

**BIOFUELS FOR ENERGY SECURITY AND
TRANSPORTATION ACT OF 2007**

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED TENTH CONGRESS
FIRST SESSION

ON

S. 987

TO ENHANCE THE ENERGY SECURITY OF THE UNITED STATES BY
PROMOTING BIOFUELS, AND FOR OTHER PURPOSES

APRIL 12, 2007



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BIOFUELS FOR ENERGY SECURITY AND TRANSPORTATION ACT OF 2007

THURSDAY, APRIL 12, 2007

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 10:04 a.m., in room SD-366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

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

The CHAIRMAN. We'll go ahead with the hearing. Thank you all for coming. This is a hearing to discuss S. 987, which is the Biofuels for Energy Security and Transportation Act. This is a bipartisan bill that Senator Domenici and I and several other senators here in the committee introduced 2 weeks ago. It's intended to increase our use of homegrown biofuels and reduce our dependence on imported oil.

Biofuels are the top priority in this committee. Already, S. 987 has six co-sponsors in addition to Senator Domenici and myself. Senators Akaka, Dorgan, Cantwell, Salazar, Craig, and Martinez have co-sponsored the bill.

The committee explored key issues on this subject during an all-day biofuels conference in early February. Legislation that we have before us today is, in large part, the result of what we believe we learned from the hundreds of conference submissions and the 30-plus conference participants. I've very glad that some of our conference participants are back talking with us today.

Today's hearing will help ensure that we're putting the right policies in place to expand our biofuels industry in an economically and environmentally responsible way. Again, thank you all for your interest and participation and I look forward to the testimony.

Senator Domenici.

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

Senator DOMENICI. Thank you very much, Mr. Chairman, and thanks to all the people who are here. We appreciate the witnesses' willingness to come and give of their time today.

The purpose of this hearing is to receive testimony on S. 987, Biofuels for Energy Security and Transportation, or BEST Act. I'm pleased that we've been joined, as indicated by the chairman, by Senators from both sides of the aisle, and he has enumerated that.

I'm sure there will be more, Senator, before this is finished, because this bill is going to pass this committee with a large vote in my opinion.

In the State of the Union Address, the President laid down a very ambitious goal. It was ambitious but worthy in my opinion, to reduce our consumption of gasoline by 20 percent in 10 years. I applaud that and hope that we can achieve it.

Just 2 days ago, Secretary Bodman and EPA Administrator Johnson, Mr. Chairman, gave a joint press release announcing the rollout of new regulations for the RFS Program. I'm pleased that the Department of Energy is moving forward to put this program in place as required by the Energy Policy Act.

The new regulations include compliance and enforcement provisions, reporting requirements and various fuel tracking mechanisms. These provisions will enable the program to develop and deliver the energy security and environmental benefits that we envisioned as we crafted the provisions.

At the time that we were writing the RFS in 2005, we all thought that ethanol was a—thought of it as a fuel additive. Just 2 years later, we see that ethanol can be a fuel in its own right. This is also true for advanced alternatives, such as biobutanol.

I understand that we need to avoid unintended consequences as we develop a domestic industry in this area and obviously, we have seen some unintended consequences in the ethanol area, and we ought to be careful. We must balance the use of cropland to produce food and feed and also fuel.

Today, U.S. ethanol production relies heavily on corn. Rapid expansion of ethanol production has caused some rises in corn prices. As a result, our farmers must pay more to feed their livestock and our exports of corn to nations such as Mexico have declined.

In our bill, we include several provisions to lessen the negative impacts, if we can, that relate to various industries.

I look forward to today's hearing, and to your leadership, and to working with you in your leadership capacity to get this bill done as soon as possible.

Thank you very much, Mr. Chairman.

[The prepared statements of Senators Murkowski and Burr follow:]

PREPARED STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

Mr. Chairman: Thank you for holding this hearing on the biofuels bill that you and Senator Domenici have developed to speed the pace of renewable fuel development.

I support assistance to the ethanol and entire bio-fuels industry. I do so since biofuels certainly should cut traditional pollutants like smog forming sulfur dioxide and ozone forming nitrogen oxide, should cut greenhouse gas emissions, and will lessen our dependence on foreign sources of oil. Those are good things.

But my support for helping get an ethanol industry started does have limits and this bill comes very close to reaching those limits.

In testimony earlier in the year we heard that it is probably not possible for the United States to produce more than 15 billion gallons of ethanol from corn kernels without having huge impacts on farm land allocation, crop selection and having even larger impacts on farm prices. I'm glad this bill caps aid at the 15 billion-gallon level for traditional corn-kernel-based ethanol production.

I'm afraid that even at the 15 billion-gallon target we will be triggering further increases in the price of corn, hiking the costs of everything from meat and milk to breakfast foods, and perhaps encouraging farmers to switch to corn from other

crops, such as soybeans or even wheat, perhaps worsening consumer prices for everything from tofu to bread.

I'm more concerned about the language that "mandates" that we produce another 21 billion gallons of biofuels either from cellulosic ethanol or other substances, from animal fats to fish oils, by 2022. (I do like encouraging greater fish oil utilization, however.)

I am concerned that we are putting the cart before the horse in setting the RFS at 36 billion gallons within 15 years, when we don't have a single production-scale cellulosic ethanol plant currently in full production in this country.

We know that biofuels, while they help the environment, don't currently and may never help the pocketbooks of drivers. Since ethanol contains between 20 and 28 percent less energy per unit volume than gasoline; all things being equal, motorists will get poorer gas mileage and thus will have to buy more fuel than if they used pure gasoline. Other fuels, like butanol, apparently contain more energy, but still don't equal gasoline on an energy basis.

I have this nagging concern that once we pass the level of ethanol production needed for Clean Air Act additive requirements, 10% or perhaps 15% in the future, that ethanol is going to have to stand on its own two feet. Detroit should make more E-85 capable vehicles, but motorists are still going to have to buy the ethanol to put in their tanks, and I have my doubts whether they will do so consistently unless the price of the fuel can be made truly competitive with gasoline on an energy/mileage basis.

I would like to thank both Senators Bingaman and Domenici and their staffs for meeting some of my concerns in the drafting of this legislation. Coming from a cold-climate state like Alaska where distribution of fuel is a major logistical and economic concern, I appreciate the flexibility this bill contains to help Alaskans deal with the issues related to biofuels in cold weather.

The truth is that I would feel far better about this major expansion of our efforts to promote biofuels, if we had a better sense that future technological improvements will permit the fuels to be priced competitively, on their own, without substantial obvious or hidden governmental subsidies.

I would also feel far better about voting for this, if this biofuels initiative was part of a balanced energy package that also promoted increased domestic production of both conventional fuels like oil and gas, and of other renewables. At mark up I may well attempt to partially remedy at least part of that concern.

Given that this nation uses 180 billion gallons of gasoline and diesel fuel a year, this bill will not be putting the petroleum industry out of business. It will not be a panacea to offset our nation's dependence on foreign oil, since if the RFS target is some how met, biofuels will still only be delivering far less than 20 percent of our fuel needs in 2022.

It does send a signal that we want to lessen that foreign oil dependency. I just worry about the total cost to consumers and government of that signal.

I also worry about the private investment markets. I know one of the reasons we are considering this bill now is because industry already has invested in so many ethanol plants, likely exceeding the 7.5 billion gallon RFS that we set just two years ago, that unless we help the industry widen its market for ethanol we may well be looking at a glut of ethanol on the domestic market by next year that could cause prices to drop and endanger the future of the entire biofuels industry.

But I want the industry to know that there are clear limits to the ability of Congress to manipulate markets, to pick "winning" and "losing" technologies, and this bill, mandating a 36 billion gallon level of biofuels development within 15 years is clearly near my personal limit. Hopefully the industry will prove it can be economically efficient and win willing consumers after reaching this level of production and the economies of scale that hopefully will thus result.

I thank the chairman for this hearing and I look forward to the comments of the witnesses.

PREPARED STATEMENT OF HON. RICHARD BURR, U.S. SENATOR FROM
NORTH CAROLINA

I want to thank Chairman Bingaman and Ranking Member Domenici for the opportunity to hear from the distinguished witnesses visiting this committee today.

There are many good reasons why this committee is considering the use of alternative fuels. Our dependence on foreign oil, global tensions that can have a significant effect on the oil markets, and concerns with pollution and emissions are issues that I believe must be addressed by Congress. The Chairman and Ranking Member share these concerns and have brought us here today to begin addressing them with

legislation. Yet while we share the same concerns, I am not convinced that this legislation will help us move towards a solution.

The increased use of alternative fuels, and the additional costs, will not be confined to the oil markets. We agree that finding a renewable source of energy that can be grown and produced by our nation's farmers is a priority. However, mandating arbitrary numbers for biofuel usage before economic and technological feasibility studies can be conducted on the impact it would have on the entire agriculture community is unwise. Since Congress mandated the use of 7.5 billion gallons of ethanol for blending, feed prices have risen 70% in just the last six months. What this means is that American consumers are paying more for chicken, turkey, pork, and beef at the grocery store. Soon the average individual will feel the financial crunch as ethanol mandates continue to increase food prices.

If we increase the federal mandate on ethanol, farmers will continue to leverage every acre of land possible to grow corn. Because of this, the corn market will soon become saturated and prices will come down drastically. This situation will expose millions of farmers to serious financial loss, and they will be looking to the federal government for disaster payments. We have the opportunity to prevent that scenario from happening by allowing the market to dictate ethanol use. I am one of the largest proponents of renewable energy and ethanol, but I cannot allow the federal government to increase the price of food in this endeavor, nor will I sit back and watch farmers walk down a disastrous path.

In addition to these problems with commodity prices, the other benefits of legislation are rather questionable. I am particularly concerned by the premise that ethanol will help reduce our reliance on imported oil. There is significant debate whether this will be achievable if we rely on a significant amount of corn derived ethanol. Although some of the ethanol production under this legislation will come from other sources besides corn, a large proportion will be corn-based ethanol.

Scientists have examined this issue and question whether corn derived ethanol provides a positive return on energy. The energy return is seen as negligible by some researchers, and even when scientists find a positive energy return in their analysis, it is often only a slight increase. The result is that corn-based ethanol may not help us achieve a significant reduction of our reliance on foreign oil. In fact, combined with increased corn production, it may make the situation worse.

The bill the committee is considering today has noble aims. It is a step towards addressing our shared concerns regarding a dependence on imported oil, particularly from countries that have animus towards the United States. However, I am not convinced that this legislation will significantly alleviate this problem. Furthermore, the unintended consequences of this bill will have a dramatic impact on commodity prices. For these reasons, I have serious concerns regarding this legislation. I look forward to hearing from our invited witnesses on this issue.

The CHAIRMAN. Thank you very much. I think all Senators are aware that we have a vote scheduled on the Senate floor at 10:30. So we will proceed and get as far as we can through the testimony and the questions, and then we'll have to adjourn for a few minutes to do that vote.

But our first witness today is Andy Karsner, who is the Assistant Secretary for Energy Efficiency and Renewable Energy in the Department of Energy, and we appreciate him. He's a frequent visitor with this committee and we appreciate his willingness to be here today. So go right ahead and give us your views on this legislation.

STATEMENT OF ANDREW KARSNER, ASSISTANT SECRETARY FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY, DEPARTMENT OF ENERGY

Mr. KARSNER. Thank you, sir.

Chairman Bingaman, Senator Domenici and members of the committee, thank you for the opportunity to present the administration's views on S. 987 and discuss programs underway at the Department of Energy to accelerate the development and use of biofuels.

In his 2007 State of the Union address, President Bush challenged our country to reduce gasoline consumption by 20 percent

within the decade, the Twenty-in-Ten Plan. The President called for a robust Alternative Fuel Standard, requiring the equivalent of 35 billion gallons of ethanol in 2017, nearly five times the target that is now in law.

Pursuing Twenty-in-Ten holds the promise of diversifying the sources, types, and volumes of fuels we use, while reducing our vulnerabilities and dependence on foreign oil. Only through transformational technological change, coupled with unprecedented capital formation and private investment in alternative fuels, can these urgent goals be achieved.

The very title of S. 987, the Biofuels for Energy Security and Transportation Act of 2007, encapsulates the critical role that biofuels must play in transforming the energy future of our Nation. S. 987 promotes the production and use of biofuels through a full spectrum of activities, from basic research to fuel retail delivery, accelerating market penetration of biofuels.

The President's call for a dramatic shift in domestic patterns of gasoline consumption and a vision of greater energy security is reflected in provisions of S. 987, and to that end, the administration generally supports the vision of the legislation.

However, the administration believes that we must aim for an ambitious and manageable timeframe for fuels and infrastructure deployment and that a 10-year goal is the appropriate metric.

In addition, the administration supports legislation that includes a wider variety of alternative fuels than is provided for in S. 987. The President's goal calls for a substantial reduction in gasoline consumption and it is important that more, rather than fewer, options of alternative fuels be considered for this.

Beyond the modifications to the existing renewable fuels standard, S. 987 also speaks to a number of infrastructure and financial issues related to the biofuels industry. While the Department supports the goal of expanding biofuels infrastructure, we believe that there are aspects of the technical language in S. 987 regarding the infrastructure pilot program that need further review and discussion.

In addition, the Department is concerned about potential modifications to the title XVII Loan Guarantee Program proposed in this legislation. Certain provisions appear to be inconsistent with the Federal Credit Reform Act as it exists today.

The bill also proposes a 90-day deadline for approval or disapproval of loan guarantees, which places artificial constraints on the due diligence that the Department must perform to prudently assess capital risk and manage taxpayer dollars. Additionally, changes to definitions or scope of projects involved could slow the implementation of the Loan Guarantee Program.

