oil consumption is just over 20 million barrels per day).

To implement these savings, the Set America Free Act would set rising targets for manufacturers to produce flexible-fuel, alternative-fuel, hybrid, plug-in hybrid, and fuel cell vehicles; institute loan guarantees, grants, and tax credits to promote sales of those vehicles; mandate the development of fuel-efficiency standards for heavy-duty vehicles; eliminate the current tax break for purchases of heavy SUVs; require the Federal Government to improve the fuel efficiency of its vehicle fleets; institute a program for increasing the use of fuel-saving tires; and institute a series of steps for increasing domestic production of ethanol.

Of particular relevance to today's hearing, the Set America Free Act would increase the ethanol infrastructure tax credit to 50 percent. This is important, because limited ethanol infrastructure is one of the greatest impediments to use of the fuel today. Millions of flexible fuel vehicles designed to use ethanol never see a drop of it simply because it is unavailable at the pump. The Set America Free Act's tax credits would help change that. The Act would also increase the authorization for cellulosic ethanol incentives to $200 million for 5 years, and add a near-term target of 75 million gallons of cellulosic biomass fuel by 2010.

My cosponsors and I were disappointed that Majority Leader Frist blocked our effort to add the Set America Free Act to the Gulf of Mexico Energy Security Act in July. We were somewhat encouraged, however, to hear Senator Frist and Energy Committee Chairman Domenici nevertheless praise our bill on the Senate floor. We will continue to advance the Set America Free Act in the next Congress, because the Energy Policy Act's significant step toward energy security will have been in vain unless we now continue the march toward that goal.

Thank you, Mr. Chairman.

STATEMENT OF WILLIAM WEHRUM ACTING ASSISTANT ADMINISTRATOR OFFICE OF AIR AND RADIATION U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman, and members of the committee, I appreciate the opportunity to come before you today to testify on the status of the Environmental Protection Agency's efforts to develop the comprehensive rulemaking implementing the Energy Policy Act's Renewable Fuels Standard.

THE ENERGY POLICY ACT OF 2005

The Energy Policy Act of 2005, or EPAct, required EPA to take a significant number of specific actions that directly affect our nation's fuel supply and quality. Some of these actions have already been proposed or have taken effect, including the removal of the oxygen standard for the Federal reformulated gasoline program, proposal of new gasoline benzene content standards to control mobile source air toxics, and the proposed listing of State boutique fuel requirements. However, a lot of work remains. As the Agency continues to work on all these actions, the most important and significant fuels requirement established in EPAct is a national renewable fuels standard, or RFS. Since increasing the amount of domestically-produced renewable fuels is a key element of the President's energy initiatives and supports his goal of reducing the country's dependence on imported oil, the Agency has placed the highest priority in preparing this major rulemaking. This effort has required significant resources for the regulatory development and impact analysis work and will require significant additional resources to implement it. EPA also understands the need to implement an RFS rulemaking that maximizes existing fuel production and minimizes impacts on the fuel distribution system.

Interest in renewable fuels has grown significantly in recent years due to concerns about high fuel prices, our Nation's dependence on foreign oil, and emissions of greenhouse gases such as carbon dioxide. These are some of the reasons that the RFS program garnered such strong support during its development. The RFS program is critical, and as such, it is important that it be carefully developed and implemented for the long term.

THE RENEWABLE FUELS STANDARD

Under EPAct, the RFS program requires that increasing volumes of renewable fuel be blended into gasoline in the continental United States beginning in 2006. EPAct establishes the years for which the RFS is in effect and the required minimum annual volumes of renewable fuel. The renewable volume begins at 4 billion gallons in 2006 and increases to 4.7 billion gallons in 2007, 5.4 billion gallons in 2008 and continues to scale up to 7.5 billion gallons in 2012. EPAct requires that EPA annually establish the percentage requirement, which will apply individually to refiners, blenders, and importers to ensure the total volume of renewable fuels specified for that year in EPAct is achieved.

That Act provided the Agency with less than 5 months to develop and implement the RFS program by regulation. With the close cooperation and support of our stakeholders, including renewable fuel producers and oil refiners, EPA was able to accomplish this by making use of a default requirement provided in the Act that only applies to 2006. Last December we promulgated a direct final rule to implement the default standard that allowed the program to begin in January without all the credit trading and compliance provisions that the full program requires. The default rule provided one additional year, until January of 2007, to implement the full program. Under the 2006 RFS default rule, refiners, importers, and gasoline blenders are collectively responsible for ensuring that the amount of renewable fuel volume used nationwide is at least 2.78 percent of the total gasoline used in the continental United States, as specified in EPAct. This equates to approximately 4.0 billion gallons of renewable fuel, of which both ethanol and biodiesel count. If the default standard is not met in 2006, the rule specifies that the deficit volume of renewable fuel would carry over to the RFS requirement for 2007. Based on data of ethanol use so far in 2006, it is expected that in excess of 4.5 billion gallons of renewable fuels will be used in the United States this year. Thus we do not anticipate that any deficit will be required to be carried over into 2007.

Although the Act prescribed many aspects of the program, including the required renewable fuel volumes, it did not specify certain critical elements, such as defining a renewable fuel credit, what parties can generate credits, how credits are generated, when and by whom credits can be traded, the life of a credit, and the meth-

odology for determining the appropriate value of credits for the different renewable fuels. Further, unlike past programs in which credit trading was used simply as a cost savings measure or a way to increase compliance flexibility, for the RFS program it will be a critical aspect of demonstrating compliance. Credit trading also differs under the RFS program because those parties that produce renewable fuels are not the same parties that must demonstrate compliance.

The proposed RFS rulemaking must also clearly define the liable parties for the RFS program, establish how liable parties demonstrate compliance with their obligation, and establish the necessary compliance and enforcement provisions, including recordkeeping and reporting. Because this rule impacts parties not traditionally affected by motor vehicle fuel regulations, namely those in the business of producing renewable fuels, there is an additional layer of complexity not found in our other clean fuel programs. Many of the issues have been considerably more complex than originally envisioned.

PROGRAM DEVELOPMENT OVERVIEW

In order to implement a rulemaking of this magnitude, it was imperative for the Agency to promptly enter into close dialog with the affected parties to understand how the RFS program would impact the stakeholders in real world applications. EPA directly engaged all the major stakeholders, including the refining industry, renewable fuel providers, and fuel marketers and distributors to gather information and suggestions which were incorporated into drafting the various compliance and credit trading provisions. Completion of a proposed rulemaking in an expeditious fashion was only possible by working closely with these stakeholders on the critical elements, including important provisions that offer maximum flexibility, such as the credit trading provisions, and limiting disruptions or changes in existing procedures, such as record keeping and reporting. Through close collaboration and cooperation, we believe the proposal will have broad stakeholder support allowing EPA to move forward quickly with a final rule.

CLOSING

Following extensive dialog with all stakeholders, along with the significant efforts of our own technical and legal staff, I am pleased to report that tomorrow, September 7th Administrator Stephen Johnson will sign this landmark proposal. We will be pleased to brief Congressional staff on the details of the proposal over the course of the next few days if requested. Following public review and comment on the proposal, our goal is to promulgate final RFS regulations early in 2007.

I want to thank you, Mr. Chairman and the members of the committee for your interest in the Agency's progress in developing this important rule. This concludes my prepared statement.

I would be pleased to answer any questions that you may have.

RESPONSES BY WILLIAM WEHRUM TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. It's extremely important that small refiners can compete in the market alongside with the majors. That's why I made sure that the renewable fuel standard included a small refiner exemption.

I know of at least one small refiner that used to blend ethanol when they didn't have to because it made financial sense for them to but since the Energy bill exercised its exemption because of high prices. Mr. Wehrum, how many small refiners have opted against participating in the RFS and did they give a reason for their decision?

Response. EPAct provides small refineries with a temporary exemption from the renewable fuel standard requirements until 2011. However, small refineries may also waive the exemption and opt-in to the program. By opting-in to the program, these small refiners would be allowed to participate in the credit trading program just like the "obligated parties"—refiners, blenders, importers—who are subject to the renewable fuel standard. They would also be subject to the renewable fuel standard. Under the proposed RFS rule that the Agency announced on September 7, 2006, the small refineries would need to notify the Agency of their intention to waive the exemption and then register in the same way other obligated parties are required to do so. Because the RFS rulemaking is not final, no official registration process is currently in place to accommodate any official requests. Consequently, the Agency has no official count of how many small refiners may choose to waive the applicable exemption. However, based on preliminary discussions with the refining

industry representatives, we are expecting that most small refineries (of which there are currently about 42) will take advantage of the automatic exemption, since they will still be able to participate in the credit trading program if they blend renewable fuels into gasoline.

Question 2. How might the flexibility of the national RFS be impacted by various State biofuels mandates? Wouldn't you agree that State biofuels mandates required at various levels in various States effectively balkanize the fuel distribution and supply system and harm the flexibility of the RFS?

Response. The RFS program as proposed is designed to implement the provisions of the Energy Policy Act of 2005 (EPAct) at a national level and provide maximum flexibility for obligated parties to meet the national standards through the credit trading program. Obligated parties (refiners, importers and blenders) that market fuel in areas with State biofuel requirements will need to evaluate their overall product slate and account for the Federal and State requirements as part of their compliance strategy at both levels.

Because the Federal RFS program is not final, at this time it is difficult to determine exactly how these State programs will impact the overall flexibility of the Federal RFS program. However, during the legislative process leading to the Energy Policy Act of 2005, the Administration supported the Renewable Fuel Program with an important proviso: that the credit and trading program be included so as to allow flexibility and reduce costs. State mandates have the potential to limit this flexibility.

Question 3. Mr. Wehrum, as you know I strongly believe that Federal policies should increase domestic motor fuel supplies. My legislation, the Gas PRICE Act would streamline the permitting process for both oil and biofuel refineries. Similarly, several members of this committee sent Administrator Johnson a letter recommending that EPA reclassify fuel ethanol plants under the Clean Air Act so that they may be permitted faster. Is EPA going to grant the bipartisan request?

Response. We are currently considering the letters sent by members of Congress along with the public comments submitted on the March 9, 2006 proposed rule to reclassify ethanol plants under the Clean Air Act. We anticipate taking final action on the proposal in early 2007.