There is clear consensus, however, that legislative action is urgently needed to substantially reduce our dependence on oil and deploy new energy technologies into the marketplace at an unprecedented scale and rate. The administration looks forward to working constructively with this committee and the Congress to deliver legislation for the President's signature, optimally before the summer driving season is underway.

The Department's portfolio of research, development and commercialization activities supports the Twenty-in-Ten and longer-

term clean energy goals. The Department is particularly focused on solving technical problems to overcome barriers to biofuels growth through strategic cost-shared partnerships with private industry and collaboration across agencies of the Federal Government.

Together, with financial tools already included in the Energy Policy Act of 2005, we believe that this multi-pronged effort will expand the role of domestically produced biofuels in our Nation's energy supply and for our economic future.

Our biomass program is focused on making cellulosic ethanol cost competitive by 2012, a target put forth in the President's 2006 Advance Energy Initiative. In fiscal year 2007, including funds appropriated under the Continuing Resolution, the Department has allocated approximately \$200 million for EERE's Biomass and Bio-Refinery Systems R&D program to implement key activities necessary to achieve our 2012 goal for cost-competitive cellulosic ethanol.

Secretary Bodman recently announced that DOE will invest up to \$385 million for six commercial-scale bio-refinery projects over the next 4 years, subject to appropriations. In the next few weeks, the Biomass Program will announce a funding opportunity for validation of advanced biomass conversion technologies and feedstocks and bio-refineries at approximately 10 percent of commercial scale. These 10 percent scale demonstrations have the potential to reduce the overall cost and risk to industry and accelerate commercialization further for large-scale facilities.

The development and deployment of a biofuels distribution infrastructure in the United States is fundamental to providing for displacement of gasoline and increased consumer choice. To bring these issues into focus, the Department has developed a biofuels infrastructure team to support far greater convergence between our Vehicle Technologies and our Biomass Programs.

As a result, the Department is pursuing a growing number of infrastructure activities, including analysis of feedstocks, pipelines, terminal facilities, storage, and advanced vehicle technologies. In addition to infrastructure and fuels research within the Department, there are important collaborations with other Federal agencies and entities, including the Inter-Agency Biomass Research and Development Board, which I co-chair with Under Secretary Dorr at the U.S. Department of Agriculture. We have elevated the importance of this Inter-Agency Board to provide coordinated, high-level Federal support for biofuels production and use.

On the financing side, the recently-passed fiscal year 2007 continuing resolution appropriated the first funds for the Department to implement the title XVII Loan Guarantee Program. As you know, last year the Department undertook a process to solicit pre-applications for the first round of loan guarantees. Biomass technologies represented nearly half of the pre-applications received, a strong indication of the broad investor interest in funding commercial cellulosic bio-refineries.

The President's Twenty-in-Ten goal holds the promise of accelerating penetration of cellulosic ethanol and other alternative fuels into the marketplace, alleviating our addiction to oil and helping to address the serious challenge of global climate change. The Federal Government's cutting-edge research, development, deployment, and commercialization efforts must be supported by long-term, trans-

formational policy changes—the types of proposals that the President articulated during the State of the Union, many of which are consistent with the objectives and directions of this legislation.

The administration looks forward to working with Congress on a bipartisan basis to shape policies and legislation that will address the great challenges of our time with the urgency the situation merits. Mr. Chairman, that concludes my opening remarks and I'd be happy to answer any questions the committee may have.

[The prepared statement of Mr. Karsner follows:]

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

Mr. Chairman, Senator Domenici, and members of the Committee, thank you for the opportunity to present the Administration's views on S. 987, the Biofuels for Energy Security and Transportation Act of 2007, and to discuss programs under way in the Office of Energy Efficiency and Renewable Energy (EERE) at the Department of Energy (DOE) to accelerate the development and use of biofuels.

In his 2007 State of the Union address, President Bush challenged our country to reduce gasoline consumption by 20 percent in the next 10 years, the "Twenty in Ten" plan. The President called for a robust Alternative Fuel Standard, requiring 35 billion gallons of renewable and alternative fuel in 2017, nearly five times the 7.5 billion gallon renewable fuel target now in law for 2012. Expanding the mandate established by the Energy Policy Act of 2005 (EPACT 2005) is expected to decrease projected gasoline use by 15 percent. Another five percent reduction in gasoline consumption can be achieved through the Administration's proposal to reform CAFE standards. The "Twenty in Ten" plan holds the promise of diversifying the sources, types, and volumes of fuels we use, while reducing our vulnerabilities and dependence on oil. Only through transformational technological change can these goals be achieved, and we believe that the Administration's proposals provide the tools to achieve them.

S. 987, THE BIOFUELS FOR ENERGY SECURITY AND TRANSPORTATION ACT OF 2007

The very title of S. 987 encapsulates the critical role that biofuels can play in reconfiguring the energy future of our Nation. S. 987 promotes the production and use of biofuels through a full spectrum of activities, from basic research to fuel pump labeling, moving the country forward to increased use of biofuels. The President's vision for a dramatic shift in domestic patterns of gasoline consumption is reflected in provisions of S. 987, and to that end, the Administration supports the vision of the legislation. However, the Administration is continuing to review the bill and looks forward to further discussions with you and your staff. The following comments represent the Administration's preliminary views on the bill.

First, I would urge the Committee to adopt the volumetric targets of 35 billion gallons of renewable and alternative fuel in the next decade, as established in the President's proposal. The Administration believes that we must have a manageable timeframe for fuels and infrastructure deployment, and that a 10-year goal is an ambitious and appropriate metric. In addition, the Administration supports legislation that includes a wider variety of fuels than is provided for in S. 987. The President's goal is substantial and urgent reduction in gasoline consumption, and it is important that all options for alternative fuels be considered and that market forces play a central role in the selection of different renewable and alternative fuels.

Beyond the modifications to the existing Renewable Fuels Standard, S. 987 also speaks to a number of infrastructure and financial issues related to the biofuels industry. While the Department supports the goals of expanding biofuels infrastructure, we believe there are aspects of the technical language in S. 987 regarding the infrastructure pilot program that need further review and discussion.

In addition, the Department has serious concerns about the modifications to the Title XVII Loan Guarantee Program proposed in this legislation. Certain provisions are inconsistent with The Federal Credit Reform Act, and the Administration believes it is important that those policies be maintained. The bill also proposes a 90-day deadline for approval or disapproval of loan guarantees, which places artificial constraints on the due diligence that the Department must perform to prudently manage taxpayer dollars. This arbitrary deadline could result in meritorious applications being denied because of insufficient time for the Department to complete its work. The Loan Guarantee Program has the potential to aggressively deploy emerging technologies for clean energy, but the very nature of these pre-commercial

projects means that prudent risk management must be integral to the Department's evaluation. Additionally, changes to definitions or scope of projects involved may slow implementation of the Loan Guarantee Program. We look forward to working with the Committee to resolve these issues.

There is clear consensus that legislative action is needed to substantially reduce our dependence on oil and deploy new energy technologies into the marketplace at an unprecedented scale and rate. The Administration looks forward to working constructively with the Congress to achieve the "Twenty in Ten" goal, and deliver legislation for the President's signature before the driving season is under way.

Supporting the "Twenty in Ten" and longer term clean energy goals is the Department's portfolio of research, development, and commercialization activities. The Department is particularly focused on solving technical problems to overcome barriers to biofuels growth, including infrastructure, through forging strategic cost-shared partnerships with private industry, collaborating with other agencies, and working with the different regions of our country to bring the promise of biofuels to fruition. Combined with the financial tools already included in EPACT 2005, we believe that this multi-pronged effort will expand the role of domestically produced biofuels in our Nation's energy supply and economic future.

BIOENERGY RESEARCH AND DEVELOPMENT

EERE's Biomass Program and Vehicle Technologies Program, as well as other Department programs such as those within the Office of Science, are working closely together to provide technology pathways to meet the "Twenty in Ten" goal. The Office of Science is conducting basic research for breakthroughs in systems biology to identify new biofuel-producing organisms or new bioenergy crops that could lead to cost reductions for cellulosic ethanol and other biofuels. To accelerate the transformational scientific breakthroughs necessary for cost-effective production of biofuels and bioenergy, including cellulosic ethanol, the Office of Science is investing \$375 million over five years to support the establishment and operation of three Bioenergy Research Centers. These centers, selected by competitive, merit-based scientific review, will conduct comprehensive, multidisciplinary research programs on microbes and plants to develop innovative biotechnology solutions to energy production.

EERE and various U.S. Department of Agriculture (USDA) agencies conduct the applied research for advancing biomass feedstocks and conversion technologies for biorefineries. Currently, ethanol is the renewable fuel with greatest market penetration and potential for both near and long-term displacement of gasoline. EERE's Biomass Program is focused on making cellulosic ethanol cost-competitive by 2012, a target put forth in the President's 2006 Advanced Energy Initiative (AEI). In Fiscal Year (FY) 2007, including funds appropriated under the Continuing Resolution, the Department has allocated approximately \$200 million for EERE's Biomass and Biorefinery Systems R&D program to implement key activities necessary to achieve the 2012 goal for cost-competitive cellulosic ethanol. Additionally, Secretary Bodman recently announced that DOE will invest up to \$385 million for six commercial-scale biorefinery projects over the next four years, subject to appropriations. These funds, combined with industry's cost share, could lead to more than \$1.2 billion in public and private sector investment in these six biorefineries.

The EERE Biomass Program will continue in FY 2007 to support its cost-shared efforts with industry to develop and demonstrate technologies to enable cellulosic biorefineries for the production of transportation fuels and co-products. In the next few weeks the Biomass Program will announce a funding opportunity for the validation of advanced biomass conversion technologies and feedstocks in biorefineries at approximately 10 percent of commercial scale. This effort will enable industry to resolve remaining technical and process integration uncertainties and allow for more predictable, less costly scale up of "next generation" biorefinery process technologies. These 10-percent scale demonstrations have the potential to reduce the overall cost and risk to industry and contribute to the quicker commercialization of larger-scale facilities.

ETHANOL AND BIOFUELS INFRASTRUCTURE DEVELOPMENT

The Department is working with other public and private sector partners to encourage development and deployment of a biofuels distribution infrastructure in the United States to provide for displacement of gasoline and increased consumer choice. To support this effort and help promote growth of the biofuels industry, the Department has developed a biofuels infrastructure team. This team works to promote convergence between Vehicle Technologies and the Biomass Programs to promote a biofuels industry and commercially competitive alternative fuels and vehi-

cles. Currently, there are more than six million flexible-fuel vehicles (FFVs) on the road in this country, a significant number, but still a relatively small percentage of the approximately 225 million light duty vehicles in the U.S. One goal is to expand the use of biofuels by increasing the number of FFV owners. This would be done by improving current biofuels infrastructure and adding fueling stations to make FFV use more convenient for consumers. Another goal is to encourage all automobile manufacturers serving the U.S. market to meet and exceed state voluntary targets and significantly increase production of FFVs. In support of these goals the Department is pursuing a number of infrastructure activities, including analyses of pipelines, water issues, and advanced vehicle technologies. The biofuels infrastructure team is also assessing the impacts of higher-level intermediate blends of ethanol (e.g., E15 and E20), renewable fuels pipeline feasibility and materials research, and optimization E85 alternative fuel vehicles. This work is being coordinated with the Department of Transportation, which has responsibility for setting integrity management standards for pipeline transportation and ensuring that these products can be safely handled. These policies are designed to work with the markets, as we believe markets are best suited in deciding how and which new biofuel infrastructure is to be deployed.

The Vehicle Technologies Program has embarked on several new efforts to address vehicle efficiency, beyond ongoing combustion and fuels research. These new efforts include evaluation of the Biowagon produced by SAAB, a manufacturing subsidiary of GM, which is sold exclusively in Europe and has been reported to use ethanol-based fuels much more efficiently than current U.S. FFVs. Another new effort is focused specifically on optimizing engine efficiency with biofuels. These projects are aimed at mitigating the lower energy content of biofuels. The program is also evaluating other biofuels such as biodiesel that may contribute to future gasoline displacement. And, Vehicle Technologies has initiated an effort to engage international collaborations to address fuel standards, data sharing, and other common interests.

INTERAGENCY ENERGY PARTNERSHIPS

In addition to infrastructure and fuels research within the Department, there are important collaborations with other Federal agencies and entities, including the Interagency Biomass Research and Development Board, which I co-chair with USDA. The Board is the governing body that coordinates biomass R&D activities across the Federal Government. In November 2006, DOE hosted the National Biofuels Action Plan workshop in Washington, DC, where representatives from multiple Federal agencies came together to identify agency roles and activities, assess gaps and synergies, and begin developing agency budgets in the area of biofuels. The Federal participants also made recommendations for improved coordination and collaboration across Federal agencies. Input from the workshop is currently being collected into the National Biofuels Action Plan workshop report. Ultimately, the goal is to improve the Board's ability to provide coordinated Federal support for biofuels production and use.

To promote the growth of local biorefineries and address biomass resource availability and feedstock infrastructure, DOE is supporting the Regional Biomass Energy Feedstock Partnerships with USDA and Sun Grant Initiative universities, which are funded through the Department of Transportation. These partnerships will help to identify the regional biomass supply, growth, and biorefinery development opportunities. We believe that using regionally available feedstocks, produced and processed locally, will allow a "distributed" transportation fuels approach that should reduce shipping and transportation issues. These regional partnerships are designed to collect and store data on a publicly available website.

LOAN GUARANTEE PROGRAM

To provide increased incentives for financing a multitude of innovative energy technologies—including biofuels—EPACT 2005 included a provision in Title XVII for a DOE Loan Guarantee Program. With its central focus on innovative technologies to avoid, reduce, or sequester air pollutants or anthropogenic greenhouse gas emissions, the Loan Guarantee Program is a tool intended for providing broad authority for DOE to guarantee loans that support early commercial use of advanced technologies including cellulosic biorefineries that employ new or significantly improved energy technologies.

I am pleased to report that the funding contained in the FY 2007 Revised Continuing Appropriations Resolution, which the President signed on February 15, 2007, is allowing the Department to move forward in implementing the Loan Guarantee Program and standing up a Loan Guarantee Office within the Department.

We are currently working on a draft Notice of Proposed Rulemaking to implement the program. Secretary Bodman has said that our goal is to have a high-quality program, and the Department is working to do just that. As you know, the Department undertook a process in FY 2006 to solicit pre-applications for the first round of loan guarantees. Biomass technologies represented nearly half of the pre-applications. The Loan Guarantee Program represents an important tool for transforming the energy portfolio in this country.

CONCLUSION

The President's "Twenty in Ten" goal holds the promise of accelerating penetration of cellulosic ethanol and other alternative fuels into the marketplace and bringing the benefits of a clean renewable and alternative energy source more quickly to our Nation. To meet these challenges, cutting edge research, development, deployment, and commercialization must be supported by transformational policy changes—the types of proposals that the President articulated in the State of the Union, many of which are consistent with the objectives and direction of this legislation. The Administration looks forward to working with Congress to shape policies and legislation that will make this happen. This concludes my prepared statement, and I would be happy to answer any questions the Committee members may have.

The CHAIRMAN. Thank you very much. Why don't we just do 5-minute rounds on questions? I'll start.

You indicated in your testimony that the bill that we have drafted does not give you enough time, where we provide 90 days to do the due diligence involved with these loan guarantees. What is your view of the right length of time that you would need to do that due diligence?

Mr. KARSNER. It's a challenging question, sir, not because the Department can't—or the Federal Government can't—develop an appropriate timeframe for processing and offering due diligence, but it is largely contingent on what the nature of the submissions are. So what we're actually looking for is project maturity. We wouldn't want to foreclose on those that might be technologically eligible for the loan guarantee program but for example, might not be sufficiently mature to have siting, permitting, and other aspects in place that would enable commercial financing. So the difficulty is, the time will vary with each submission, depending on that project's maturity.

The CHAIRMAN. Well, I think we've obviously been trying to address the frustration that many of us feel about the lack of forward motion on this issue, and we're trying to figure out how to do something legislatively to prompt the Department to move out more quickly. If you have concrete ideas about what we might do along those lines, other than just back off and give you more flexibility, we'd be anxious to hear it. But as I hear what you're saying, you want to have flexibility to take whatever time you need. I can understand that sentiment, but it's not a satisfactory conclusion for many of us.

Mr. KARSNER. I appreciate the underlying motive, and I think it would be the objective of the Department to develop a more standardized program for due diligence and evaluation and ultimately, financial closings, as the program evolves.

The CHAIRMAN. We put together a proposal for a renewable fuel standard. The President's proposal is for an alternative fuel standard, as I understand it, which is different. Could you explain to us exactly what portion of the President's 35-billion-gallon per-year target by 2017—that is the target that I think he announced in the State of the Union, 35 billion by 2017—what portion of that do you

expect to be met from renewable fuels? What portion do you expect to be met by other fuels, and could you be specific? I just have always had difficulty, and I've raised this at a couple of hearings, understanding how we get to 35 billion gallons by 2017 and our bill, of course, calls for 36 billion by 2022, but we think we've got a plan for how we add up to that. I'm not clear what your plan is.

Mr. KARSNER. Part of the reason for that is that it is not the administration's goal to be prescriptive about how the market perceives various technology pathways in order to meet the end state. The goal of the administration's plan is to mandate the end state and offer force of law into a national objective that provides certainty and predictability to the market to perform.

So in that way, if for example, lithium ion batteries and sources of electricity and plug-in vehicles were to surpass or have a technological leap ahead of other pathways, we would not want to preclude or foreclose on that possibility. What we would like to see is that we apply everything that this Nation has—from its scientific community, from its farming community, from its innovative community, from its industrial leaders and entrepreneurs—that they all have the certainty that their technology pathways for clean, domestic alternatives will be included to lower gasoline consumption.

The CHAIRMAN. Well, I think that's a grand vision, but there is bound to be some scenario that you could envision that gets you to 35 billion gallons equivalent by 2017 and I'm just trying to understand what that is.

Mr. KARSNER. And forgive me because I didn't mean to be elusive. In my own personal view, based on the latest data that I have and the portfolio that I manage, I would imagine that cellulosic ethanol and ethanol in general would make up the overwhelming majority of that, based on what I know today.

Of course, based on what people knew 10 years ago, I think they had no idea about what the status of the technology is today, and so we're trying to be predictive 10 years into the future. But based on what I know today, I have every reason to believe that renewable fuels will constitute the overwhelming majority.

The CHAIRMAN. Do you have a figure you could give us as to how much of the ethanol that you anticipate us using would be imported? Because we do not contemplate in our bill that any of the 36 billion by 2022 would be imported. But I gather that you do contemplate some portion of the 35 billion by 2017 that would be imported. Could you tell us how much?

Mr. KARSNER. I don't think that it would be correct to say that I necessarily contemplate that any of it would be foreign. I think the point is that the bill doesn't necessarily preclude that option in the event that augmentation from foreign sources is needed after U.S. growth is accounted for.

Having said that, there is nothing, again, in today's data set that would lead us to believe that foreign sources of imported ethanol might eclipse our own production if industry were given sufficient policy predictability to grow the industry at home.

The CHAIRMAN. Senator Domenici.

Senator DOMENICI. Thank you very much, Senator Bingaman. Let me say, in asking you and listening to your responses regarding the activity that will take place with reference to loan guaran-

tees, it's one thing to have you up there going back to your office and implementing a bill we pass, because obviously, there is no question that you would be acting on the basis of trying to get it done.

Our problem is, we've been running into legitimate stop-over points in the administration where we run into a post that says, "Stop Here instead of Proceed." It's not you, and that's what we're wondering about, because this one won't work to the fullest without loan guarantees, I think. Is that not true, as you see it?

Mr. KARSNER. I absolutely believe loan guarantees and enabling debt are absolutely fundamental to achieving these goals.

Senator DOMENICI. All right. So when we talk highly of this program, we are at the same time, saying whoever in the administration wants to make their voices heard, come now. Right? That's the way I feel and I hope the Chairman does. As we move through, we've got to be sending out the word and any cabinet members that are going to oppose this, we want to see them. We want to hear them. We don't want them to come in after we've passed the bill and we're back in the same mess we're in now on loan guarantees from the bill we passed however long ago—how long ago was it?

So let me ask—change the subject for a minute. As I understand it, our country does not have a cellulosic ethanol industry today. Why should we lower tariffs on imported ethanol that would undercut a new cellulosic ethanol industry just when we want it to get off the ground?

Mr. KARSNER. I'm not in a position to defend lowering tariffs. To my knowledge, that's not the subject of the current discussion for the administration.

Senator DOMENICI. All right, I understand, it's business in somebody else's shop.

Mr. KARSNER. Could be.

Senator DOMENICI. Maybe. The President's Twenty-in-Ten Initiative, as you point out, would include alternative fuels beyond biofuels, including credits for hydrogen vehicles?

Mr. KARSNER. Correct.

Senator DOMENICI. Both hydrogen and biofuel would require major infrastructure investments up there to make a major contribution to the transportation sector. In your view, should we commit to both of these fuel alternatives, each with massive infrastructure requirements?

Mr. KARSNER. In my view, time matters, and that is part of the reason why we would like to see, from this bill, a greater focus on a manageable timeframe of a decade so that we can focus on what is achievable within the decade and measure ourselves in increments thereof.

I do not think that we take the position that hydrogen will make a significant enough difference within the decade to warrant overemphasis on it at this juncture, at the cost of the other alternative fuels that may make a dent within that timeframe.

Senator DOMENICI. Now let me close my questions by asking—you and your people have gone through this bill. It's a full-blown bill in all detail, and you've had an opportunity to look at that, and you come before us today, and you are telling us the few things

that you think need fixing and with those getting compromised or solved, the bill is ready to go, is that correct?

Mr. KARSNER. We certainly believe that the bill is in the right direction and the right spirit of the President's call for action. There is further collaboration that we could do to tweak elements of the bill to make it more palatable to all sides.

Senator DOMENICI. All right. I thank you, Mr. Chairman. I'll maybe pick one round again, if we have time.

The CHAIRMAN. Thank you.

Senator Salazar.

Senator SALAZAR. Thank you very much, Senator Bingaman and Senator Domenici, for your leadership on this issue and I too, look forward to working with all of you on this committee to develop a robust energy package as we did with the 2005 Energy Policy Act. I appreciate your leadership, Assistant Secretary Karsner, on this issue.

I have two sets of questions. The first one has to do with the RFS that is included in this legislation, and whether or not we are being too timid with respect to the RFS that has been proposed here. I ask that question very much with an open mind and recognizing all the work that has gone into this RFS by this committee.

But if I look at the numbers that we've included in S. 987, at 35 billion gallons per year, that's equivalent, as I understand it, to 1.5 million barrels per day, which essentially is about 10 percent of our oil consumption a year. So I ask myself the question then, if I look out at the year 2022, 15 years from now, we will have embraced an agenda that will essentially move us off of petroleum-based fuels into biofuels to the extent of 10 percent. So my question to you, Andy, is whether or not, from your perspective, that's the right number or whether we have to go higher?

When I look at the Department of Energy Billion-Ton study that was done in 2005, there the Department of Energy concluded that there's enough biomass out there that we might be able to make it to 3.5 million barrels of oil. When I talk to some of the experts at the National Renewable Energy Lab, they tell me that we are at a point where within 3 years, we ought to be able to move forward with the commercialization of cellulosic ethanol.

Yesterday I had a meeting with the Chairman of the Board of BP. They've invested \$500 million in a research project in California. They tell me that they are 3 years away from being able to commercialize their technology with respect to biofuels.

So one of the things that I think we agree on, on a very bipartisan basis here—one of the areas where I think we work closely with the President is this concept that we can get ourselves to a brighter energy future than we've had for the last 30 years. How we set this renewable fuel standard essentially is setting out the vision for how far we think we can go with respect to this agenda, and if the goal that we have set at 36 billion gallons by the year 2022 is getting us only 10 percent of the way there, my question to you from your personal perspective and your personal knowledge, is whether or not that is too low of a reach and whether we ought to go higher?

Mr. KARSNER. That's a great question, sir and I think ultimately time will tell and validate out whether any of these goals are met.

But as we've discussed in this committee before, I very much believe in stretch targets across our entire portfolio. Our motto is "More, Better, Further, Faster" and the question is how much we're going to limit ourselves by our imagination, given what the technological tools are in our toolkit.

So what we do here to form policy will either be an accelerant or an impediment to the market attaining those goals, and it is certainly the case if you cap out the goal lower, the market will definitely perform lower. So it is our goal to have reasonable stretch targets mandated in law as an end-state with enough certainty and predictability to catalyze the market to perform to the higher level. That higher level, as we have put forward, is 15 percent through displacement of alternative fuels within a time period of 10 years, rather than 15 years and meeting another quarter of our national goal through efficiency—vehicular efficiency, elevating and reforming CAFE standards. So we think it is important that the ambition be strong, that it be manageable and that it be in a tighter time-frame.

Senator SALAZAR. I want to continue with questions on this RFS versus the Alternative Fuel Standard, especially as it relates to liquid coal or coals-to-liquid. But I think this may take a little longer than the 31 seconds that I have left so let me just pose the question and then we when come back to the second round, we can continue the conversation.

It seems to me, and many of the members of this committee recognize, that we have substantial coal resources here. We say often that coal is to the United States what oil is to Saudi Arabia. So if we could find a way of utilizing our coal resources without doing damage to our environment, then we ought to move forward with that. We know how we do that. The technology is already out there, and so one of the questions I have is whether it would be possible for us to separate the Renewable Fuel Standards with respect to biofuels from a separate standard that we might follow with respect to coal-to-liquids as an avenue of exploration.

My time is up, Mr. Chairman, but I want to explore that with you in my next round.

Mr. KARSNER. Okay, sir.

The CHAIRMAN. Senator Thomas.

Senator THOMAS. Thank you, sir. I'm going to kind of make a statement rather than ask a question. So at any rate, I think the underlying purpose of this bill is good. We need to reduce our reliance on foreign energy. We have to become better stewards of the environment. We have to utilize our domestic resources but I have some concerns with it. It does not include coal, as just was mentioned. I think over-promoting some of these fuels can have harmful consequences and our infrastructure is not adequate to deliver these fuels under the circumstances that we have now.

So we're considering a bill that says the increased standard is necessary to ensure there is no ethanol glut in the near future. If that's the case, then we've only had this bill for a year and a half. What are going to go by 2009, if that's a true statement and that information?

The right solution, of course, is people want to exceed the RFS and they should be allowed to. The right solution is to let the mar-

ket work, and we don't simply have to increase a mandate every time an excessive level of investment takes place.

I think there are some numbers worth looking at. Certainly, U.S. farmers planted nearly 90 million acres of corn this year. The amount is up 15 percent from last year and 27 percent of that corn is going to be used for ethanol. It has higher prices. Corn is now selling for \$4.20, a little tough on our cattlemen in Wyoming to feed the cattle, and people across the world using corn as a staple for their diets.