Question 4. Mr. Wehrum, as you know the RFS was crafted to provide flexible and efficient compliance across the country. Please provide the committee with a sense as to how that goal was maintained in the proposed rule.

Response. EPAct prescribed many aspects of the RFS program, including the minimum volume of renewable fuel to be used and the requirement to establish a credit trading program. The proposed RFS rule would establish a program that allows for all qualified renewable products to participate, including renewable ethanol made from corn and cellulosic biomass, biodiesel, and renewable diesel. It would also establish a mechanism to calculate credits for qualified renewable products based on energy content as compared to that of ethanol. Further, the credit trading program would afford refiners maximum flexibility by allowing obligated parties to meet the standards through the use of credits. The credit trading scheme as proposed would be an open market program allowing parties to sell or trade credits for compliance and bank up to 20 percent of the credits generated in one compliance year, for use in the next compliance year. Thus, renewable fuels could continue to be blended and consumed where it is most economical to do so.

The RFS proposal was developed through extensive coordination with the affected industry sectors, including renewable fuel producers, petroleum refiners, product distributors and marketers, and other critical parties. Where possible we utilized existing compliance mechanisms to reduce the record keeping and reporting burden on affected parties. We believe that these efforts helped to ensure that the proposed RFS program provides for flexible and efficient compliance.

Question 5. What are the renewable fuels that might qualify to receive credits under the September 7, 2006 draft Renewable Fuels Standard (RFS) preliminary rule and what "test" will be employed to determine whether a future fuel might qualify? The Energy Policy Act amended Section 211 of the Clean Air Act to define a renewable fuel as follows:

(i) IN GENERAL.—The term 'renewable fuel' means motor vehicle fuel that—

(I)(aa) is produced from grain, starch, oilseeds, vegetable, animal, or fish materials including fats, greases, and oils, sugarcane, sugar beets, sugar components, tobacco, potatoes, or other biomass; or

(bb) is natural gas produced from a biogas source, including a landfill, sewage waste treatment plant, feedlot, or other place where decaying organic material is found; and

(II) is used to replace or reduce the quantity of fossil fuel present in a fuel mixture used to operate a motor vehicle.

By this definition, would diesel fuels derived from coal or by the Fischer-Tropsch process from non-biogas methane qualify? A slide included in an EPA OTAC presentation earlier this year to illustrate the Agency's "non-exclusion principle" included both of these fuels as "potentially qualifying" for credits. Likewise, would MTBE from a landfill gas source potentially qualify? How would the fossil fuel use associated with ethanol production influence the interpretation of subsection (II) if findings such as those advanced by Dr. David Pimintel at Cornell University are found to be true?

Response. The RFS proposal is designed to have the flexibility to cover the range of renewable fuels produced today as well as any that might be produced in the future, so long as they meet the Act's definition of renewable fuel and have been registered and approved for use in motor vehicles. We believe that the proposed program, if finalized, would provide a significant amount of encouragement for the development, production, and use of renewable fuels to reduce our dependence on petroleum. In general, renewable fuels must be produced from plant or animal products or wastes, as opposed to fossil fuel sources. Valid renewable fuels would include ethanol made from starch seeds, sugar, or cellulosic materials, biodiesel (monoalkyl esters), non-ester renewable diesel, and a variety of other products. Both renewable fuels blended into conventional gasoline or diesel and those used in their neat (unblended) form as motor vehicle fuel would qualify. The proposal provides further details on the renewable fuels that would be allowable under the proposed standard.

You also inquired about whether diesel fuels derived from coal or by the Fischer-Tropsch process from non-biogas methane qualify as a renewable fuel. Any diesel fuel derived by the Fischer-Tropsch process or any other process would qualify only if the feedstocks utilized to make the fuel were renewable. Further, you inquired whether MTBE from a landfill gas source potentially qualifies as a renewable fuel. Based on the interpretation set forth in the proposal, this indeed could qualify as a renewable fuel. However, since the production of MTBE involves the combination of renewable methane with nonrenewable isobutylene, a gallon of MTBE would not qualify as a full gallon of renewable fuel under our proposal. Instead, it would qualify as 0.3 gallons.

Finally, you asked how the fossil fuel use associated with ethanol production would influence the interpretation of subsection (II) if findings such as those advanced by Dr. David Pimintel at Cornell University are found to be true. In such a case, neither our definition of renewable fuels nor the number of credits we attribute to any particular renewable fuel would be affected. It is important to note that Section 211(o)(1)(C)(i) (II) is directed at the fuel mixture itself, and whether the fuel itself is from fossil fuel sources. It does not address the use of fossil fuel in the production process, such as the use of fossil fuel to produce thermal energy used in the production process. Dr. Pimentel's concerns about ethanol production would only potentially impact our treatment of ethanol if we were basing credit values on lifecycle analyses that take into account such things as the production process. Although we seek comment on basing credits on lifecycle performance, our proposal only uses the energy content of the fuel itself in comparison to ethanol to establish credit values.

RESPONSES BY WILLIAM WEHRUM TO ADDITIONAL QUESTIONS FROM SENATOR LAUTENBERG

Question 1. In your testimony, you indicated that EPA did not intend to act upon California's request for a waiver to allow its limits on greenhouse gas emissions from cars to take effect, prior to the Supreme Court's decision in the Massachusetts v. EPA case it is hearing this term.

Will the Administration similarly wait for the Supreme Court's decision in the Duke Power case to issue its final emissions increase rule affecting the New Source Review program? If not, why not?

Response. The primary legal issue in the proposed rulemaking concerning the Emissions Test for Electric Generating Units (70 FR 61081, October 20, 2005), the Agency's authority to adopt an hourly emissions rate test, is not squarely before the Court in Duke. Accordingly, the agency does not believe that the timing of the Duke decision should affect the schedule for that rule.

Question 2. If EPA's New Source Review proposal to measure hourly allowable emissions instead of actual annual emissions had been in place 10 years ago, how many of the existing enforcement cases against power plants could have been brought?

Response. The NSR reform rules plainly and expressly state that they are to be applied to changes that post-date the rules' respective effective dates and thus do not have any impact on the existing enforcement cases. EPA intends to continue to vigorously pursue the existing enforcement cases and other matters in negotiations.

Question 3. Could you outline the relative amount of greenhouse gas tailpipe emissions that would result from using "cellulosic" ethanol, as compared to "coal-to-liquids" fuels?

Response. The combustion of biomass-based fuels, such as ethanol from cellulosic feedstock, generates CO_2. However, the emissions released in combustion do not measure the greenhouse gas impacts of different fuel types. For example, CO_2 emitted from biomass-based fuels combustion would not increase long-term atmospheric CO_2 concentrations since the biogenic carbon emitted is fully offset by the uptake of CO_2 resulting from the growth of new biomass. However, different biomass fuels have different embedded levels of fossil fuels used in their production. Consequently a "fullfuel-cycle" analysis is required to estimate the greenhouse gas emissions of different fuel types.

Coal-to-liquid (CTL) fuels are similar to petroleum based fuels in that the CO_2 emitted during combustion of the fuel is of fossil origin. In addition, when the full-fuel-cycle emissions are taken into account, some analysts have found that CTL fuels would have greater greenhouse gas emissions than petroleum fuels (although this difference can be substantially reduced if carbon capture and storage technologies were used in the CTL process).

To sum up, considering full-fuel-cycle emissions, the use of cellulosic ethanol would result in significantly less greenhouse gas emissions as compared to the use of grain ethanol, gasoline or CTL fuels.

RESPONSES BY WILLIAM WEHRUM TO ADDITIONAL QUESTIONS FROM SENATOR JEFFORDS

Question 1. In your written testimony, you describe the challenges EPA faced in developing the RFS rule it proposed on September 7, 2006. I want to better understand the relationship between those challenges and the length of time it took EPA to put this proposed rule together. What was the most challenging part of the rule, and how long did it take to resolve it?

Response. Regulatory actions of this magnitude and complexity often take multiple years to develop and implement. Prior to embarking on the development of the comprehensive proposal that was just announced on September 7, 2006, EPA had to develop and promulgate a default rule to implement EPAct's provisions for the 2006 RFS standard. Concurrently, EPA was also initiating efforts for developing the comprehensive RFS proposal. Development of the comprehensive program required establishing a credit trading program. This program went beyond the involvement of traditional responsible parties (refiners, importers and blenders). The renewable fuel producers are now a critical component of the supply system because use of their products is now required for compliance with the RFS. Developing a system that was workable for the renewable fuel producers and that provides maximum flexibility and minimal impact in establishing the RFS was the most challenging aspect of the rule development process.

The RFS proposal was developed through extensive coordination with the affected industry sectors, including renewable fuel producers, petroleum refiners, product distributors and marketers, and other critical parties. Understanding the transactions between these sectors, how they will change, how to monitor them and how to design a flexible and effective credit trading program allowing for all potentially qualifying renewable products to participate was very complicated. We also utilized existing compliance mechanisms and business practices when possible to reduce the record keeping and reporting burden on affected parties. As a direct result of these efforts, we believe we have broad support for the RFS program as proposed

Question 2. Have you estimated the effects of the rule you are proposing tomorrow on the supply of Clean Air Act compliant motor fuels?

Response. As part of the analysis of the impacts of the proposal, we evaluated the impacts on supply of motor vehicle fuels from increased renewable fuel use. We conducted an initial assessment of the changes refiners would need to make in order to blend additional ethanol into their gasoline, including the removal of MTBE and its replacement with alkylate and ethanol and the removal of butane to maintain the appropriate RVP of the fuel blend. We then estimated the net impact on gasoline production which resulted from all these changes and determined that there would be a net savings of gasoline produced from crude oil of 1.3 to 2.7 percent de-

pending on the volume of ethanol use assumed in the calculation. This analysis does not account for all the impacts, however, due to the petroleum used in growing and transporting ethanol. Therefore we also used the GREET (Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation) Model developed by Argonne National Laboratory to estimate the lifecycle petroleum impacts. This analysis resulted in an estimated 1.0 to 1.6 percent decrease in all petroleum use in the entire transportation sector, again, depending on the volume of ethanol used.