We also want to take a look at the money. The Energy Department committed \$23 million to new processes for cellulosic ethanol production. This money is in addition to \$385 million given to six companies for cellulosic ethanol production already. All of this to make sure we produce something other than corn, and yet the bill authorizes \$225 million more to help biofuels. It authorizes over \$1 billion for research and development money as well, and I don't know—it hijacks six loan guarantees issued for DIO fuels that were already there.

I voted for the program in 2005 but I have to look at this spending. I think it's very important. I visited a plant last week in Wyoming that is planning to produce 1 million gallons a year from wood chips and forest wood. I wonder why we continue to research these things. They seem to be done pretty well.

There are 114 ethanol refineries producing 6 billion gallons a year, more than 80 more plants under construction and seven extensions. All this progress, we have zero commercial scale coal-to-liquids prediction that we've had. Why are we not trying to fix that shortcoming in this bill?

We have zero commercial-scale carbon sequestration projects. Why are we not trying to fix that shortcoming with respect to this bill?

So biofuels is not a carbon-neutral approach, entirely. It takes diesel to run the tractors, it takes natural gas to provide the fertilizer, it takes more diesel to run the trucks that deliver. So I just think we have to take a long look at this. I'm for moving in this direction but I think we are overlooking some of the things that we already know how to do, and that can produce a great deal more than we are here. So, Mr. Chairman, I am just looking for a balance as we move forward in this, and I just sense that all I hear from the administration lately is alternative biofuels. Well, I have to tell you that that's out there a ways before there is enough to make a great deal of difference. In the meantime, we know how to do some of these other things where there is a great deal of fuel available, and we are not moving to do Future Gen. We haven't done anything on that.

So I just think we need to look at a balance, and this bill has merit, but I think it also has some troublesome aspects to it. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

Senator SANDERS.

Senator SANDERS. Thank you, Mr. Chairman. Welcome, Mr. Karsner.

Mr. KARSNER. Thank you, sir.

Senator SANDERS. Mr. Karsner, the President's Alternative Fuel Standards Act of 2007, which was sent to the Senate but has not yet been introduced, would require establishment of a "alternative fuels standard of 35 billion by 2017." Now the President defines "alternative fuels" to include biofuels, natural gas, and liquid coal. It goes without saying that I am glad that the Bingaman-Domenici bill is more enlightened on what we should be focusing on.

Why, Secretary Karsner, would the administration promote a fuel, liquid coal, that according to the EPA has carbon emissions that are, at best, 3.7 percent worse than conventional gasoline and at worst, over double the carbon emissions of conventional gasoline? Does the administration pay attention to the IPCC reports, the most recent of which came out last Friday?

Mr. KARSNER. Sir, not only does the administration pay attention to them, we embrace them, we fund them, we support them, we have the scientists that contribute to them very deliberately. So of course, the administration pays attention to the IPCC reports, and with regard to the EPA, they have a very separate function with regard to regulating and taking static snapshots in time of what any existing technology performs. At the Department of Energy, we have a very different mission, which is dedicated to development of those technologies for clean, domestic, affordable output of the energies.

So coal-to-liquids can't be viewed in its current state as something that we expect to expand and proliferate without the technologies that we are currently investing in, namely carbon capture and storage, which would give a very different emissions profile than the one that you just cited from EPA, by way of example. We expect that, and of course, the taxpayer is fully funding those changes as a majority of what's going on in my colleagues' shop in Fossil Energy. So that is why, when we talk about the development of this over the next decade or 20 or 30 years, the role of coal, we recognize, I think, some of the setbacks of coal as we do—

Senator SANDERS. Not setbacks, but the understanding that right now, the fuel you're talking about is a dirty fuel, correct? It's a polluting fuel.

Mr. KARSNER. If the technology is not utilized to give it a low-carbon profile, then it—

Senator SANDERS. Let me reverse—ask you another question regarding the President's proposal for the importation of biofuels to meet the targets the President has put forward. Again, I want to thank the chairman and the ranking member for understanding that we should be investing here in this country to meet important energy goals that will improve our environment, boost our world economies, and enhance our security, as opposed to looking to imports.

Most specifically, the President's proposal will allow the importation of palm oil from Southeast Asia, the production of which is causing incredible deforestation of tropical rain forests. As we all know and as we cut these tropical forests down, we release significant amounts of carbon into the atmosphere. Do you think that this is a good ethic—a good idea as we attempt to deal with the crisis of global warming?

Mr. KARSNER. I understand your concern. I truthfully don't have enough knowledge with regard to the trade policy as it applies to importations of palm oil. I think that would only apply to biodiesel, which of course is a very small contribution overall, but nonetheless an important one. So to the extent that palm oil is being used rather than soy or some of the domestic—I mean, there's a trade issue there that I wouldn't feel comfortable commenting on, because I don't have the facts.

Senator SANDERS. Well, it does concern me that the administration is advocating a proposal that will lead to more carbon emissions. It doesn't make a whole lot of sense.

Mr. KARSNER. I disagree with that. I disagree that this proposal would lead to more carbon emissions.

Senator SANDERS. Okay. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

Let's see. Senator Corker is next.

Senator CORKER. I appreciate your testimony and again, thank our chairman and ranking member for their leadership on this bill. You mentioned the flexibility of not necessarily knowing into the future which technologies will be the ones that actually take off and contribute most, and you mentioned lithium batteries.

How does the administration go about measuring that? I know that all of these goals have been measured in gallons, if you will, so we too, obviously want to see that type of technology take off, and a number of manufacturers around the country are focused on that. But how do you measure that if you will, as it relates to these goals that have been laid out, either in the President's plan or in this bill here?

Mr. KARSNER. Well, it's a very good question because it would be a new technology emerging that we haven't accounted for with a credit system before in either a renewable fuel standard or some other pre-existing Energy Policy Act. We would seek to work together to devise that with Congress.

But presumably you would use it for electricity as a source of energy that displaces gasoline consumption. You would have to come up with a means of measuring it to credit it or conversely, it could be measured in a way that it is now for efficiency, for displacing gasoline consumption as part of a vehicle. We'd really have to figure out what is the appropriate balance. But we're in new territory. It would be a new technology and we expect that technological pathway to be fairly prevalent when we expand beyond biofuels. We expect electricity to be a major contributor. So your question is an important one. We're working now in our National Labs to try and get all of the analogs we have in previous policy. But we would look forward to working with your office and this committee to devise such a system.

Senator CORKER. But I guess the enforcement mechanism here is really focusing on blenders, right? And how much ethanol they're using, and these are actual mandates, I suppose. Do you have any theory about how we might go about doing that? Any theory? Because the mechanism we're going to use, I guess, is with the blenders themselves, is that correct?

Mr. KARSNER. Well, right. As it stands, if you project an evolution of the RFS or along the lines of this legislation, yes. But

there is no doubt that this is a holistic conversation that is going to have to involve the vehicle industry at some point. That is what the President's proposal has sought to do, to include efficiency as well as alternative fuels displacement in a more holistic formula, and we still think that that formula has to hold together, both the fuel providers and producers and the car producers.

Senator CORKER. I think we'd like to talk with you further about that as this bill is moving through, because I think it is something we ought to focus on.

How do you feel about this bill segregating out how much alternative fuel can be produced by corn and how much cannot? What is your general sense of that? Just segregates that out and actually caps corn ethanol at 15 billion gallons?

Mr. KARSNER. We don't view that as productive. Again, we understand what the motive will be but it is definitely a case where we think that the market will determine the equilibrium of a supply and demand of corn, as the evolution of the cellulosic economy builds upon it. Corn will have a natural ceiling, a natural limit, but we don't really view this as a competition between grain ethanol and cellulosic ethanol but rather an evolution of cellulosic ethanol, on top of the existing grain ethanol market.

Senator CORKER. I'm sympathetic to that. Back to the distinguished Senator's liquid coal issue, are there ways that you know of today where this availability, which I know is important to many people—is there a way that we can put in place standards to actually cause this to be a cleaner fuel, and is that something that we're working on right now?

Mr. KARSNER. We are working on that. I hesitate to speak for my colleague, the Assistant Secretary for Fossil Energy on that subject, but being aware of the Department's efforts, of course the primary focus of the Department with regard to fossil energy is clean coal and making it a low carbon source. So there is a heavy technology investment that this committee has authorized and has been appropriated for that purpose, and of course, the very same loan guarantee program has as its condition, reducing, sequestering, avoiding of anthropogenic greenhouse gas emissions. And so, to qualify for that kind of financing that would enable large-scale coal-to-liquids, ultimately, you would need to employ those technologies.

Senator CORKER. I'll just close with 7 seconds left saying that I know we have some bio-research centers. One of those is in Tennessee, actually, that is doing a great job. I worry somewhat about having seven scattered around and not having the funding in place, actually focused appropriately, and I'd love to have any comments as we move along regarding that, maybe at a later questioning time.

The CHAIRMAN. Senator Menendez.

Senator MENENDEZ. Thank you, Mr. Chairman. I'm pleased that we're starting to move on legislation to address some of the energy challenges that we have facing the Nation, and this bill is certainly one step out of many that we'll need to do in order to put ourselves on the path toward a sustainable and healthy energy future.

I do have a few concerns with the bill as written, which I know are shared by some of my colleagues on the committee, such as

making sure that we include appropriate environmental safeguards. I look forward to working with you, Mr. Chairman and Senator Domenici in addressing these as we move forward.

But on the whole, I want to commend both of you and your staffs for putting together an ambitious, forward-looking piece of legislation, and for taking into account some of the challenges faced by parts of the country that do not have robust biofuel production or distributions systems, such as the northeast. There is one modestly-sized biodiesel plant in New Jersey, but no ethanol plants, and to my knowledge, no E-85 pumps. So several sections of the bill, such as the additional bio-research centers and locale transportation grants could, I believe, be very beneficial for those parts of the country that don't have enormous fields of corn and switch grass.

So with that as a preface, let me turn to the Secretary. Mr. Secretary, thank you for your service. At least one of these provisions that I just referred to was in EAct, but that was to be administered by EPA. So Mr. Secretary, do you know what actions the EPA has taken in this regard, and does the Department of Energy have any existing initiatives that look at the specific problems faced by these areas that are outside the corn and grass belt? Second, what's your opinion of the provisions in S. 987 that address that challenge? It's like sections 203, 205, 206.

Mr. KARSNER. Just for clarity, sir, what are the provisions of the EAct you're referring to for the EPA?

Senator MENENDEZ. The ones that were in fact dealing with some of the challenges that I think 203, 205, and 206 actually reflected in this bill.

Mr. KARSNER. I'm not comfortable commenting on EPA's implementation of that. What I can tell you is that EPA, at a high level of my counterpart, meets and participates in our Inter-Agency Biofuels Board and so we do coordinate with him on that. We do very much believe, as you indicate, that regional diffusion efforts are needed, and that one of the great benefits of cellulosic ethanol is the availability of the feedstock across the Nation without a single concentration, as we have with the grain-based ethanol in the Midwest. So it is a substantial part of our focus and to that end, we have begun regional feedstock partnerships that we began funding last year and will expand upon this year.

With regard to the provisions of this bill, I think you're largely talking about the E-85 corridor grants?

Senator MENENDEZ. Well, sections 203, 205, and 206, which deal with bioresearch centers for systems biology programs, grants for renewable fuel production, research and development in certain States, grants for infrastructure, for transportation of biomass to local bio-refineries. There are parts of the country that don't have the enormous fields of corn and switch grass. We're called the Garden State of New Jersey but have cranberry bogs, peach orchards, and great tomatoes. But it's not going to be accessible to parts of the country like mine.

So if we are to have a national strategy, obviously we need to figure out how we incorporate access to biofuels across the landscape of the country, regardless of what that landscape is.

Mr. KARSNER. Right. You shouldn't discount the existing crops in any one part of the country because—

Senator MENENDEZ. I don't.

Mr. KARSNER. Of course, the benefit of the cellulosic is that it includes also urban waste amongst other feedstocks. So one of the feedstocks at one of the six bio-refineries that we are funding is working with Waste Management, by way of example, to mine local green urban waste, which is available in every urban center across the country; agricultural residue, sorghum, etc. So the diversity of the waste streams should enable every part of the country to—

Senator MENENDEZ. So does the administration support these provisions of the bill? Do you have problems with those provisions of the bill?

Mr. KARSNER. I think that we have technical comments. I don't think that they are showstoppers, so to say.

Senator MENENDEZ. Okay.

Mr. KARSNER. But we would want to make sure that they are consistent with market development. I suppose the over-arching thing for the administration is that scale and rate matter, and no provision in this should be an impediment to scaling at the fastest rate that the market will bear over the course of the decade.

Senator MENENDEZ. One last question. One of the things that's obviously a big problem in part of the country is getting the ethanol from plants to consumers. We have a section in the bill that would look at dedicated ethanol pipelines, and that's certainly one potential way to address that issue. But I've been told by the pipeline industry that one of the biggest problems with ethanol is stress, corrosion, and cracking, both in pipelines and in tanks, and that they are currently researching the issue. I'm wondering whether the DOE is undertaking any research into stress corrosion and cracking due to ethanol. Do you have any plans to do so? I know you're coordinating with DOT and the industry on this issue.

Mr. KARSNER. We very much appreciate your question. I had the Acting Deputy Secretary of DOT and his senior team in my office this week precisely to have that level of coordination for a full morning, so that we could attack those questions. That is their domain and of course, the Acting Deputy Secretary also has the portfolio for pipelines. There is wide interest in the pipeline community, not just for dedicated E-85 pipeline transportation where much of those problems occur, but for other intermediate blends as well, and for the use of biobutanol and other biofuel blends that might enable more rapid conversion of their pipeline system.

Senator MENENDEZ. Thank you, Mr. Chairman.

The CHAIRMAN. I want to thank you. Let me just advise folks—there is a vote here at 11 o'clock. So Senator Bunning still has his 5 minutes of questioning and then we will take any last minute urgent questions that need to be asked, and then try to finish with Secretary Karsner before we go to that vote.

Senator Bunning.

Senator BUNNING. Thank you, Mr. Chairman. Secretary, are you familiar with the Princeton study that has shown that coal-to-liquids technology with carbon sequestration and biomass feedstock would have 30 percent less CO₂ emissions compared to fossil fuel?

This is commercially available technology today. Are you familiar with that study?

Mr. KARSNER. I'm not familiar with that particular study, but I'm familiar with comparable studies with comparable findings.

Senator BUNNING. Okay. Just for the committee's information, there is a technology available commercially today that would capture all the carbon as you produced the liquid fuels from coal and therefore, the disposal of or the use of that carbon sequestration or the carbon gas form or whatever form you turn into, whether you put into the ground, or you ship it to an oil field to reconstitute oil wells that are depleted, or whatever you use it for, there is 30 percent less emissions from that than the current fuels that are being used.

One of the things that really bothers me in this bill and you praised it, is that by the fact that we would kind of pick out of the air a number like 35 or 38—why didn't we pick 50 billion gallons or whatever—I think a realistic figure, and I don't think the administration picked a realistic figure, and I don't think this bill picks a realistic figure.

In fact, the Energy Information Administration forecasts 15 billion gallons of renewable fuel could be produced in the United States by 2030. Do you think that the Energy Information Administration is a reasonable agency or forecaster?

Mr. KARSNER. They are my colleagues, of course. I think they are reasonable people doing a very difficult job. You know, if you go back to the EIA's prognosis 10 years ago about what the state of biofuels would be in this country today, you would unlikely find the numbers.

Senator BUNNING. We didn't have the 2005 bill either.

Mr. KARSNER. I'm sorry?

Senator BUNNING. The 2005 bill was not passed.

Mr. KARSNER. Exactly, and so without the appropriate policy stimulus, you cannot expect the market to perform. EIA takes a snapshot in time without this legislation or the President's legislation being considered, and that is why we were saying, a policy stimulus will make the market different and will certainly impact EIA's forecast.

Senator BUNNING. Then you agree that loan guarantees and incentives in the tax code are absolutely necessary to achieve the goal, not only in this bill but in your administration bill?

Mr. KARSNER. Loan guarantees—leveraging capital for capital formation is indispensable to meeting these objectives.

Senator BUNNING. That's one of the things I wanted to make sure of. I'm a lot like Senator Thomas in wondering why this bill would exclude any form of coal-to-liquids or for that matter, some other technologies that are available. I think unless we use the total portfolio of what we know and what we anticipate learning, that we're not going to be able to make the gap and get off the Mid-east oil importation that we want to achieve over a period of 20 years.

Do you and the administration feel the same way?

Mr. KARSNER. The administration agrees that it should be the broadest possible use of all alternative technologies that can displace gasoline for that objective.

Senator BUNNING. Including different types of vehicles and all the things that go with it?

Mr. KARSNER. Yes, sir.

Senator BUNNING. Thank you very much.

The CHAIRMAN. Thank you very much. I did not have additional questions at this time.

Let me call on Senator Domenici for any additional questions he has.

Senator DOMENICI. Mr. Chairman, I'll try to be brief here. In your words, tell us specifically why you think the implementation of loan guarantees is important to our Nation's energy security.

Mr. KARSNER. Thank you, Senator. I view title XVII as one of the most elegant provisions of the Energy Policy Act of 2005 because it openly and with great simplicity offers the Nation what we need: clean, domestic affordable supply. For that supply to take hold—most of which emerges from our portfolio, in terms of diverse sources—they are all capital cost-intensive; that is heavy upfront cost with life cycle savings that give them parity. To recognize the life cycle savings that are intrinsic in renewable technologies, including cellulosic bio-refineries, we have to have debt to cover the out-years and leverage the capital.

Fundamentally, this Nation has less of a technological challenge right now in terms of achieving our goals, and far more of a capital formation challenge in developing the marketplace to achieve these enormous goals. So we need to pivot to have new commercial paradigms. Disruptive technology requires disruptive policy and institutional and organizational approaches. That is what the Loan Guarantee Program gives us.

Senator DOMENICI. Well, what I wanted to say to you, you have just said in your own way, and I didn't have any idea that you got it, but you did. If you read section 17 of the Energy Policy Act, it's pretty obvious that somebody thought instead of trying to enumerate every way to help leverage capital during this transition, a great transitional period, why don't we just do what we did in this section, and say "Make it all available." That's what this says. It talks about loan guarantees and it talks about all the kinds of U.S. Government tools that are going to be available to the capital markets for innovators to use during this very difficult time when there should be plenty of capital leverage, because the price of the product is so high. But there are other things that cause it to go amiss and awry and we put these in its place. It is extremely frustrating to come along and say, now we've got a new one and we want to do this Bingaman and Domenici bill, which is going to take another load off of us because of gasoline use, and then to find everywhere we turn around, that the thing we say is imperative for the application of capital has got something wrong with it.

Now, even on ours, you found something wrong with it today. I urge that we get that out of our way and we get something that is final. Because if you still have problems with the loan guarantee and we still have to go to conference, we don't know where we're going to get language that's right. I think we ought to use this bill to get the right language on the subject. Would you agree with that?

Mr. KARSNER. We would be happy to help you craft that.

Senator DOMENICI. If you'd help us and then we could all say this is it, then all we are waiting for is to finish the bill, which would lend an urgency to the bill, I would think.

Mr. KARSNER. Yes, sir.

Senator DOMENICI. Mr. Chairman, I had another question but I'm going to just hand it to him as part of the record and he'll answer it. It will require a little more work than what we've done now and I'll submit that now.

Thank you very much. Thank you, Mr. Secretary.

Mr. KARSNER. Thank you, sir.

The CHAIRMAN. Thank you.

Senator Salazar.

Senator SALAZAR. Thank you very much, Senator Bingaman. Secretary Karsner, let me ask you again this question about how far you think we might be able to go with respect to the renewable fuel standard? I think back to World War II and the Manhattan Project, 4 years from the start to the finish of that project. I think back to John Kennedy's speech on getting a man to the moon within 10 years and doing it in less than 10 years. I want us to be as aggressive and robust with our renewable fuel standard as we possibly can be. I understand that there is a real calculation that has gone on by staff and my colleagues, including the chairman, to try to come up with what we consider to be a realistic standard that is included in this bill, and I do intend to support this bill.

But my question back again is: if we were to be as absolutely bold as we could be, could we put this standard at a higher number than it currently is? Could we, for example, get the 35 billion gallons by 2017, if we were dependent only on ethanol and cellulosic ethanol? Could we get to that level of production by 2017?

Mr. KARSNER. I believe we could get to that level of displacement of gasoline. I'm not so certain that 100 percent of it would be ethanol exclusively, but I do concur with your premise that our ambitions will define our level of success.

Senator SALAZAR. On the coal-to-liquids issue that I raised with you earlier: that's one of the issues of contention, I think, that we're going to see as we move forward with this debate. Is there a way, from your point of view, that we might be able to separate the coal-to-liquids program from the biofuels program that we are dealing with in this bill? To set up goals with respect to coal-to-liquids production, that we might incorporate into this legislation in the form of some alternative fuel standard or some other way, and at the same time, requiring standards in there that also deal with the carbon emissions issues, which are obviously of concern to many of our colleagues?

Mr. KARSNER. Well, our position is not that it should be added and separated, but that the focus shouldn't be on any one specific technology's role but rather on all of the technologies that Americans can throw at the problem of gasoline consumption reduction. So of course, we favor the inclusion of coal-to-liquid technology, which the taxpayer is heavily investing in, carbon capture storage, IGCC clean coal and low-carbon coal and of course, we would be open to a dialog on how to make that best work in a sustainable way.

Senator SALAZAR. Okay. I know, Mr. Chairman, we have to leave for this vote but let me just say, despite the polarization that exists in this city and with the President today, I think there are many issues that we can work on together in a bipartisan way and one of those, obviously is energy, which I think is one of the signature issues of the 21st century. I appreciate your leadership in helping us figure out the best way to achieve a mutually agreeable goal here.

Mr. KARSNER. Thank you, sir.

The CHAIRMAN. Thank you very much, Secretary Karsner, for your testimony. I think it has been very useful and we will adjourn now and go try and do this vote and return in 10 or 15 minutes for Panel Number 2. Thank you.

Mr. KARSNER. Thank you, sir.

[Recess.]

The CHAIRMAN. Okay, why don't we get started again. Sorry for the delay. They had various ceremonies on the Senate floor that delayed us, but I thank the witnesses on this second panel for waiting and being here today.

Let me just briefly introduce each of the witnesses, and then we'll ask them to give us a summary of their testimony and then we'll have some questions.

First is Bob Dinneen, who is the president and chief executive officer of the Renewable Fuels Association. Next is Daniel Lashof, who is the science director with the Climate Center, the Natural Resources Defense Council. Also here is Red Cavaney, who is president and chief executive officer for the American Petroleum Institute, and Brian Foody who is the chief executive officer with Iogen Corporation in Ottawa, Ontario, Canada. Thank you very much, all of you, for being here and we look forward to your testimony. Why don't we just go in the order I introduced you? Then we will try to have some questions after you're all finished testifying.

Mr. Dinneen, thanks for being here.

**STATEMENT OF BOB DINNEEN, PRESIDENT AND CHIEF
EXECUTIVE OFFICER, RENEWABLE FUELS ASSOCIATION**

Mr. DINNEEN. Thank you, Mr. Chairman. Thank you, Senator Domenici and Senator Salazar for your collective leadership on renewable fuels and these issues. It is my pleasure to be able to testify on behalf of the U.S. ethanol industry in support of the Biofuels for Energy Security and Transportation Act, and I can tell you it's not just because of the acronym that we believe that this the best of the bills that have been introduced on these issues over the past several months.

We think it strikes the right balance between incentivizing cellulose while maintaining the growth market for grain ethanol that has already occurred. And indeed, you really can't talk about this bill without understanding what you all accomplished with the Energy Policy Act of 2005, a terrific piece of legislation that has absolutely worked. It has absolutely done what you all intended it to do. It sent the refining industry the message that the future included ethanol and biodiesel. It sent a strong signal to the financial community to invest in these new technologies and it certainly sent

a clarion call to the U.S. ethanol industry to expand, and expand we have.

Since August 2005, when President Bush signed the Energy Policy Act, more than 15 ethanol plants have opened up, but a number have broken ground, begun construction. Today there are 79 ethanol plants that are under construction. That's steel on the ground, welders welding, the facilities going up that will add 6 billion gallons of new capacity to the existing 115 ethanol plants that today have a capacity of 6 billion gallons that are processing 2 billion bushels of grain, corn and sorghum into high-value, high-octane fuel components.

The Energy Policy Act of 2005 stimulated the growth in this industry that we're seeing today, and it has been terrific. The fact of the matter is, since 2000, 30 percent of the increase in gasoline consumption has been met with ethanol but if you look at a shorter timeframe, last year, gasoline consumption increased by essentially about a billion gallons a year. We added more than a billion gallons just in ethanol production capacity.

Today, ethanol is blended in 46 percent of the Nation's fuel, literally coast-to-coast and border-to-border, and I have to give great credit to the refineries, the gasoline marketers across this country that have invested in infrastructure and made certain that the renewable fuel standard has been implemented successfully.

I take great pride in the fact that we've worked extraordinarily well with our customers in the refining industry to make sure that the renewable fuel standard—that the regulatory language was actually just finalized yesterday, but it's already been in place since January 2006 and it has gone extremely well.

People thought it couldn't be done. People thought that 7½ billion gallons in 2005 was too big a number, that there's no way the ethanol industry could build that fast, that there's no way the infrastructure would expand to allow ethanol to be shipped all across the country. What we've demonstrated is, that was not too big a target. What we demonstrated is, the marketplace was given an important signal and the marketplace responds.

Indeed, 7½ billion gallons will be met likely some time this summer, not in 2012. So I think, in answer to Senator Salazar's question earlier, the goals that are being set in this bill—35 billion gallons by 2022 are eminently achievable. We believe that this bill can do for cellulosic ethanol what EAct did for grain-derived ethanol.

We realize that there are limits to how much ethanol we're going to be able to produce from grain, and that is why every single ethanol plant that I represent has a very aggressive cellulose-to-ethanol research program underway today, and this bill is going to allow that to move forward. By creating a certain and aggressive market for cellulosic ethanol, you will inspire the financial community to invest in cellulose with the same enthusiasm that it has for grain. You will compel research institutions to attack the remaining technical barriers to cellulose with more urgency, and you will clearly provide an important signal to our industry to move with greater speed toward commercializing these newer technologies.

As important as the car route for cellulose is to ensure production, it is equally important to ensure that there are markets for that product. Thus, the RFA is very appreciative of the focus of S.

987 on studying the potential for higher-level blends, on creating incentives for E-85 corridors, and researching the possibilities of optimizing E-85 technology.

S. 987 builds upon the success of EPAct. It builds upon several legislative initiatives that have been introduced in this Congress to expand the production and use of biofuels. It is a thoughtful, constructive, comprehensive and achievable piece of legislation. The RFA is proud to support it and we look forward to working with you, Mr. Chairman and this committee, to iron out the few technical issues that remain and to move forward with this important piece of legislation. Thank you.