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

Mr. Chairman and members of the committee, I appreciate the opportunity to testify today on biofuels. To paraphrase President Bush in his State of the Union address this year, reducing America's dependence on oil is an imperative for our time, and the need for a diverse supply of domestic energy sources has never been greater. Biofuels are among the most promising near-term replacements for liquid transportation fuels since they offer a renewable, essentially carbon-neutral energy source that can help to meet a portion of our transportation fuel needs with domestic production. If growth in the use of biofuels outpaces our Nation's increasing demand for liquid transportation fuels, we can reduce our dependence on foreign oil. In addition to increasing our energy security, the production of biofuels can contribute to the domestic economy, especially rural communities.

Biofuels play a significant role in the President's Advanced Energy Initiative, a broad program designed to change the way we power our homes, businesses, and vehicles by developing cleaner, more affordable, and more reliable domestic alternative energy sources and technologies. I would like to give you an overview of the Department of Energy's (DOE) programs in biofuels, specifically research into ethanol and cellulosic ethanol.

Ethanol is now sold across the U.S. with plants expanding to States outside the traditional corn-growing areas. As of May 2006, 101 ethanol plants were producing nearly 4 billion gallons of ethanol with the capacity to produce 4.8 billion gallons. Based on information from the Renewable Fuels Association, by 2008, we expect this capacity to increase 45 percent with the addition of 42 new plants and the expansion of seven existing plants. Almost all the ethanol produced at these plants is derived from corn and other starch-based feedstocks.

To put U.S. ethanol use—and the extent of our oil dependence—in perspective, the amount of ethanol produced in 2005, approximately 4 billion gallons, represents less than three percent of liquid highway transportation fuel use. By contrast, one reason Brazil is able to meet 20 percent of its liquid transportation fuel needs with ethanol is because Brazil uses approximately 1/20th (5 percent) of the amount of liquid transportation fuels used in the U.S. Brazil uses a sugar cane feedstock, whereas U.S. ethanol is largely derived from corn. Given land area required for corn production and growing U.S. demand for transportation fuel demand, we estimate that the maximum amount of corn ethanol that the U.S. could produce on a sustainable basis is approximately 18 billion gallons, or about 13 percent of current transportation fuel use (by National Corn Growers Association estimates). Clearly, producing ethanol cost competitively from other feedstocks is essential to helping reduce our dependence on oil.

CELLULOSIC ETHANOL

While ethanol made from corn is an important blend agent for gasoline, corn represents only a small fraction of biomass feedstock that can be used to make ethanol. Ethanol can also be produced from cellulose, the main component of plant cell walls and the most common form of biomass. Cellulosic biomass has the potential to provide a clean, abundant, domestic, renewable resource that can make a major near-term contribution to increasing supplies of liquid transportation fuel.

The Biofuels Initiative, a key component of the President's Advanced Energy Initiative (AEI), seeks to accelerate research and development (R&D) to make cellulosic ethanol commercially competitive by 2012 and help reduce the Nation's dependence on foreign oil. In order to meet these goals, the Department developed targets to help guide its efforts. The Office of Energy Efficiency and Renewable Energy (EERE) established a near-term energy cost goal of $1.07/gallon of cellulosic ethanol by 2012.

Many materials currently regarded as wastes such as corn stalks, straw, and wood chips could be converted to ethanol along with dedicated energy crops, including a number of fast-growing trees and grasses. While chemically identical to ethanol produced from corn, cellulosic ethanol exhibits a net energy balance that may

be as much as three times higher than corn ethanol. In addition, because energy crops reabsorb carbon dioxide that is emitted when they are combusted, the use of biofuels sets up a cycle that leaves a low net level of greenhouse gas emissions in the atmosphere.[1]

However, while making ethanol from cellulose would dramatically expand the types and amount of available biomass feedstock that can be used to make ethanol, it is more technically difficult—and consequently far more expensive—than producing ethanol from corn. In order to expand the available resource base for fermented sugars and lower the cost of inputs, the Department's research is concentrating on developing cost-effective means to use non-starch, non-food-related biomass such as trees, grasses, and waste materials as fuel feedstocks. The goal is to find production methods that will enable us to convert ordinary low-value plant materials such as corn stalks, sawdust, or waste paper into fuel ethanol, and to do so cost-effectively and on a large industrial scale.

EERE'S BIOMASS R&D

EERE's research is focused on three areas: feedstock infrastructure, platforms R&D, and utilization of platforms outputs. Feedstock activities are directed toward reducing the cost of collecting and preparing raw biomass, and for the sustainable production and delivery of future energy crops. EERE's efforts in this area aim to ensure the availability of cost-competitive, sustainable feedstocks by 2012.

A joint U.S. Department of Agriculture (USDA)/DOE study of 2005, the so-called "Billion Ton Study", indicates that there are enough agricultural and forestland resources in the U.S. to sustainably produce up to 1.3 billion tons of biomass feedstocks by 2030. This would be enough feedstock to potentially produce at least 60 billion gallons of ethanol. We stress that this is a resource potential study, not an economic study for the future. The study assumes that the new feedstock infrastructure includes the collection and use of agricultural and forest residues as well as the growth by U.S. farmers of dedicated energy crops. Different regions could potentially support different feedstock crops—for example, switchgrass in the South Central region and willow in the Northeast.

Our activities relating to Platforms R&D focus on reducing the cost, and increasing the quality, of outputs from biochemical and thermochemical conversion processes. These processes produce intermediates such as sugars and syngas, which are then used to produce fuels, value-added chemicals and materials, and heat and power. Thermochemical R&D focuses on gasification and pyrolysis technology, while biochemical R&D centers on further improving enzymatic and pretreatment processes, integrating these two steps in the conversion process and reducing the cost of sugar. These activities will help develop technologies to be used in producing cellulosic ethanol at a competitive price.

Finally, the program's strategy is to integrate these technologies and processes into operating biorefineries. DOE recently issued the Commercial Demonstration of an Integrated Biorefinery System Solicitation, which was authorized under section 932 of the Energy Policy Act of 2005 (EPACT). This solicitation was designed to develop industrial-scale demonstration of an integrated biorefinery system using a wide variety of lignocellulosic feedstocks such as trees, switchgrass and corn stover, including the collection and treatment of the feedstock. The aim of the biorefinery demonstration program is to show that such a facility could be operated profitably without Federal subsidies, once initial construction costs are paid, and easily replicated. The Department plans to select the best proposals and begin funding projects with Fiscal Year 2007 appropriations.

WORKING WITH THE PRIVATE SECTOR

To obtain key industry and academia stakeholder input for successful strategies to develop biofuels, EERE's Biomass Program last month held a "30x'30" workshop. The "30x'30" refers to the theoretical potential of replacing 30 percent of current U.S. gasoline consumption with ethanol, or producing about 60 billion gallons of ethanol by the year 2030. Over 130 experts from agriculture, automotive, fuels, chemicals, and other related industries came together to map out R&D and policy strategies for achieving the Biomass program's 2012 cellulosic ethanol cost goal and to consider pathways to maximize biomass use by 2030. The results will be integrated into a planning tool with input from other Federal agencies involved in biomass

[1]Wang, M.Q., 2002, "Impacts of Greenhouse Gas Emissions of Using Alternative Transportation Fuels with Advanced Vehicle Technologies, in Global Climate Change and Transportation: Coming to Terms", pp.65-77, Eno Transportation Foundation, Washington, DC.

R&D, describing the technical and infrastructure challenges that would need to be overcome and to map out each agency's role in addressing them.

OTHER MULTI-AGENCY FEDERAL INITIATIVES

To this end, EERE's Biomass Program co-chairs with USDA a multi-agency initiative. This initiative accelerates DOE's Biomass Program R&D activities, as well as some of DOE's Office of Science and USDA's bioenergy-related R&D, in accordance with the Biomass Research and Development Act of 2000. As part of this effort, DOE and USDA have an annual joint solicitation for the Biomass Grant Program addressing research, development, and demonstration of biomass-based products, bioenergy, biofuels, and related processes. EERE's Biomass Office is undertaking an effort to coordinate bioenergyrelated R&D at Federal agencies. The 30x30 workshop mentioned earlier was one of the initial coordinating efforts. EERE is holding planning meetings with other agencies, and regional workshops are being held to gather input from area experts in feedstocks, processing and conversion, production uses and distribution, and public policy. Additionally, the Renewable Fuels Standard and the Biofuels Initiative goals are being incorporated, consolidating an integrated and collaborative approach that will help us to achieve our national energy goals.

To continue to build on the President's vision laid out in the AEI, DOE and USDA will co-host a national renewable energy conference to help create partnerships and strategies necessary to accelerate commercialization of renewable energy industries and distribution systems. The conference, Advancing Renewable Energy: An American Rural Renaissance, is scheduled for October 10-12 in St. Louis. The goal of the conference is to identify major impediments and critical pathways to get more domestically grown, renewable energy sources out of the laboratory and into the market as soon as possible.

Consistent quality standards for biofuels, such as those that might be developed through the American Society for Testing and Materials (ASTM International) will enhance consumer acceptance and market penetration. DOE is interested in working with others in government and the private sector to accomplish this.

INCREASING DEMAND AND PRODUCTION

Before I conclude, I would also like to mention the role that increased demand for ethanol will have on increasing ethanol production. The Renewable Fuels Standard (RFS), for example, has established a baseline for the use of renewable fuels. Authorized by EPACT, the RFS requires that four billion gallons of renewable fuels be blended with gasoline by 2006, growing to 7.5 billion gallons by 2012 (with proportional growth beyond 2012). Additionally, the RFS calls for a minimum of 250 million gallons of ethanol to be derived from cellulosic biomass sources by 2013. These EPACT requirements provide a long-term commitment to farmers, renewable fuel producers, refiners and motorists that biofuels use will not be a temporary response to volatile oil prices and tight markets that can disappear as quickly as they appeared and consequently provide some measure of market stability to an emerging industry. The Administration supported these EPACT requirements.

CONCLUSION

I would like to end by emphasizing that biomass is an important domestic renewable energy resource that can help lead our Nation to greater energy independence. The Department is working diligently to meet the President's goals for 2012 and beyond, fostering biofuels technologies with a balanced, yet focused program of research, development, and deployment. We will continue to work with our partners in the academic community, at our National Labs, at other Federal agencies, and in private industry, putting our research dollars in the most promising areas to address critical technical barriers. With clear goals and strategies to achieve them, we believe that greater quantities of cost-competitive liquid biofuels are already in sight.