[The prepared statement of Mr. Dinneen follows:]

PREPARED STATEMENT OF BOB DINNEEN, PRESIDENT AND CHIEF EXECUTIVE OFFICER,
RENEWABLE FUELS ASSOCIATION

Good morning, Chairman Bingaman, Ranking Member Domenici, and Members of the Committee. My name is Bob Dinneen and I am president and CEO of the Renewable Fuels Association, the national trade association representing the U.S. ethanol industry.

This is an important and timely hearing, and I am pleased to be here to discuss the future of our nation's ethanol industry and how the bipartisan Biofuels for Energy Security and Transportation Act of 2007 (S. 987) can help our country achieve its energy security goals.

Due to the visionary and invaluable work of this Committee in the 109th Congress, the Energy Policy Act of 2005 (EPAct 2005) put our nation on a new path toward greater energy diversity and national security through the RFS. EPAct 2005 has stimulated unprecedented investment in the U.S. ethanol industry. Since January of 2006, when the RFS went into effect, no fewer than 15 new ethanol biorefineries have begun operation, representing some 1.2 billion gallons of new production capacity. These new gallons represent a direct investment of more than \$1.8 billion and the creation of more than 22,000 new jobs in small communities across rural America.

The RFS has done exactly what Congress intended. It provided our industry with the opportunity to grow with confidence. It convinced the petroleum industry that ethanol would be a significant part of future motor fuel markets and moved them toward incorporating renewable fuels into their future plans. It persuaded the financial community that biofuels companies are growth market opportunities, encouraging significant new investment from Wall Street and other institutional investors. If a farmer in Des Moines doesn't want to invest in the local co-op, he can choose to invest in a publicly traded ethanol company through the stock market. As can a schoolteacher in Boston, or a receptionist in Seattle. Americans coast-to-coast have the opportunity to invest in our domestic energy industry, and not just in ethanol, but biodiesel and bio-products.

In addition to the RFS, many of the other programs authorized by EPAct 2005, such as the loan guarantee and grant programs, will accelerate the commercialization of cellulosic ethanol and make the new goals set forth in S. 987 absolutely achievable. Many of the provisions included in S. 987 build upon the programs designed by this Committee and included in EPAct 2005 to further expand the domestic renewable fuels industry. The Senate Energy and Natural Resources Committee will have an invaluable role to play in making sure our nation successfully moves toward increasing the use of domestic, renewable energy sources.

BACKGROUND

Today's ethanol industry consists of 115 biorefineries located in 19 different states with the capacity to process almost 2 billion bushels of grain into 5.7 billion gallons of high octane, clean burning motor fuel, and more than 12 million metric tons of livestock and poultry feed. It is a dynamic and growing industry that is revitalizing rural America, reducing emissions in our nation's cities, and lowering our dependence on imported petroleum.

Ethanol has become an essential component of the U.S. motor fuel market. Today, ethanol is blended in more than 46% of the nation's fuel, and is sold virtually from coast to coast and border to border. The almost 5 billion gallons of ethanol produced and sold in the U.S. last year contributed significantly to the nation's economic, en-

vironmental and energy security. According to an analysis completed for the RFA,¹ the approximately 5 billion gallons of ethanol produced in 2006 resulted in the following impacts:

- Added \$41.1 billion to gross output;
- Created 160,231 jobs in all sectors of the economy;
- Increased economic activity and new jobs from ethanol increased household income by \$6.7 billion, money that flows directly into consumers' pockets;
- Contributed \$2.7 billion of tax revenue for the Federal government and \$2.3 billion for State and Local governments; and,
- Reduced oil imports by 170 million barrels of oil, valued at \$11.2 billion.

In addition to providing a growing and reliable domestic market for American farmers, the ethanol industry also provides the opportunity for farmers to enjoy some of the value added to their commodity by further processing. Farmer-owned ethanol plants account for 43 percent of the U.S. fuel ethanol plants and almost 34 percent of industry capacity.

There are currently 79 biorefineries under construction. With seven existing biorefineries expanding, the industry expects more than 6 billion gallons of new production capacity to be in operation by the end of 2009. The following is our best estimate of when this new production will come online.*

FEEDSTOCKS

To date, the U.S. ethanol industry has grown almost exclusively from grain processing. As a result of steadily increasing yields and improving technology, the National Corn Growers Association (NCGA) projects that by 2015, corn growers will produce 15 billion bushels of grain. According to the NCGA analysis, this will allow a portion of that crop to be processed into 15 billion gallons of ethanol without significantly disrupting other markets for corn. Ethanol also represents a growing market for other grains, such as grain sorghum. Ethanol production consumed approximately 26 percent of the nation's sorghum crop in 2006 (domestic use). Research is also underway on the use of sweet and forage sorghum for ethanol production. In fact, the National Sorghum Producers believe that as new generation ethanol processes are studied and improved, sorghum's role will continue to expand.

In the future, however, ethanol will be produced from other feedstocks, such as cellulose. Ethanol from cellulose will dramatically expand the types and amount of available material for ethanol production, and ultimately dramatically expand ethanol supplies. Many companies are working to commercialize cellulosic ethanol production. Indeed, there is not an ethanol biorefinery in production today that does not have a very aggressive cellulose ethanol research program. The reason for this is that today's ethanol producers all have cellulose already coming into the plant in the form of corn fiber. Producers are making good use of all parts of the corn kernel—beyond just the starch. Several ethanol producers are working on technology to turn the fiber in a corn kernel into ethanol through fermentation. Since fiber represents 11 percent of the kernel, this could lead to dramatic increases in ethanol production efficiency. If today's producers can process these cellulosic materials into ethanol, they will have a significant marketplace advantage. The RFA believes cellulose ethanol will be commercialized first by current producers who have these cellulosic feedstocks at their grain-based facilities. It is essential to the advancement of the ethanol industry that these "bridge technology" cellulosic feedstocks be included in the definition of advanced biofuels.

Further, biotechnology will play a significant role in meeting our nation's future ethanol needs. Average yield per acre is not static and will increase incrementally, especially with the introduction of new biotech hybrid varieties. According to NCGA, corn yields have consistently increased an average of about 3.5 bushels per year over the last decade. Based on the 10-year historical trend, corn yield per acre could reach 180 bushels by 2015. For comparison, the average yield in 1970 was about 72 bushels per acre. Agricultural companies like Monsanto believe we can achieve corn yields of up to 300 bushels per acre by 2030. It is not necessary to limit the potential of any feedstock—existing or prospective. Ultimately, the marketplace will determine which feedstocks are the most economically and environmentally feasible.

While there are indeed limits to what we will be able to produce from grain, cellulose ethanol production will augment, not replace, grain-based ethanol. The conversion of feedstocks like corn stover, corn fiber and corn cobs will be the "bridge

¹Contribution of the Ethanol Industry to the Economy of the United States, Dr. John Urbanchuk, Director, LECG, LLC, December, 2006.

*Graphic has been retained in committee files.

technology” that leads the industry to the conversion of other cellulosic feedstocks and energy crops such as wheat straw, switchgrass, and fast-growing trees. Even the garbage, or municipal solid waste, Americans throw away today will be a future source of ethanol.

RESEARCH & DEVELOPMENT, DEPLOYMENT AND COMMERCIALIZATION OF
NEW TECHNOLOGIES

The ethanol industry today is on the cutting edge of technology, pursuing new processes, new energy sources and new feedstocks that will make tomorrow’s ethanol industry unrecognizable from today’s. Ethanol companies are already utilizing cold starch fermentation, corn fractionation, and corn oil extraction. Companies are pursuing more sustainable energy sources, including biomass gasification and methane digesters. And, as stated, there is not an ethanol company represented by the RFA that does not have a cellulose-to-ethanol research program. These cutting edge technologies are reducing energy consumption and production costs, increasing biorefinery efficiency, improving the protein content of feed co-products, utilizing new feedstocks such as cellulose, and reducing emissions by employing best available control technologies.

The technology exists to process ethanol from cellulose feedstocks; however, commercialization of cellulosic ethanol remains a question of economics. The capital investment necessary to build cellulosic ethanol facilities remain about five times that of grain-based facilities. Those costs will, of course, come down once the first handful of cellulosic facilities are built, the bugs in those “first mover” facilities are worked out, and the technology continues to advance. The enzymes involved in the cellulosic ethanol process remain a significant cost, as well. While there has been a tremendous amount of progress over the past few years to bring the cost of those enzymes down, it is still a significant cost relative to processing grain-based ethanol.

To continue this technological revolution, however, continued government support will be critically important. The biomass, bioresearch, and biorefinery development programs included in S. 987 will be essential to developing these new technologies and bringing them to commercialization. Competitively awarded grants and loan guarantees that build upon the existing programs authorized in EPAct 2005 and enhanced in S. 987 will allow technologically promising cellulosic ethanol projects move the industry forward become a reality.

INFRASTRUCTURE

Ethanol today is largely a blend component with gasoline, adding octane, displacing toxics and helping refiners meet Clean Air Act specifications. But the time when ethanol will saturate the blend market is on the horizon, and the industry is looking forward to new market opportunities. As rapidly as ethanol production is expanding, it is possible the industry will saturate the existing blend market before a meaningful E-85 market develops. In such a case, it would be most beneficial to allow refiners to blend ethanol in greater volumes, e.g., 15 or 20 percent. The ethanol industry today is engaged in testing on higher blend levels of ethanol, beyond E-10. There is evidence to suggest that today’s vehicle fleet could use higher blends. An initial round of testing is underway, and more test programs will be needed. A study of increased blend levels of ethanol, included in S. 987, will be an essential and necessary step to moving to higher blend levels with our current vehicle fleet. Higher blend levels would have a significant positive impact on the U.S. ethanol market, without needing to install new fuel pumps and wait for a vehicle fleet to turn over in the next few decades. It would also allow for a smoother transition to E-85 by growing the infrastructure more steadily.

Enhancing incentives to gasoline marketers to install E-85 refueling pumps will continue to be essential. There are now more than 1,000 E-85 refueling stations across the country, more than doubling in number since the passage of EPAct 2005. The RFA also supports the concept of regional “corridors” that concentrate the E-85 markets first where the infrastructure already exists, which is reflected in S. 987 in the infrastructure pilot program for renewable fuels.

Over the past several years, the ethanol industry has worked to expand a “Virtual Pipeline” through aggressive use of the rail system, barge and truck traffic. As a result, we can move product quickly to those areas where it is needed. Many ethanol plants have the capability to load unit trains of ethanol for shipment to ethanol terminals in key markets. Unit trains are quickly becoming the norm, not the exception, which was not the case just a few years ago. Railroad companies are working with our industry to develop infrastructure to meet future demand for ethanol. We are also working closely with terminal operators and refiners to identify ethanol storage facilities and install blending equipment. We will continue to grow the nec-

essary infrastructure to make sure that in any market we need to ship ethanol there is rail access at gasoline terminals, and that those terminals are able to take unit trains. Looking to the future, studying the feasibility of transporting ethanol by pipeline from the Midwest to the East and West coasts, as proposed in S. 987, will be critical.

As flexible fuel vehicle (FFV) production is ramped up, it is important to encourage the use of the most efficient technologies. Some FFVs today experience a reduction in mileage when ethanol is used because of the differences in BTU content compared to gasoline. But the debit can be easily addressed through continued research and development. For example, General Motors has introduced a turbo-charged SAAB that experiences no reduction in fuel efficiency when E-85 is used. There is also technology being developed that utilizes "variable compression ratio engines" that would adjust the compression ratio depending on the fuel used. Thus, if the car's computer system recognized E-85 was being used, it would adjust the compression ratio to take full advantage of ethanol's properties. RFA supports the further study of how best to optimize technologies of alternative fueled vehicles to use E-85 fuel as included in S. 987. The study of new technologies could dramatically improve E-85 economics by eliminating or substantially reducing the mileage penalty associated with existing FFV technology.

CONCLUSION

The continued commitment of the 110th Congress, this Committee, and the introduction of legislation such as S. 987 will all contribute to ensuring America's future energy security. Chairman Bingaman and Ranking Member Domenici, you have made clear your commitment to the hardworking men and woman across America who are today's newest energy producers.

There have been numerous bills introduced in the first few months of the 110th Congress to further expand the rapidly growing domestic biofuels industry that will soon eclipse the current RFS. Many of the sound provisions included in those bills to move the industry forward and create new market opportunities for biofuels are incorporated in S. 987. With minimal modifications, S. 987 strikes the right balance between incentivizing cellulosic ethanol technologies, developing the necessary infrastructure, moving beyond existing blend markets for ethanol, and capitalizing on the momentum created by EPAct 2005. The RFA looks forward to working with you to further develop this important legislation.

Thank you.

The CHAIRMAN. Thank you very much. Before we go on to Mr. Lashof, I think Senator Domenici wanted to make a statement. He's going to have to leave. Why don't you go right ahead?

Senator DOMENICI. Thank you, Mr. Chairman. I'm hoping that the Senator from Tennessee can spend some time here in my stead. Can you do that?

Senator CORKER. For a little while, yes, sir.

Senator DOMENICI. For a little while? Thank you. I just want to say to all the witnesses, we will thoroughly analyze your statements and also any questions that are asked of you and any questions that I have, I will just submit in writing.

I would say to you, Red, representing the Independent Petroleum people, I do hope you are not looking on this bill unfavorably, because I believe it is good for everybody, including the independent producers that I represent in one way and you represent in another way. I just hope that we can work together and get this done as soon as possible.

Thank you, Senator Bingaman.

The CHAIRMAN. Thank you very much. Mr. Lashof, thank you very much for being here.

STATEMENT OF DANIEL A. LASHOF, SCIENCE DIRECTOR, CLIMATE CENTER, NATURAL RESOURCES DEFENSE COUNCIL

Mr. LASHOF. This is actually my third opportunity to testify before this committee this year, which I'm told will set some kind of

record. I don't know if you keep asking me back because you appreciate my testimony or you hope with enough practice, I'll get it right. But in any case, I do appreciate the opportunity.

As you know and as you have exercised a lot of leadership, U.S. energy policy must address three major challenges: reducing America's dangerous dependence on oil, first; reducing global warming and pollution, second; and, providing affordable energy services that sustain a robust economy, third—not in order of priority. All three must be addressed together.

Biofuels has the potential to contribute significantly to all three of these goals. Sustainably-produced biofuels, processed efficiently and used in efficient vehicles, can reduce our dependence on oil for transportation, reduce emissions of heat-trapping pollution, and contribute significantly to a vibrant farm economy.

Pursued without adequate safeguards and incentives, however, biofuels production does carry grave risks for our lands, forests, water, wildlife, public health, and climate. And while S. 987 addresses some of these concerns, in its current form, I don't believe that it does have the adequate standards and incentives that are needed to ensure that biofuels are part of the solution rather than part of the problem.

As introduced, the bill distinguishes between conventional biofuels defined as corn kernels and advanced biofuels basically defined as anything else. It would limit a portion of the overall renewable fuel standard that could be satisfied with corn to 15 billion gallons. Certainly, I think that's helpful because it ensures the diversification of our feedstocks for producing biofuels, but it really is not an adequate substitute for an explicit greenhouse gas performance standard and sustainable feedstock sourcing requirements.

The reason is that the choice of feedstock is just one of many factors that really needs to be considered in evaluating the environmental impact of biofuels on production. Additional factors include one: the carbon emissions from converting land from other uses to feedstock production; two, the tillage method that is used; three, the energy used for irrigation; four, the fertilizer application rate; five, the source of thermal energy used and the electricity at the bio-refinery; six, the overall efficiency of the bio-refinery; and seven, whether the CO₂ produced from fermentation is sequestered underground or put into the atmosphere.

When you consider all of these factors together, it's possible to produce corn ethanol that has a very substantial greenhouse gas benefit or one that has no benefit at all and similarly, it's possible for cellulosic ethanol to have very substantial greenhouse gas benefit or actually make emissions worse.

If we could put that chart—that shows some of this, and I'll refer to it in a minute. Let me give you an example. If you consider a dry mill ethanol plant that is using corn produced with no-till cultivation, and it uses corn for its thermal energy rather than fossil fuels, and finally that takes the CO₂ that is produced as a pure stream from fermentation and injects that underground for sequestration, using the Argonne National Laboratory GREET Model, which is the same model that was used by EPA in their Fact Sheet—we estimate that the life cycle of greenhouse gas emissions

from ethanol produced from such a plant would be 7.5 pounds per gallon of gasoline-equivalent produced.

That's about 70 percent lower than gasoline. So that's—starting with corn, it's possible to achieve 70 percent reductions, while the average for run-of-the-mill plants is somewhere around 15 to 20 percent, maybe 25 depending on what study you get. So there is a huge variation depending on the specifics of how it's produced.

Now, if you consider a cellulosic ethanol plant as an alternative, cellulosic ethanol generally is assumed to produce much greater environmental benefits and the potential for that is certainly there. But it's not necessarily the case. For example, if the biomass that's used in the cellulosic ethanol plant comes from converting forests that have been grown on Conservation Reserve Program lands to go into energy crop production, then by clearing those forests, you're going to put the CO₂—the carbon that was accumulated in those forests, say over a 15-year contract life—that's going to go back into the atmosphere very quickly. You're losing the future potential for those forests to take additional carbon out of the atmosphere, and when you take that into account, even though the cellulosic ethanol itself is producing a climate benefit, it would take many, many years to make up for the carbon losses that would occur by converting those forest lands to mass production.

So to me, that means that we really need to include explicit standards for life cycle greenhouse gas emissions in any legislation, that would mandate a substantial increase in biofuels, both beyond where the current renewable fuel standard does.

Specifically, I'd suggest that for conventional biofuels, at least a 15 percent improvement relative to gasoline. That's certainly achievable. With corn technology today, it's being done with new plants that are being built all the time, and it's about what the average for the industry as a whole is doing.

For advanced biofuels, I think we can do much better, at least a 50 percent reduction in greenhouse gas emissions compared with gasoline, and I think we really need to build incentives into the bill to meet and achieve those standards.

Second, it's really important for the biomass used for biofuels to be produced from—in a sustainable way and not from environmentally-sensitive lands.

Third, we need to ensure that the conservation of wetland reserve programs supported by the farm bill continue to be managed primarily for those conservation benefits, and not converted just to energy production and losing those benefits.

Fourth, I believe that there should be certification standards and incentives established as part of the overall program to promote best management practices for biomass production on private lands. It should address protection of wildlife habitat, prevention of erosion, conservation of soil and water resources, nutrient management, and selection of appropriate species as well as biologically-integrated pest management.

Finally, if I could just close with a few comments on implementation of the renewable fuel standard. Earlier this week as you know, the Environmental Protection Agency issued its final rules to implement the RFS that was passed in the 2005 Energy Policy Act. Congress appropriately assigned the responsibility to implement

the RFS to EPA in the 2005 Act because EPA has the authority to regulate transportation fuels under the Clean Air Act, and has the mission to ensure that this is implemented in a way that protects air quality. I believe that any expansion of the renewable fuel standard should also be given to EPA to implement. They can do that by building on the renewable identification number system that they establish to implement the existing renewable fuels standard. EPA has already done a lot of staff work to look at how that could be expanded to incorporate life cycle greenhouse gas analysis, to implement a bill of that kind.

So I do urge this committee to work with your colleagues in the Environmental and Public Works Committee to bring legislation to the Senate that incorporates appropriate safeguards and implementation provisions to move us forward on biofuels.

I do believe that biofuels—

The CHAIRMAN. Could you try to summarize the remainder of your comments?

Mr. LASHOF. I'm concluding that biofuels holds great promise for reducing global warming, pollution and breaking our dangerous oil addiction, as well as revitalizing rural economies as long as appropriate standards and incentives are used to shape the Nation's bio-energy industry to provide those benefits with a sound and truly sustainable framework. I look forward to working with you and members of the committee to achieve those goals. Thank you.

[The prepared statement of Mr. Lashof follows:]

PREPARED STATEMENT OF DANIEL A. LASHOF, SCIENCE DIRECTOR, CLIMATE CENTER,
NATURAL RESOURCES DEFENSE COUNCIL

INTRODUCTION

Thank you for the opportunity to share my views regarding S. 987, the Biofuels for Energy Security and Transportation Act of 2007. My name is Daniel A. Lashof, and I am the science director of the Climate Center at the Natural Resources Defense Council (NRDC). NRDC is a national, nonprofit organization of scientists, lawyers and environmental specialists dedicated to protecting public health and the environment. Founded in 1970, NRDC has more than 1.2 million members and online activists nationwide, served from offices in New York, Washington, Los Angeles and San Francisco.

Mr. Chairman, as you know, U.S. energy policy must address three major challenges: reducing America's dangerous dependence on oil, reducing global warming pollution, and providing affordable energy services that sustain a robust economy. Biofuels have the potential to contribute significantly to all three of these goals. Sustainably-produced biomass feedstocks, processed efficiently and used in efficient vehicles can reduce our dependence on oil for transportation, reduce emissions of heat-trapping carbon dioxide, and contribute significantly to a vibrant farm economy. Pursued without adequate guidelines, however, biofuels production carries grave risk to our lands, forests, water, wildlife, public health and climate. While S. 987 addresses some of these concerns, in its current form it does not have adequate standards and incentives to ensure that biofuels are part of the solution, rather than part of the problem.

Accelerated corn cultivation for ethanol, for example, threatens to deplete water tables, magnify contamination by fertilizers, pesticides, and herbicides, and undermine vital conservation programs such as the Farm Bill's Conservation Reserve Program. On farms and in forests across the country and abroad, imprudent biomass harvesting would cause soil erosion, water pollution, and habitat destruction, while also substantially reducing the carbon sequestered on land. Advancing a biofuels policy that increases lifecycle greenhouse gas emissions would be a particularly perverse result for a policy that is intended, at least in part, to reduce global warming pollution.

THE NEED FOR PERFORMANCE STANDARDS

As introduced, S. 987 distinguishes between “conventional biofuel,” defined as ethanol derived from corn kernels, and “advanced biofuels,” which is essentially fuel derived from any other form of biomass, other than old growth forests. The bill would limit the portion of the overall renewable fuels standard that can be satisfied with conventional biofuels to 15 billion gallons. Structuring the standard in this way to ensure the diversification of feedstocks used for biofuels production is very helpful, but is not an adequate substitute for explicit greenhouse gas performance standards and sustainable feedstock sourcing requirements.

In structuring an effective biofuels policy it is important to recognize that the choice of feedstocks is just one of many factors that influence the environmental impacts of biofuels production. Key factors to consider in addition to feedstock type are carbon emissions from converting land from other uses to feedstock production, tillage method, energy use for irrigation, fertilizer application rate, the source of thermal energy and electricity at the biorefinery, the overall efficiency of the biorefinery, and whether CO₂ produced during fermentation is sequestered or released into the atmosphere. Considering all of these factors it is possible to produce ethanol derived from corn in a way that produces less than half of the lifecycle greenhouse gas emissions of gasoline (per BTU of delivered fuel). Conversely it is possible to produce ethanol from cellulosic feedstocks in a manner that produces far more CO₂ than gasoline.

First consider a dry mill corn ethanol plant. Greenhouse gas emissions from corn production can be minimized by obtaining the corn from a farm that practices no-till cultivation. In addition, by collecting a portion of the corn stover along with the grain the ethanol plant can meet its thermal energy needs with this biomass energy source rather than fossil fuels. Finally, fermentation produces carbon dioxide in a pure stream that can be easily captured for geologic sequestration. Using Argonne National Laboratory’s GREET model, we estimate that the lifecycle greenhouse gas emissions from ethanol produced at such a plant would be 7.5 pounds per gasoline gallon equivalent, or more than 70% lower than gasoline. NRDC has examined the greenhouse gas emissions from a wide variety of feedstock and conversion process combinations using the Argonne GREET model (see Figure 1* and Appendix). EPA conducted a similar analysis for a fact sheet released in conjunction with its final rule for implementing the Renewable Fuels Standard enacted in EPACT 2005.¹ EPA’s results are shown in Figure 2* and are very similar to ours (note that EPA displays results relative to conventional gasoline, which is set to zero on their chart.)

Now consider a cellulosic ethanol plant. While such plants are often considered to be environmentally superior to corn ethanol plants, this is not necessarily the case, depending on how the cellulosic feedstock is produced. For example, if the biomass for the cellulosic ethanol plant is obtained by converting to biomass production land that had been enrolled in the conservation reserve program (CRP), then the forgone conservation benefits and carbon benefits must be accounted for. The CRP has enrolled more than 1 million acres in forest cover, including hardwoods, longleaf pine, and other softwoods. While these are secondary, rather than old growth, forests, they nonetheless provide important ecological services and sequester a substantial amount of carbon. Converting such lands to biofuels production would not only rapidly return to the atmosphere the carbon sequestered since the trees were planted, but would also forgo future carbon sequestration on this land. The net result would be CO₂ emissions to the atmosphere many times greater than the annual greenhouse gas benefits from cellulosic ethanol production on this land.

Land conversion need not be this direct to undermine the environmental benefits of biofuel production. Devoting an increased share of U.S. agricultural output to fuel production rather than grain exports will result in increased demand for animal feed from sources abroad. If any significant portion of this additional feed is obtained by converting mature forests into pasture or cropland the CO₂ emissions from this land use change could greatly exceed the emission reductions from the use of biofuels.

BIOFUELS ENVIRONMENTAL PERFORMANCE PRINCIPLES

Fortunately, the benefits of biofuels can be realized, and the potential pitfalls avoided, through carefully crafted policy. Here I outline key principles that should be incorporated into S. 987 through a combination of more robust limitations on what qualifies as a renewable fuel and incentives to promote voluntary management

* Graphics have been retained in committee files.

¹ <http://www.epa.gov/otaq/renewablefuels/420f07035.htm>.

practices that protect ecological values. These principles were endorsed by twelve leading environmental organizations in a letter sent to Congress on March 27th.

The Use of Bioenergy Must Reduce Greenhouse Gas Emissions

To assure benefits, new incentives and requirements for increased use of biofuels need to be tied to significant reductions in the greenhouse gas intensity of these fuels. As discussed above, this requires explicit greenhouse gas performance standards rather than an implicit assumption that certain feedstocks will produce greater benefits than others. I suggest that conventional biofuels be required to achieve at least a 15% reduction in lifecycle greenhouse gas emissions compared to conventional gasoline. This level of performance can easily be achieved with efficient corn ethanol plants as shown in Figure 1. Advanced biofuels should achieve at least a 50% reduction in lifecycle greenhouse gas emissions, which can be accomplished through several different feedstock and conversion process combinations. In addition to these minimum requirements, incentives for continuous improvement should also be established by requiring progressive reductions in the average greenhouse gas emissions of all transportation fuels.