Thank you. I would be pleased to respond to any questions the committee may have.

RESPONSES BY ALEXANDER KARSNER TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. According to Dr. Collin's testomony, high natual gas prices have increased ethanol production costs 10 to 15 cents per gallon. Do you agree that if the goal is to reduce reliance on foreign countries and reduce prices for American families, then we must increase domestic gas production?

Response. The Department of Energy agrees that increased domestic gas production is an important element in a deverse domestic energy mix. In addition, we are working closely with the ethanol production industry to reduce the amount of fossil fuel inputs, including natural gas. Our ethanol R&D will utilize new cellulosic feedstocks that can eliminate the need for natural gas consumption in the ethanol production process.

Question 2. Mr. Karsner, it is my understanding that the relative high cost of feedstock is one of the factors holding back cellulosic ethanol production. How important is bioenergy crop research, like projects by the Noble Foundation and Ceres, Inc. to reduce these costs by increasing crop yields?

Response. Reducing the cost of feedstocks in important for cellulosic ethanol production and work undertaken by private industry is important to enavle cost-competitive and sustainable feedstock supplies to enter the marketplace. The Department's Office of Science recently released a solucitation for two Bioenergy Research Centers to support genomic research for the production of bio-based energy fuels such as cellulosic ethanol. Potential advances include the lowering of feedstock costs through the development of enzymes to take adcantage of the wide variety of feedstocks that can be converted to ethanol in different regions of the Country.

The Department has requested funding in FY 2007 to implement the concept of regional feedstock development partnerships to take advantage of this variety. Partnerships are needed because of the complexity of feedstock issues that incude basic and applied science to develop the feedstock resources; infrastructure feedstock needs for biorefineries including reliability, availability, and cost; and sustainability issues as they pertain to resource development. Partnership efforts will bring together Federal funding, the biofuels production industry, the grower community, and university researchers to better define the actual resource on a regional and local basis.

Question 3. Witnesses have acknowledged that even with Federal and State subsidies ethanol is economic only when oil is pricedhigh. What is the ecomomic cost comparison between leasing out areas of Fedeal waters that are out of sight, beyon the reach of coastal currents to the shore and likely to contain plentiful reserves of high quality oil in return for royalty payments and bid bonuses, as compared to direct subsidies to refiners blenders of ethanol and Federal and State subsidies to agriculture interests? What is the lifting cost of a marginal barrel of oil fron the Outer Continental Shelf?

Response. According to the Energy Information Agency (EIA), the latest data available (2004) for the averagelifting costs per barrel of oil in the ourter shelf was $4.25 per barrel of oil equivalent.

The Department of Energy has not conducted a formal cost comparison between leasing in Federal waters and supporting the development of a domestic ethanol industry. However, the Administration views the potential for expanding domestic oil supplies and diversifying the Nation's transportation fuel mix as complementary activities for the diversification of the domestic energy supply and in reducing America's vulnerability to oil supply disruptions. the Advanced Energy Initiative (AEI) proposed accelerating development of efficient hybrid and clean diesel vehicles, domestic renewable alternatives to gasoline and diesel fuels, and advanced battery and hydrogen fuel-cell technologies.

Question 4. Some ethanol proponents hold up flex fuel vehicles and E-85 as the answer to reducing the price of fuel even though it has less energy per gallon than gasoline. Consumer Reports recently concluded in an article titled "The Ethanol Myth"that E-85 will cost consumers more money than gasoline in August, a 27 percent fuel-economy penalty means drivers would have paid an average of $3.99 for the energy equivalent of a gallon of gasoline. First, please briefly comment on those finding and second, considering that families want lower fuel prices, do you believe that the focus on E-85 is misplaced?

Response. Consumer Reports has researched some of the issues surrounding use of ethanol as a transportation fuel. DOE believs that ethanol is a reality, not a myth and does not concur with the premise of the article. Ethanol supplied 4 billion gallons of transportation fuel last year and production is growing more rapidly than ever befor which should ensure that the volumetric requirement of the Renewable Fuels Standard goal of 7.5 billion gallons of renewable transportation fuel be used by 2012 is met or exceeded. Ethanol is only one of several policies and technologies the DOE is promoting to reduce transportation petroleum use such as hybrid vehicles, more efficient engines, light-weight materials, cleandiesel engines and other alternative fuels and renewable fuels such as biodiesel. All these things together will help our Nation reduce its demand for petroleum fuel in the transportation sector with its commensurate benefits to the ecomomy and our national security.

As the article points out, ethanol made from cellulosic sources (e.g., corn stalks for example instead of the corn itself) has environmental, economic, and energy benefits. Ethanol made from cellulosic sources requires less energy to make, generates lower emissions (both reactive and greenhouse gas) and is projected to be cost competitive with ethanol made from corn or similar crops. In addition, ethanol from cellulose would be just one of several valuable products such as plastics and chemicals made from "bio-refineries," and most of the cellulosic resources do not compete with production of crops in terms of land use. Under the Advanced Energy Initiative, DOE is expanding research, development, and demonstration to make cellulosic ethanol cost effective by 2012.

Futhermore, our analysis indicates that current variability of E-85 cost structure does not reflect what a more mature langer-term cost structure is likely to be. Currently, almost all ethanol is priced as a blending component to replace methyl tertiary butyl ether in the marketplace. There are alreadu early signals that for E-85, the price structure will change as E-85 production volumes increase even for ethanol produced from corn. For example, in Minnesota, one of the leading E-85 States, a recent monthly survey found that the average price of E-85 was selling at 49 cents per gallon less than "87" octane gasoline, a 16 percent difference. Similar examples elsewhere in the Nation show that producers are offering ethanol at prices that deliver value to the consumer and expand consumer choices for fuels. With the tremendous potential that E-85 has a bulk transportation fuel, the Department believes that it is worth continued support.

RESPONSES BY ALEXANDER KARSNER TO ADDITIONAL QUESTIONS FROM SENATOR JEFFORDS

Question 1. Generally, it seems that DOE is more interested in the loan guarantee provisions of the Energy Policy Act of 2005 when it comes to developing ehtanol generally, and particularly, in developing cellulsic ethanol. In your discussions with ethanol producers, is there a preference for loan guarantees rather than grants?

Response. Projected developers have expressed significant interest in both Sections 932 and the Title XVII provision incentives of the Energy Policy Act of 2005

The grants under Section 932, paid for by the Federal Government, provide 40 percent of the total project costs. With such a commitment, they can usually leverage additional financings from lenders on generally faverable terms and conditions to cover the remaining 60 percent. If they do obtain a loan for the remainder of the costs, then, at the end of the day, the project sponser pays virtually nothing to build a cellulosic ethanol refinery and divides the revenues from the sale of the refinery products to paying the debt to the lenders and paying themselves a dividend.

Under the loan guarantee, the project sponsors must commit their own money to paying for a significant portion of the project costs in addition to the administrative costs and a Cost Subsidy fee. Assuming the project runs smoothly, the Federal Government never pays any money at all. The project operates under normal commercial conditions and its success virtually assures that similar projects can be financed and sustained without additional Federal incentives.

It is too early to draw definitive conclusions regarding producer preferences, although it is fair to say that some producers prefer the less constrained nature of grants (on a case by case basisi).

Question 2. I am also interested in the promotion of energy efficiency, in addition to the development of renewable fuels. I have been extremely concerned about efficiency programs, and particularly with the pace of new appliance and efficiency standards at DOE. For example, DOE and EPA have not yet proposed new Energy Star labling for on-demand hot water heaters, yet they have tremendous efficiency. What is DOE doing to accelerate the development of new efficiency standards?

Response. On January 31, DOE submitted to Congress ahead of schedule an EPACT05 required report detailing the reasons for pat delaysand the Department's plan for expeditiously prescribing new and amended standards. The Department's plan considers both the backlog and meeting the additional EPACT 2005 statutory requirements, have been instituted. Productivity improvements in the rulemaking program are taking effect and will significantly increase the number of new standards to be issued. In Fiscal Year 2006, the program has already initiated five new rulemakings while continuing work on two others scheduled to be completed in Fiscal Year 2007.

With respect to ENERGY STAR labling for on-demand hat water heaters, DOE is strongly committed to implementing an ENERGY STAR labling program for advanced technology residential water heaters. We are completing our technical and market analysis and expect to hold a stakeholder meeting in December, 2006. Cri-

teria will be announced in late spring 2007. The program is anticipated to include all advanced technologies such as on-demand or instantaneous whole-house gas water heater, heat pump water heaters, gas condensing water heaters, and solar water heaters.

STATEMENT OF DR. KEITH COLLINS CHIEF ECONOMIST UNITED STATES DEPARTMENT OF AGRICULTURE

Mr. Chairman, thank you for the invitation to discuss the implications of the growing biofuels industry on American agriculture. Since the energy crisis of the 1970s, developing new energy sources from agricultural materials has been viewed as a way to expand the domestic energy supply and help lessen our dependence on imported oil. My comments today address recent growth in biofuels, the prospects for future growth, and the current and future implications of that growth for the U.S. agricultural economy.

ETHANOL MARKET PRODUCTION AND CORN USE

In 2000, 1.6 billion gallons of ethanol were produced in the United States. By 2005, 4 billion gallons of ethanol were produced, a 150-percent increase in 5 years. In 2006, nearly 5 billion gallons of ethanol are expected to be produced, a 1 year increase of 20 percent. Today, over 100 ethanol plants operate in 20 States. The Renewable Fuels Association reports 42 ethanol plants are under construction and another 7 are expanding. When that construction and expansion is completed, ethanol capacity in the United States will be 7.7 billion gallons per year.

Despite the rapid growth in U.S. ethanol production, the 4 billion gallons produced in 2005 was equal only to about 3 percent of the 140 billion gallons of motor gasoline used. However, ethanol's economic importance to agriculture is quite significant. In 2000, about 6 percent of U.S. corn production was used to produce ethanol. About 14 percent of the 2005 U.S. corn crop is estimated to have been used for ethanol, and USDA projects nearly 20 percent of the 2006 U.S. corn crop will be converted into ethanol. For the first time, in the 2006/07 corn marketing year, corn used in ethanol is expected to equal to the amount of corn exported. This rapid increase in the share of corn production used in ethanol highlights two key issues: (1) as more corn supplies ethanol plants, rising corn prices and increased corn acreage will have implications for other agricultural commodity markets and (2) because the supply of corn is relatively small compared with U.S. gasoline demand, other domestic sources of renewable and alternative energy must be developed to replace petroleum-based fuels if the United States is to reduce its dependence on imported oil.

A number of factors have contributed to the rapid increase in ethanol production, including the 51 cent per gallon tax credit provided to blenders, high crude oil and gasoline prices, low corn prices, the Renewable Fuels Standard (RFS) under the Energy Policy Act of 2005, and the sharp reduction in use of ethanol's main oxygenate competitor, methyl tertiary butyl ether (MTBE).

ETHANOL PRODUCTION COST

Another factor supporting ethanol expansion has been generally improving production economics. Ethanol production costs declined between 1980 and 1998. Technology improved over this period leading to: (1) a higher yield of ethanol per bushel of corn, (2) a lower cost of enzymes required for conversion, and (3) production automation which lowered labor costs. Energy input costs also fell over this period. Department of Agriculture (USDA) surveys indicate that between 1998 and 2002 the average cost of producing ethanol (excluding capital costs and a rate of return on investment) remained unchanged at about 95 cents per gallon. Since 2002, the cost of producing ethanol has increased by 10 to 15 cents per gallon due to the increased cost of energy (electricity and natural gas). Hence, USDA estimates that the current average cost of corn-based ethanol production is about $1.10 per gallon.

ETHANOL COPRODUCT ANIMAL FEEDS

An issue that has gained attention as ethanol production has expanded is the implication for animal feed supplies, which is the primary use of corn. When corn is used for ethanol, it is diverted from animal feed and other uses such as exports. However, different forms of animal feeds are produced as ethanol coproducts. The primary feed from dry-mill ethanol plants, which account for most of the new plants, is distillers dried grains with solubles (DDGS). About 17 pounds of DDGS are produced per bushel of corn used for ethanol. Distillers grains are sold one of three

ways: DDGS with 13 percent moisture, wet distillers grains (WDG) with 67 percent moisture, or modified distillers grains with 50 percent moisture. Generally, animal nutritionists recommend a maximum of 25 percent DDGS for dairy feed rations on a dry matter basis and 40 percent DDGS for fed cattle. Monogastric poultry and hog rations can include up to 5-15 percent DDGS and are limited because of the high fiber content of DDGS.

DDGS can be used in livestock feed rations as a supply of both energy and protein. About one-third of the corn used in the production of ethanol is available as a feed in the form of coproducts feeds from dry mill ethanol plants. While these coproduct feeds can offset some of the feed supply going into ethanol production, there are some limitations on the ability to effectively use the available coproduct feeds. For example, some producers have indicated feeding at the upper end or more of the ranges indicated above can reduce product quality. In addition, some producers have been concerned with the variable quality of the coproduct feeds, and not all of the coproduct feeds make it into the U.S. animal feed supply due to drying, handling, and shipping costs.

ETHANOL'S LONGER TERM PROSPECTS AND IMPLICATIONS FOR U.S. AGRICULTURE

Industry analysts suggest that there may be another 60 or more ethanol plants under different stages of planning, and these plants are in addition to those currently under, or approved for, construction. The expectation is that production capacity could rise well above the current 7.7 billion gallon level of plants that are now operating or are under expansion or construction. New facilities under construction or in development tend to be large, with production capacity in the range of 50 to 100 million gallons per year. Ethanol production capacity could increase to 8.5 billion gallons by 2008-9 and more than 10 billion gallons by 2010 if many of the planned plants are built. Some suggest ethanol production could be well above 10 billion gallons. This prospect raises two issues: is such a production capacity likely, and if so, what would it mean for U.S. agriculture?

While many investments in biofuel production are planned, there are risks in the outlook that could slow or prevent continued rapid expansion. The major uncertainty is how the ethanol market will evolve over time if production of ethanol stays above the levels mandated by the RFS. There is no requirement for ethanol use to rise above 7.5 billion gallons per year at this time, and for use to exceed 7.5 billion gallons, ethanol must be competitive with gasoline in the marketplace. A combination of declining gasoline prices, sharply rising corn prices, or a decline in the price premium ethanol has had relative to gasoline could curtail the expansion in ethanol production. Let's evaluate these factors.

GASOLINE AND ETHANOL PRICES

The surge in oil prices has made biofuels much more cost competitive with gasoline, helping to spur new investment. Ethanol and biodiesel production will continue to expand as long as world petroleum prices and ethanol prices remain high. World oil prices have increased sharply since 1999, from an annual average nominal price for West Texas Intermediate (WTI) crude oil of $19.25 per barrel to over $41 per barrel in 2004 and an expected $70.29 per barrel in 2006 (Energy Information Administration's (EIA) short-term projection). EIA expects the price of crude oil to remain at about that level in 2007.

Higher crude oil prices have translated into higher wholesale and retail prices for gasoline and diesel fuel. EIA estimates that the average retail price for gasoline rose from $1.85 per gallon in 2004 to a forecast $2.72 per gallon in 2006. The wholesale, or rack, price of ethanol has generally traded at a premium to wholesale gasoline prices, in the range of 35 to 50 cents a gallon prior to the past year. With the recent increase in gasoline prices and the price premium on ethanol over gasoline rising to about $1.00 a gallon this year, the ethanol rack, or wholesale, price reached the mid-$3.00 per gallon range earlier this year, making corn-based ethanol very profitable.

Looking to the future, Chicago Board of Trade futures prices for ethanol in late August have been about $2.20 per gallon for December 2006 delivery and December 2007 delivery. While these prices indicate a drop from this summer's prices and a reduction of the premium on ethanol over gasoline, they suggest continued strong and profitable prices at the ethanol plant level.

Further, if the world price of crude oil remains higher than $50 (in 2005 dollars) per barrel in the future, as projected by EIA, and corn prices do not rise considerably, then ethanol would be used as a gasoline extender, because ethanol would be competitive with gasoline and demand for ethanol would readily exceed the minimum levels in the RFS. Below about $30 per barrel for crude oil, there would no

incentive to produce corn ethanol beyond the RFS, because ethanol would be unprofitable to produce and market as a fuel extender.

CORN PRICES

While the prospective gasoline and ethanol prices suggest a strong continued incentive to expand ethanol production, rising corn prices could reduce the profitability of corn ethanol and slow the expansion in ethanol production. Corn costs are the primary input cost in corn ethanol production. This summer the net feedstock cost of corn to ethanol plants, which is the cost of corn minus the value of the coproducts, has been about 50 to 60 cents per gallon of ethanol while the ethanol rack price has been in the range of $3.50 per gallon. During the past decade, the net cost of corn peaked during the summer of 1996 when it reached about $1.50 per bushel, about the same as the rack price of ethanol. The high corn price caused many ethanol plants to shut down that summer. With ethanol rack prices above $3.00 per gallon, ethanol plants can pay high prices for corn and remain profitable and in operation. We used a financial model for a 45-million-gallon-per-year dry mill ethanol plant to estimate how high corn prices could go and plants still cover operating costs (excluding any return on invested capital). With ethanol prices at the plant of $2.25 per gallon, a dry mill plant could pay up to about $5.00 per bushel of corn and cover operating costs. The all-time record-high season-average corn price is $3.24 per bushel in 1995/96, and corn prices have exceeded $3 per bushel in only 3 other years. This analysis suggests with continued strong gasoline and ethanol prices over the next several years, corn prices will not discourage ethanol expansion unless corn prices increase to well beyond previous record-high levels. Another implication is that ethanol plants will likely be able to bid corn away from other users over a wide range of corn prices.

AGRICULTURAL MARKET AND PROGRAM IMPACTS OF EXPANDED ETHANOL PRODUCTION

USDA released long-term projections of agricultural markets last February that indicated the general effects of increased ethanol production on agriculture. At that time, USDA projected corn ethanol production at about 7.5 billion gallons during the 2012/13 crop year. At that level, 2.75 billion bushels of corn would be used for ethanol, compared with 2.15 billion expected in 2006/07. As a result of the increase in ethanol demand for corn, the analysis indicated that corn acreage planted would rise to 85 million acres in 2012, up from 81.8 million in 2005 and 79.4 million in 2006. Corn prices would increase to $2.60 per bushel compared with $1.99 in 2005/06 and an expected $2.35 in 2006/07. U.S. corn feed use is projected to decline slightly and corn exports to rise slightly to 2.2 billion bushels in 2012/13, which would be well below corn use for ethanol. The increases in corn acreage and yield, which rises from 148 bushels per harvested acre in 2005 to 158.5 bushels per acre in 2012/13, are sufficient to meet the rising ethanol and export demand. Soybean acreage declines from current levels, as some land shifts to corn production; soybean meal faces greater competition from corn ethanol coproduct feeds; and soybean exports decline from current estimates for 2006/07 as competition from Brazil and Argentina increases. These opposing forces result in soybean prices rising slightly through 2012/13 driven by acreage declines and the increase in soybean oil demand. Livestock profitability declines under higher corn feeding costs, but beef prices still decline due to the secular expansion of the cattle cycle that is just now beginning. Hog and broiler prices generally remain at the levels of the past couple of years.

The USDA analysis depicts a farm sector that adjusts fairly readily to higher corn demand as crop prices are generally bid up with acreage shifts to corn. The livestock sector faces higher feed costs and incurs modest and manageable adjustment.

While this analysis is comforting, it is out of date, as ethanol production appears to be on a path to exceed USDA's long-term projections released last winter. USDA will release a new analysis this winter. In the meantime, based on the discussion to this point, we can draw a series of conclusions about the ability of agricultural markets to adjust to rapid increases in biofuel production:

1) Ethanol production is exceeding most analysts' expectations, including USDA projections. The 7.5 billion gallons of ethanol production previously forecast by 2012/2013 was mainly driven by the RFS. With expected market incentives, ethanol production may reach 7.5 billion gallons over the next couple of years and could reach in excess of 10 billion gallons by 2010/2011.

2) Gasoline and ethanol prices are likely to stay high enough over the next several years to maintain ethanol expansion. While there is much uncertainty about future crude oil prices, continued world economic growth and limited expansion in crude oil production are expected to maintain crude oil prices at relatively high levels over the next several years. Continued historically high crude oil prices, and in turn gas-

oline prices, will help maintain ethanol prices and foster continued growth in ethanol production. There is also uncertainty in the longer term as to the relationship of ethanol to gasoline prices. As ethanol production expands, the unusually high premium relative to gasoline prices seen this year will decline and in the longer term may reflect the energy content of the two fuels.

3) Corn ethanol returns are such that plants can remain profitable over a wide range of corn prices. With continued relatively high crude oil, gasoline and ethanol prices, ethanol plants can pay much higher prices for corn and remain profitable. Various State incentives, particularly in Minnesota, Nebraska and South Dakota, add to ethanol returns and boost the price ethanol plants can pay for corn and remain profitable.

4) Corn prices could set new record highs over the next 5 to 6 years. Increased demand for corn for conversion into ethanol will likely lead to higher corn prices as corn must be bid away from other uses, and land must be bid into corn production and away from other crops. As ethanol production expands over the next several years, corn prices appear likely to set new records, especially if production is adversely affected by weather.

5) Ethanol plants will likely continue to operate even if corn prices rise well above past record highs. Ethanol plants will be able to bid corn away from a variety of other uses over a wide range of corn prices. In the short term, export demand is more price sensitive than domestic feed use, so competition for corn supplies would result in larger percentage declines in corn exports compared with other uses.

6) The United States will need substantial increases in corn acreage to prevent exports from declining and livestock profitability from falling. We can illustrate the need for more corn acreage with the following example. Assume ethanol production increases to 10 billion gallons in the 2010 crop year, corn yield per harvested acre rises to 155 bushels per acre as projected by USDA's last long-term projections, ethanol yield is 2.8 gallons per bushel of corn, and 15 percent of corn used for ethanol returns to corn feed use in the form of DDGS. Then, if exports and feed use are to be maintained, corn acreage would have to rise to about 90 million acres in 2010, or 5.5 million more than in USDA's February baseline projections and nearly 10 million more than the average planted during 2005 and 2006. Econometric relationships suggest that corn prices would have to rise to around $3.10-3.20 per bushel, or near the current record high, to attract the 5.5 million more acres to corn. To the extent that corn exports and domestic feed use would decline from current levels under the higher corn prices, corn prices would be lower and less corn acreage would be needed to meet ethanol demand than indicated in this illustration. Stronger growth in corn yields per acre would also reduce the corn acreage and price effects of larger ethanol production.

7) The Conservation Reserve Program (CRP), which has 36 million acres set aside from crop production for environmental reasons, may provide a source of additional crop acreage. As CRP contracts mature, increasing numbers of producers may not seek to reenroll in the CRP, and instead, bring previously idled land back into crop production. The CRP will likely be examined as part of the 2007 Farm bill process. The extent to which producers voluntarily exit the CRP or changes in CRP policy could reduce the effects of rapid ethanol expansion on corn prices noted above. To provide a rough indication of CRP land that could potentially be used to produce corn, we examined all CRP land in counties where 25 percent or more of harvested cropland was producing non-irrigated corn and soybeans. Only CRP land enrolled during general sign ups that could be farmed sustainably was considered. The higher environmentally-valued land enrolled in continuous sign ups and the Conservation Reserve Enhancement Program was excluded. This preliminary assessment concluded that 4.3 to 7.2 million acres currently enrolled in the CRP could be used to grow corn or soybeans in a sustainable way.

8) It is likely other exporters (such as Brazil and Argentina) will have to supply more corn to the world market as world meat demand rises and U.S. corn ethanol production increases. As U.S. ethanol production expands, higher U.S. and world corn prices would provide an incentive for Brazil and Argentina to expand corn production and compete with U.S. corn in world markets.

9) Corn stocks are likely to be increasingly tight and corn prices high, so the corn sector will be highly vulnerable to market disruptions ethanol plants and other users will be operating in a much riskier environment than we have today. The expansion in corn ethanol production is likely to keep corn stocks at low levels. Market disruptions are likely not only from supply disruptions due to natural causes but also from market participants such as China, who as witnessed in energy markets, can be a big demand-side factor. A systemic natural disaster, such as drought, could cause dramatic corn price increases under this tight market environment.

10) Corn ethanol alone cannot greatly reduce U.S. dependence on crude oil imports. About 58 percent of all crude oil used in the United States is imported. In 2006, ethanol production will reach 5 billion gallons, which is equivalent on an energy content basis to only 1.5 percent of U.S. crude oil imports.

11) Cellulosic ethanol production appears to be the best renewable alternative for reducing crude oil imports. Given the current barriers to commercialization of cellulosic ethanol, such as high production costs relative to corn ethanol, corn ethanol will have the competitive advantage for some time. This suggests that the tightening corn supply and demand balance as more and more corn is converted to ethanol will not be relieved by cellulosic ethanol for some years into the future.

12) Even so, ethanol growth is manageable in the near future. Markets will work over the longer term, but the allocation function of market prices can mean substantial costs for some sectors, so the evolution of ethanol bears close monitoring. Key factors that could ease the market adjustment are corn yield increases and acreage withdrawals from the CRP. Corn yields since 2004 have exceeded the long-term trend based on 1980-2003 data. If these yield increases reflect better a faster pace of improved seed varieties and adoption, trend corn yields could well exceed 155 bushels by 2010. Each 5 bushel increase in yield above current trend would be the equivalent of adding around 2.5 million acres to corn plantings, enough to produce an additional one billion gallons of ethanol.

BIODIESEL PRODUCTION AND SOYBEAN OIL USE

Biodiesel, a biofuel substitute for petroleum diesel, is mostly made from soybean oil (estimated at over 90 percent), but some producers use other oilseed crops, palm oil, animal fats and recycled oils to make biodiesel. Biodiesel blends can be used in most diesel engines, with little modification. Because it has similar properties to petroleum diesel fuel, biodiesel can be blended in any ratio with petroleum diesel fuel and is most often blended at the 20 percent level (B20). Today, most B20 is used by government motor fleets, urban bus fleets, and school buses. In addition biodiesel has been used in farm equipment, marine engines and furnaces as a replacement for heating oil. The trucking industry has recently shown interest in using biodiesel and B20 is being offered at some truck stops.

U.S. biodiesel production remained very small and flat until USDA created the Commodity Credit Corporation Bioenergy Program in fiscal year (FY) 2000 that encouraged biodiesel production through cash payments to producers. Mostly as a result of this program, biodiesel production jumped from 500,000 gallons in 1999 to 28 million gallons in 2004. In 2005, 91 million gallons of biodiesel were produced with 65 million supported by the program. The Bioenergy Program authorization from the 2002 Farm bill ends in FY 2006. Even so, with high diesel prices and new tax incentives, USDA forecasts biodiesel production will reach 245 million gallons in 2006, a 170-percent increase year over year and a 490-fold increase since 1999.

As of April 2006, the National Biodiesel Board indicated there were 65 commercial U.S. biodiesel plants. The annual production capacity of these plants ranges from 200,000 gallons to 30 million gallons, and they have a total capacity of about 400 million gallons. Most plants have an annual production capacity below 6 million gallons. Only 7 plants have an annual capacity above 15 million gallons, however, newer plants currently under construction tend to be larger. The National Biodiesel Board reports that there were 50 new plants under construction as of April 2006 that are expected to add another 700 million gallons to annual capacity. The annual capacity of these new plants ranges between 15,000 and 85 million gallons. Fourteen plants will have an annual capacity over 15 million gallons. Soybean oil is the most common feedstock used for biodiesel production, however, the largest plant under construction that will have an annual capacity of 85 million gallons plans to use canola oil. Plants that use recycled cooking oil are generally smaller with capacities ranging between 15,000 and 1 million gallons per year.

BIODIESEL PRODUCTION COSTS

The cost of building a biodiesel plant depends on many factors, including plant capacity, location, plant design, and equipment cost, which varies by the type of feedstock used. A general rule of thumb for estimating the cost of installing a small biodiesel plant is about $1.00 per gallon of annual capacity, thus a 5-million-gallon capacity plant has an estimated installation cost of $5 million. However, due to economies of scale, the installation costs begin to decrease as plant size exceeds about 5 million gallons per year.

When assessing the cost of producing biodiesel, soybean oil has a higher cost than some other feedstocks, such as yellow grease and beef tallow, but these alternatives cost more to process. The processing cost per gallon of biodiesel, including the cost

of materials, labor, energy, plant depreciation, and interest averages about $0.50 per gallon for a 5 million gallon per year plant. The cost of the feedstock is by far the largest expense for a biodiesel producer. For example, soybean oil at current prices would cost about $1.95 to produce one gallon of biodiesel, resulting in a total production cost (excluding capital costs) of about $2.45 per gallon. Adding the expected return to investment and the costs for transportation, blending, and marketing would push the expected retail price of 100 percent biodiesel (B100) well over $3.00 per gallon. Until recently, the high cost of biodiesel has made it very difficult for biodiesel to compete in the diesel fuel market. However, with the recent surge in crude oil prices, diesel fuel prices have risen to historical highs, and biodiesel has become more cost competitive. Moreover, recent legislation has granted biodiesel a $1.00 per gallon excise tax credit and a $0.10 gallon small producer tax credit. Government incentives along with higher diesel fuel prices have made biodiesel production profitable and the industry is now expanding rapidly, much like ethanol. Biodiesel production is expected to continue growing rapidly over the next few years, with over 100 plants expected to be on-line by the end of 2007. The pace of this expansion will depend on crude oil and diesel prices remaining relatively high.

BIODIESEL'S LONGER TERM PROSPECTS AND IMPLICATIONS FOR U.S. AGRICULTURE

The biodiesel industry is still young and relatively small, so as it grows to a larger scale and when an infrastructure is developed, the costs of producing and marketing biodiesel may decline. New cost-saving technologies will likely be developed to help producers use energy more efficiently, increase conversion yields and convert cheaper feedstocks into high-quality biodiesel. However, in the longer term, the biggest challenge may be the ability of the feedstock supply to keep up with growing demand. The supply of soybeans and other feedstocks available for biodiesel production will be limited by competition from other uses and land constraints. For the 2005/06 crop year, biodiesel production accounted for 5 percent of soybean oil use, and for 2006/07, biodiesel is expected to account for 2.6 billion pounds of soybean oil or 13 percent of total soybean oil use. The 2.6 billion pounds equals the oil extracted from 229 million bushels of soybeans or 8 percent of estimated U.S. soybean production in 2006. Therefore, the rapidly increasing demand for biodiesel will tend to push feedstock prices up, causing production costs to rise.

CONCLUSION

In 2006, ethanol and biodiesel production is expected to total about 5.3 billion gallons, an important new source of demand for U.S. agriculture. Biofuel production is increasing farm income and rural economic activity. However, the supply of corn is relatively small compared with U.S. gasoline demand, so other domestic sources of renewable and alternative energy must be developed to replace oil and thus reduce U.S. reliance on imported oil. Biodiesel, which has grown more rapidly than ethanol in recent years on a percentage basis, can extend the U.S. supply of diesel fuel, but the supply of oil crops, animal fats and other biodiesel feedstocks are also relatively small compared to the size of the overall diesel fuel market.

There is optimism that research may provide technological breakthroughs that lead to a significant expansion in ethanol produced from alternative biomass feedstocks. Ethanol's feedstock base could expand significantly with the advancement of technologies that economically convert switchgrass and other low-valued biomass into cellulosic ethanol

Corn ethanol will have an advantage over biomass ethanol in the near future under existing biomass technologies. It will take continued research and development and time to increase the ethanol yield per dry ton of biomass. In addition, research and development is needed to increase energy crop yield per acre and reduce the conversion cost of biomass to ethanol. The Department of Energy is investing in this research and development in its Genomics: GTL program in the Office of Science and in its Office of Biomass programs. Research activities are also being conducted by USDA. In addition, the Department of Energy and the USDA recently announced joint funding for new research projects aimed at improving energy crops. Ensuring biofuels meet consistent quality standards will also be important for meeting consumer needs and market expansion.

Mr. Chairman, that completes my statement.

RESPONSES TO ADDITIONAL QUESTION BY KEITH COLLINS
FROM SENATOR BOXER

Question 1. Dr. Collins, although renewable fuels have been around for decades, wouldn't you agree that the renewable fuel standard—which you may know originated from this committee—has been the greatest driver for the growth of the industry?

Response. I believe that the renewable fuel standard (RFS) has been a positive incentive for expansion of biofuels production, but it has not been the only driving force behind recent developments. By assuring a steadily increasing minimum market for biofuels, the RFS reduces risk for the biofuels industry and has been a factor in encouraging investment. However, several other factors have been critically important to the growth of the industry, including generally moderate corn prices and record-high ethanol prices. The high ethanol prices have been driven by high crude oil and gasoline prices, by the 51 cent blender tax credit, and by the phase-out of methyl tertiary butyl ether (MTBE), which has increased the demand for ethanol in reformulated gasoline markets. State initiatives and incentives also have likely been important drivers of the industry.

Question 2. Dr. Collins, a significant portion of current crop yields is dedicated to ethanol production. Experts have repeatedly pointed out that further increases could jeopardize other agriculture commodities. Cargill even stated that the focus should be on food then feed and last fuel—a position at odds with other companies. What is your opinion on this looming controversy and the competing interests involved and to what extent are consumers and motorists considered?

Response. About 19 percent of the 2006 U.S. corn production is expected to be used to produce ethanol. This is up from 6 percent in 2000. Similarly, about 13 percent of 2006/07 soybean oil production is expected to be used to produce biodiesel, up from negligible levels in 2000. If ethanol and biodiesel production maintain their rapid pace of growth, corn and soybean oil prices will rise due to increased demand. Users of these products domestically and abroad would have to pay more. How much more they would have to pay depends on several key factors. First, rising prices would cause more land to be bid into production for crops used in biofuels. Some of this land would come from other crops and some may come from cropland pasture or idle land. Second, substantial acreages of land in the long-term Conservation Reserve Program (CRP) are not in crop production. To the extent biofuels production causes crop price increases, producers are likely to put some of this land back into production as CRP contracts mature. Third, biotechnology has the promise of increasing the rate of growth of yields, and the higher the yield, the less acreage is needed to increase production and the lower the price increase would be for crops used to produce biofuels. Fourth, the production of ethanol results in the production of coproduct feeds, including corn gluten feed, corn gluten meal and distillers dried grains. The feeds can substitute for corn and soybean meal in livestock rations, so some of the crop production going to biofuels is returned to feed livestock in an alternative but useable form. Fifth, the use of other, non-grain feedstocks for biofuel production, as described in the Administration's Advanced Energy Initiativ, offers substantial promise for greatly increasing ethanol production without reducing the availability of grain for food and feed. The development of new feedstocks for biofuels offers new opportunities for America's farmers. Already, the USDA and the Department of Energy are funding basic research on the genetics of feedstocks to increase their availability and usability for the production of biofuels. Consequently, should biofuels production continue to grow rapidly, feedstock price increases can be expected, but given the mitigating factors just mentioned, the adjustment is likely to be manageable for consumers and motorists over the next several years.

Question 3. Does ethanol need the 51 cent tax credit to be profitable?

Response. When ethanol prices peaked earlier in 2006, ethanol producers would likely have been profitable without the tax credit. However, futures prices on the Chicago Board of Trade have fallen from the $3.00 per gallon range to near $2.00 per gallon. Assuming the futures prices exceed what some blenders are paying given transportation costs and long-term contracts, some ethanol producers are likely to need some portion of the credit to be profitable at these lower price levels. Under current market conditions neither the mandate nor the entire tax credit is solely responsible for driving demand. Under less favorable market conditions (e.g., lower crude oil prices) the tax credit will be critical to drive demand, and under even less favorable conditions - where despite the tax credit the cost of ethanol is greater than the cost of gasoline - the mandate will be the baseline for driving demand.

Question 4. Dr. Collins your testimony refers to Federal and State "incentives" for renewable fuels but also describes the "market." Considering that the Energy bill

mandated the market, are the various "incentives" or subsidies appropriate? As an economist, don't they restrict the market's efficiency since it is very difficult to understand true cost and price?

Response. The Energy Policy Act of 2005 mandated a market through the RFS. Biofuel production is currently projected to be well above the mandated minimum use levels. While subsidies and incentives are one factor behind biofuel production exceeding the RFS there are other market factors that also influence both production and use. If the RFS minimums are the public policy goals for biofuels production, then one could argue that the subsidies or incentives are not appropriate. However, without them, it is possible biofuels production would decline and consumer prices for biofuels would increase. Various State incentives, whether tax subsidies, direct subsidies or mandates for use, have the general effect of stimulating production or consumption or both. Generally, subsidies and incentives reduce market efficiency if they are applied in competitive markets with no externalities. Some economists argue that some subsidization is justified because the environmental and energy security benefits of biofuels are not reflected in their market prices. Thus, the market prices for biofuels may provide an under-incentive to produce and consume biofuels when both market and nonmarket costs and benefits are considered. However, it is very difficult to place a value on the external benefits of biofuels to appropriately set subsidy levels.

Question 5. USDA and DOE both have loan programs for biofuels production--how are they different? How do USDA and DOE coordinate their programs to avoid duplication?

Response. There is a possibility for overlap between USDA loan guarantee programs and DOE's Title XVII loan program. However, there are also significant differences between the programs including statutory objectives, beneficiaries, location of projects, scope of projects, and amount of credit support provided. While these differences are important, they do not avoid the possibility for overlap.

The statutory objective of DOE's Title XVII loan guarantee program is to support projects that employ advanced (e.g., early commercial) technologies, and avoid, reduce, or capture air pollutants and greenhouse gas emissions while having a reasonable prospect for repayment of debt by the borrower. Projects that may be eligible for a Title XVII guarantee include renewable energy systems, fossil energy (including gasification), hydrogen fuel cells, nuclear energy facilities; carbon capture and sequestration practices and technologies; efficient electrical generation, transmission, and distribution technologies; efficient end-use technologies; production facilities for fuel efficient vehicles; pollution control equipment; and crude oil refineries. Thus the program covers among other things, alternative transportation fuels production and power generation. Guaranteed projects must be in the U.S. (or U.S. territories), and borrower eligibility is not restricted.

While EPACT Title 17 does not limit the size of DOE's program, under the first solicitation, DOE will limit the total dollar amount of loan guarantee commitments to no more than $2 billion. Statutorily Title XVII guarantees cannot exceed 80 percent of total project costs. Given these statutory requirements, DOE's program can potentially support projects of larger sizes.

USDA loan programs that can support biofuels production include the Renewable Energy Systems and Energy Efficiency Improvements Program, the Business and Industry (B&I) Guaranteed Loan Program, and the Rural Development Electric Programs. These programs can overlap with the DOE loan programs, but are targeted to support different purposes.

The Farm Security and Rural Investment Act of 2002 (2002 Farm bill) established the Renewable Energy Systems and Energy Efficiency Improvements Program under Title IX, Section 9006. This section directs the Secretary of Agriculture to make loans, loan guarantees, and grants to farmers, ranchers and rural small businesses to purchase renewable energy systems and make energy efficiency improvements. Renewable energy systems include wind, solar, biomass (including biofuel production), or geothermal energy, or for producing hydrogen derived from biomass or water using wind, solar biomass, or geothermal energy sources. Eligible technologies funded under the Section 9006 program must be commercially available (i.e., technology in general use within the marketplace) or pre-commercially available (i.e., technology with documented operating history at scalable size, typically at least 1 year past completion of start-up, shakedown and/or commissioning).

Congress provided nearly $23 million to fund the program in each of fiscal years (FY) 2003 to 2006. In the first 4 years of the Section 9006 program, USDA has awarded a total of $87.9 million in grants and $34.6 million in guaranteed loans to 832 agricultural producers or rural small businesses in over 40 States. The guaranteed loan program was initiated in FY 2005 with the publication of the Section 9006 regulation. FY 2006 was the first full year of the guaranteed loan program.

USDA anticipates the Section 9006 program will help farmers, ranchers, and small rural businesses reduce energy costs and support and stimulate rural economic development by helping agricultural producers and rural small businesses create new sources of income, create new jobs, and create new uses for agricultural products and wastes. Grants may not exceed 25 percent of the eligible project costs and guaranteed loans may not exceed 50 percent of the eligible project costs.

In addition to differences in program objectives discussed above, the Section 9006 program differs from the DOE's Title XVII loan program in loan levels, eligible applicants, location of project, and phase of technologies. Based on statutory requirements, the Section 9006 program can provide a loan guarantee of up to $10 million or 50 percent of the total eligible project cost. Additionally, eligible applicants under the Section 9006 program are limited to farmers, ranchers, and rural small businesses and the project must be located in a rural area. The DOE program is not subject to these eligibility or location requirements, nor are they subject to a $10 million funding cap. Another fundamental difference in the programs is that the Section 9006 program is targeted specifically for only renewable energy systems, whereas under Title XVII, DOE can provide loan guarantees for various energy technologies and practices.

Projects to convert biomass into biobased products and produce bioenergy are eligible for financing under the B&I Guaranteed Loan Program. The overall purpose of the B&I Guaranteed Loan Program is to help create jobs and stimulate rural economies by providing financial backing for rural businesses. The program provides guarantees up to 80 percent of a loan made by a commercial lender. Loan proceeds may be used for working capital, machinery and equipment, buildings and real estate, and certain types of debt refinancing. Assistance under the B&I Guaranteed Loan Program is available to virtually any legally organized entity, including a cooperative, corporation, partnership, trust or other profit or nonprofit entity, Indian tribe or Federally recognized tribal group, municipality, county, or other political subdivision of a State. The maximum aggregate B&I Guaranteed Loan(s) amount that can be offered to any one borrower under this program is $25 million. A maximum of 10 percent of program funding is available to value-added cooperative organizations for loans above $25 million to a maximum aggregate of $40 million. Providing financial support for projects related to biobased products and bioenergy production is viewed as a way to create new market opportunities for farm and forestry resources. From FY 2001 to FY 2005, 10 such loans were guaranteed with almost $77 million awarded under the B&I Guaranteed Loan Program.

Again, there are differences between the DOE's Title XVII loan program and the B&I Guaranteed Loan Program in terms of program objectives, loan levels, eligible applicants, and project location. For example, B&I loan guarantees are not available for projects in cities or towns with a population of greater than 50,000 inhabitants or the urbanized area contiguous and adjacent to such a city or town. Energy technologies funded under the B&I program must be commercially available. In addition, the maximum B&I guaranteed loan that can be offered to any one borrower is $25 million. The DOE program is not subject to these requirements.

Question 6. Dr. Collins, Thank you for your candor in saying that USDA's 2006 baseline projections of corn use and ethanol demand are "out of date." That baseline projection suggested that ethanol demand could be balanced by lower feed use, slowed export growth, higher corn yields, and manageable cost increases for livestock. And yet that baseline project from last February is still the basis for most rationale that ethanol production could increase to 16 billion gallons—instead of the 7.5 billion gallons mandated by the Energy Policy Act.

In your testimony, you raised some pertinent observations:

- The corn complex will be increasingly volatile in the next few years because of tightness brought on by ethanol,
- Argentina and Brazil will take away some of the US market share of corn exports,
- Corn prices are likely to set record highs in the next 5-6 years affecting other crops and livestock, and
- That without large increases in corn acreage livestock profitability will fall.

Coming from a corn-deficit State that has a lot of livestock, these observations from the Chief Economist of the U.S. Department of Agriculture—one who is widely respected I might add—do give me pause.

We've certainly seen some scenarios laid out for ethanol growth and we've seen projections for corn profitability under various market scenarios. Can you tell me Dr. Collins, is there any work completed or underway at the USDA that shows how badly livestock could get impacted from $3.20/bu corn—a level you suggest is possible if not likely?

Or any look at the long term impact on livestock production from an ethanol sector that produces 16 billion gallons as some of the advocates and even the National Corn Growers Association says is an attainable goal?

Response. The U.S. Department of Agriculture (USDA) conducts a 10-year analysis of the agricultural economy each year and usually releases the results in February. This February's analysis will reflect the recent and projected substantial growth in biofuels and will project the implications for the livestock sector. Similarly, the next "U.S. and World Agricultural Outlook" report by the Food and Agricultural Policy Institute of the University of Missouri and Iowa State University is also expected to incorporate stronger biofuels production and assess the implications for the livestock sector. One recently published study, "25 percent Renewable Energy for the United States by 2025: Agricultural and Economic Impacts" (available at www.25x25.org), funded by the 25x25 Work Group of the Energy Future Coalition projected the farm economy to 2025 assuming renewable energy provided 25 percent of the nation's energy consumption. The study assumed corn yield growth rates 50 percent greater than in the USDA's last long-term baseline projections. Under that assumption and others, the study projected corn prices of $2.83 per bushel by 2010, cattle net returns 1.5 percent above their baseline, hog net returns 9 percent below their baseline, and chicken net returns 4.2 percent below their baseline. It is likely that a number of studies of the longer term effects of biofuels will be produced during the coming year. USDA plans to sponsor a workshop to bring together analysts that are assessing the impacts of the emerging biofuels market.

Question 7. Dr. Collins, in your testimony you speak to ethanol and biodiesel. However, it seems as if biodiesel may be harmed at the expense of ethanol. More acreage for corn means less for biodiesel. Is there a way to increase the production of both without harming the other? What other viable biodiesel feedstocks are there?

Response. In the short-term, higher corn prices and greater coproduct feed production appear likely to attract land into corn and away from soybeans. However, as technology improves and becomes more cost effective and producers try alternative crops, a wide array of feedstocks may be used to produce economically both ethanol and biodiesel. For example, ethanol may be produced from corn, corn fibers, corn stover, switchgrass, rice straw, wheat straw, food residues, and short rotation trees and underutilized trees. Biodiesel may be produced from an array of vegetable oils, including soybean, rapeseed and sunflower as well as from yellow grease.

RESPONSE BY KEITH COLLINS TO AN ADDITIONAL QUESTION FROM SENATOR CARPER

Question 1. Some ethanol proponents hold up flex fuel vehicles and E-85 as the answer to reducing the price of fuel even though it has less energy per gallon than gasoline.

Consumer Reports recently concluded in an article titled "The Ethanol Myth" that E85 will cost consumers more money than gasoline. For example, with the retail pump price of E85 averaging $2.91 per gallon in August, a 27 percent fuel-economy penalty means drivers would have paid an average of $3.99 for the energy equivalent of a gallon of gasoline.

First, please briefly comment on those findings and second, considering that families want lower fuel prices, do you believe that the focus on E-85 is misplaced?

Response. The article in Consumer Reports appears to be factually correct. The energy content of gasoline as measured in British Thermal Units (BTUs) is about 115,400 compared to only 75,670 for ethanol (data from the National Highway Traffic Safety Administration). Thus, a gallon of 100 percent ethanol only has two-thirds of the energy content as a gallon of 100 percent gasoline, and consequently, gas mileage for ethanol is expected to be less than that for gasoline in conventional or flex-fuel vehicles.

A blend of 85 percent ethanol and 15 percent gasoline would have an energy content of 81,630 BTUs, about 70 percent of the energy content of 100 percent gasoline.

Consumer Reports does err, however, in asserting that ethanol or E85 will drive gasoline prices. Ethanol in total accounts for about 3 percent of U.S. gasoline use and E85 an even smaller percentage. E85 is a relatively new alternative fuel and that niche of the ethanol market is developing. Until there is a developed market for E85, which includes vehicles that can use E85 (demand) and the infrastructure in place (retail fuel pumps an distribution), E85 will likely be priced at a premium and not readily available at all gasoline stations. Once the ethanol market is fully developed, ethanol including E85, must compete with gasoline based on price, and over time ethanol is likely to be discounted based on its BTU content relative to gasoline.

Consumer Reports is correct in asserting that there will be a differential between gasoline and ethanol blends. The renewable fuel standard provisions of the Energy Policy Act of 2005 (EPACT) established a 7.5 billion gallon minimum use level of renewable fuels by 2012. Since EPACT was enacted, gasoline blenders have been phasing out methyl tertiary butyl ether (MTBE), which sparked a surge in demand for ethanol (the primary alternative to MTBE). In addition, a short sugar crop led to lower ethanol production in Brazil. Collectively, these factors helped to drive up the price of ethanol this summer. Ethanol prices have come down from the highs observed earlier.

Looking forward, ethanol and E85 are likely to be important elements in helping address the need for transportation fuels in the United States. There are several questions that must be considered when weighing the benefits of ethanol. Ethanol's primary use at the current time is as a fuel oxygenate blended with gasoline. Oxygenates, such as ethanol, help gasoline burn more efficiently and cleanly and can lead to lower emissions. Thus, there are environmental benefits to consider.

RESPONSES BY KEITH COLLINS TO ADDITIONAL QUESTIONS FROM SENATOR JEFFORDS

Question 1. Does USDA generally see a preference for loan guarantees, rather than grants, for those companies interested in producing cellulosic ethanol?

Response. USDA provides both loan guarantees and grants for biofuels production. Grants are provided mainly for feasibility studies, development activities, and working capital. However, cellulosic ethanol plants are very expensive to build per gallon of capacity and large amounts of funding are needed for construction. Also, under existing technology there are no commercially viable celluosic ethanol plants. Thus, financing cellulosic ethanol plants would quickly exhaust the budget authority of USDA energy grant and loan programs, thus limiting the benefits of the program to a smaller number of program beneficiaries.

Question 2. How significant do you believe that State renewable fuels programs will be in the growth of ethanol use?

Response. State renewable fuels programs, such as production mandates and tax incentives, will probably have a limited overall effect on total U.S. ethanol production. Total production will mostly be determined by the Federal renewable fuel standard (RFS) and general oil and gasoline market conditions. However, State programs could influence the distribution of ethanol production throughout the country and help stimulate needed investment in infrastructure. States with strong incentive programs could encourage instate ethanol production and consumption.

The Environmental Protection Agency (EPA) in their boutique fuels study found refiners concerned that State RFS programs may inhibit the flexibility of implementing the national RFS. Coordination between EPA, refiners, and States in developing any State RFS will be important.

Question 3. Are small cellulosic ethanol plants economically feasible?

Response. At the present time, small cellulosic ethanol plants are not economically viable. In addition, to the best of my knowledge and based on existing technology, large cellulosic plants are not viable either. There have been recent announcements by some suggesting otherwise, but to date only pilot and demonstration plants have been built. Further research is required to lower costs and reduce technical risks to the point where developers can attract capital market financing of a commercial cellulosic ethanol plant.

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