Biomass Used for Bioenergy Has To Be Renewable

Biomass must be regrown on site, recapturing its released carbon, so that it is genuinely sustainable—unless it is the by-product of activity with independent, over-riding social utility (like removal of vegetation immediately around wildland-interface homes). Greenhouse gas emissions from land-use change associated with biofuels production, both directly and indirectly, must be accounted for to ensure that biofuels are genuinely renewable and produce net environmental benefits. If wastes are used, care must be taken to prevent combustion of any toxic materials, such as pressure treated or painted wood products. In addition, material such as post-consumer waste paper should be recycled rather than converted to fuel in order to reduce the pressure on forests for virgin fibers.

Bioenergy Feedstocks Must not Be Grown on Environmentally Sensitive Lands

The exclusion of biomass from old growth forests in S. 987 is a start, but this exclusion should be expanded to cover wilderness study areas; roadless areas on national forests; native grasslands; important wildlife habitat; ecosystems that are intact, rare, high in species richness or endemism, or exhibit rare ecological phenomena.

Conversion of Natural Ecosystems Must Be Avoided

Habitat loss from the conversion of natural ecosystems represents the primary driving force in the loss of biological diversity worldwide. Activities to be avoided include those that alter the native habitat to such an extent that it no longer supports most characteristic native species and ecological processes.

Exemptions and Waivers From Environmental Rules Must not Be Used To Promote Biomass Production or Utilization

Trading one serious environmental harm for another is poor policy. Our environmental laws and regulations act as a fundamental system of checks and balances to guard against just such collateral damage and the promotion of bioenergy production and utilization must in no way be exempted.

Conservation and Wetland Reserve Programs Supported by the Farm Bill Must Be Managed for Their Conservation Benefits

These programs protect marginal lands, water quality, soil, and wildlife habitat. Enrolled lands need to be managed principally for these important values, not bioenergy feedstocks.

Independent Certification, Market Incentives, and Minimum Performance Requirements Are Necessary To Ensure That Bioenergy Feedstocks Are Produced Using Sustainable Practices

Certification standards for biomass from private lands must address key environmental and social objectives, such as protection of wildlife habitat, prevention of erosion, conservation of soil and water resources, nutrient management, selection of appropriate feedstock species, and biologically-integrated pest management. New policies are needed to ensure that producers, refiners and distributors adhere to minimum performance requirements and have incentives to maximize environmental performance at each step.

Stringent Safeguards Must Be Established for Bioenergy Production From Feedstock Derived From Federal Land

Federal lands, including wildlife refuges, BLM lands, national forests and grasslands, are held subject to the public's interest in their non-commodity values. They are not appropriate for large-scale, sustained biomass sourcing.

IMPLEMENTING A RENEWABLE FUELS STANDARD

Earlier this week EPA issued its final rules to implement the renewable fuels standard (RFS) enacted as part of the 2005 Energy Policy Act. Congress appropriately assigned this responsibility to EPA as it has the authority to regulate transportation fuels under the Clean Air Act as well as experience with implementing credit trading programs. Any expansion of the RFS should similarly be implemented by EPA and should be on the system of Renewable Identification Numbers (RINs) established by EPA to implement the existing program.

EPA has also already explored how the RIN system could be expanded to track environmental practices in biofuel feedstock production as well as lifecycle greenhouse emissions. While some may argue that there is insufficient information available to implement a program based on lifecycle greenhouse gas emissions this is not the case. Statewide data on average yields, energy and fertilizer use for different crops can be combined with specific information for individual biorefineries to arrive at reasonable estimates of lifecycle greenhouse gas emissions for each batch of biofuels. Indeed, although the administration ultimately rejected it, EPA proposed to use lifecycle greenhouse gas emissions as the equivalency factor for different biofuels under the RFS as well as in a labeling program. Hence EPA has already done most of the policy and methodological development needed to implement an expanded RFS that includes greenhouse gas performance standards and incentives for management practices that protect ecological values.

An expanded RFS should also be updated to accommodate renewable electricity used for transportation in emerging vehicles, such as Plug-in Hybrid Electric Vehicles (PHEVs). This can be accomplished by allowing electricity providers to opt into the program as fuel providers as long as they use smart meters to track separately renewable electricity supplied for transportation purposes. With the emergence of PHEVs and other electric vehicles, renewable electricity can be an important additional option to augment renewable biofuels to supply non-petroleum, low greenhouse gas fuels for transportation.

CONCLUSION

Biofuels holds great promise as a tool for reducing global warming pollution, breaking our dangerous oil addiction, and revitalizing rural economies, as long as appropriate standards and incentives are used to shape the nascent bioenergy industry to provide these benefits in a sound and truly sustainable fashion. I look forward to working with the Committee to improve S. 987 to accomplish this important goal.

The CHAIRMAN. Thank you very much. Mr. Cavaney, thank you for being here.

STATEMENT OF RED CAVANEY, PRESIDENT AND CHIEF EXECUTIVE OFFICER, AMERICAN PETROLEUM INSTITUTE

Mr. CAVANEY. Thank you, Chairman Bingaman, Senators Craig and Corker. API welcomes this opportunity to present the views of the U.S. oil and natural gas industry on renewable fuels and S. 987. API supports a realistic and workable renewable fuels standard. Our industry is the Nation's largest user of ethanol and is increasing the volume of renewable fuels in America's transportation fuels portfolio.

The industry significantly exceeded the 2006 RFS requirement of 4 billion gallons of renewables and according to EIA estimates, should exceed the 2007 requirement as well.

The existing RFS requirements have attracted substantial and significant investment capital to increase ethanol production. At the same time, innovative new approaches to producing and uti-

lizing biofuels in the transportation arena are underway. Presently, the most economical and practical use of ethanol is as a 10 percent blend in gasoline. E-10 is already used in many parts of the country, as Bob Dinneen mentioned. It requires no modifications to vehicles, no major changes to service station pumps and storage tanks and has a long history of successful use by consumers.

E-85, a transportation fuel containing 85 percent ethanol and 15 percent gasoline, is an alternative fuel that faces significant technological and economic hurdles. E-85 requires specially-built, flexible fuel vehicles, which currently comprise only 3 percent of our Nation's existing fleet of 220 million vehicles. The EIA estimates that the FFV penetration will not rise above 10 percent until some time after 2030. E-85 also requires special service station pumps and storage tanks, which represent a significant expenditure to our Nation's independent service station dealers that can represent anywhere from \$20,000 to upwards of \$200,000. Most service station owners will need to see significant demand before making such investments.

Although no one knows the precise ceiling number, at some point in the not-too-distant future, limits on domestic corn ethanol production will be reached. Too little attention is being paid to the transition from that point forward, especially impacts associated with the delay in mass scale production of cellulosic ethanol volume.

The Energy Policy Act of 2005 contains language potentially adaptable to such a circumstance, around which stakeholders may want to begin discussions in the near future. The consequences of a failure to be adequately prepared for such a development could adversely impact millions of Americans, and given the limited likelihood that cellulosic technologies could begin providing sizable volumes of ethanol within 5 years, it is likely that safety valves, will in fact, be needed.

API offers these specific comments on S. 987: First, restrictions on Federal requirements in EPAct should continue. A Federal alternative or renewable fuels mandate should not have a per-gallon requirement and not require any particular alternative fuel to be used to meet a mandate; not require an alternative fuel to be used in any particular geographic area; and not require an alternative fuel to be made from a particular feedstocks or restrict the use of any feedstock or processing scheme.

Second, States and their political subdivisions should be preempted from setting State, alternative, or renewable fuel mandates. There should be an explicit, complete Federal preemption from setting alternative fuel standards or controls of any type or in lieu of an explicit exemption, restrictions on State latitudes should be enacted.

Third, EPA should be provided with additional authority to grant waivers during supply emergencies. There should be a Federal preemption of existing State fuel and AFPM performance regulations when a waiver is issued during a supply emergency, such as Hurricanes Katrina and Rita. Emergency waiver authority should be for up to 90 days. A 20-day limit per waiver that is provided in EPAct is adequate for most situations, but proved inadequate during Hurricanes Katrina and Rita, and waiver authority should remain with

the EPA Administrator. To change authority through the President will prevent speedy implementation, which was intended under EPLA.

Last, all mandates for renewable fuel usage should be accompanied by a periodic technology feasibility review that would allow for appropriate adjustments to ensure that energy companies and consumers alike are not penalized due to an economic or technical hurdle that might prevent reaching alternative or biofuels usage, targets, or goals that had been set. We recognize that S. 987 provides for a National Academy of Sciences review to address that matter and we appreciate that attention.

API and its member companies stand ready to work with the committee to provide additional information or assistance as needed on both items I've covered, as well as anything else that may develop during the course of committee deliberations. Thank you.

[The prepared statement of Mr. Cavaney follows:]

PREPARED STATEMENT OF RED CAVANEY, PRESIDENT AND CHIEF EXECUTIVE OFFICER,
AMERICAN PETROLEUM INSTITUTE

I am Red Cavaney, President and CEO of API, the national trade association of the U.S. oil and natural gas industry. API represents more than 400 companies involved in all aspects of the oil and natural gas industry, including exploration and production, refining, marketing and transportation, as well as the service companies that support our industry.

API welcomes this opportunity to present our industry's views on renewable fuels and S. 987, the proposed Biofuels for Energy Security and Transportation Act of 2007.

For centuries, energy and food have been the engines that have given rise to mankind's ascendancy from poverty, particularly in the developing world. To give a family food, warmth, mobility, and a job is to progress toward a more stable world and to nurture an improving standard of living for every man, woman and child.

The International Energy Agency forecasts that world-wide energy demand will increase by 50 percent between now and 2030. For those of us steeped in the energy business for well over a century, one stark conclusion flowing from this forecast stands out—our world, and our nation, will need all commercially viable energy sources for decades into the future, including both fossil and alternative energy sources.

Our companies have long been pioneers in developing alternatives and expanding our utilization of existing sources of energy. From 2000 to 2005, the U.S. oil and natural gas industry invested an estimated \$98 billion in emerging energy technologies, including renewables, frontier hydrocarbons such as shale, tar sands, and gas-to-liquids technology. This represents almost 75 percent of the total \$135 billion spent on emerging technologies by all U.S. companies and the federal government. Our companies are actively investing in second generation biofuels research in cellulosic ethanol and biobutanol and weekly we hear of new and exciting approaches to growing and utilizing biomass in the motor fuels markets.

Given this huge global appetite for energy, energy security, not "energy independence," should be our nation's energy framework going forward. Today, the U.S. oil and natural gas industry provides two-thirds of all the energy consumed each year by our nation. However, we import more than 60 percent of our oil in order to meet consumer demand.

The United States must do everything it can to access a diversity of resources around the world. "Energy independence" would be at odds with this objective. For all the talk of the need to wean ourselves from Arabian Gulf oil, the fact is the amount of Arabian Gulf oil imported has been substantially unchanged for years. Our real supply security depends on international trade. Our Arabian Gulf partners provide important supply—but they are only one source, representing less than 20 percent of the whole.

As we take steps to meet the energy needs of future generations, we must focus on three areas: meeting growing demand, improving energy efficiency and environmental performance, and developing new energy technologies.

- First, we must continue to meet our nation's growing energy needs through diverse sources of oil and natural gas supplies both here and around the world, while alternative and renewable sources continue their rapid rates of growth;
- Second, American industry must continue to increase its energy efficiency and the American public should be encouraged to become more energy efficient; and
- Third, we must develop new technologies to find and produce increased oil and natural gas supplies, improve energy efficiency, and develop new economic sources of renewable energy.

The current Renewable Fuels Standard (RFS) has stimulated substantial investments to grow biofuels supplies, particularly ethanol, beyond that required to satisfy the RFS. In addition, research into advanced production methods and alternative fuels is underway. The existing RFS has done its job well in stimulating the ethanol industry. Last year, our industry utilized 25 percent more than the target amount of ethanol established under the RFS. Additionally, nearly 50 percent of all gasoline consumed in the U.S. now includes ethanol.

Thanks to the almost seamless transition of huge amounts of ethanol into our nation's gasoline pool, ethanol is gaining broader consumer acceptance. From our experience, we know that customer acceptance is the single most important factor in the success of a product, especially a transportation fuel. It is ever more essential that we maintain and build the consumer acceptance of ethanol.

In assessing policy options to further increase alternative fuels usage, the following should be considered:

- Reliance on market forces is the best way to satisfy our growing fuel requirements to ensure reliable supply and deliver the greatest value to consumers. Policies should be performance-based and provide a level playing field for all energy options, including renewable/alternative fuels, without favoring one specific technology over another or creating unsustainable or uneconomic solutions. They should be feedstock neutral;
- Government should not over-promise on the potential for renewables to reduce petroleum demand. Overestimates create unrealistic expectations, poor policy and wasted resources;
- Government policy should strive to encourage sustainable and competitive second generation technologies;
- The most economic and practical use of ethanol is E-10, which should be maximized before considering higher ethanol blends. E-10 requires no modifications to vehicles, no major changes to service station fueling equipment and tankage, and has a lengthy history of successful fuel use by consumers. Consumers will likely be unhappy with the mileage penalty of E-85;
- The existing infrastructure/distribution system should continue to grow and be utilized to the extent practicable. The industry was stretched last year in maximizing ethanol integration into the national gasoline pool, due in part to a tight wholesale delivery infrastructure, that is, additional terminals and blending facilities for ethanol, rail cars and rail spurs. The growth in infrastructure must keep pace with consumer demand. Greater cooperative work involving infrastructure among all stakeholders will benefit the consumer;
- Wide-spread use of E-85, however, would require that the major technological and economic hurdles of cellulosic ethanol conversion first be overcome. Even with breakthroughs in cellulosic ethanol production technology, significant logistical hurdles will need to be addressed. Gathering the feedstock (biomass such as forestry waste and switch grass), processing it, disposing of "waste" products, and delivering ethanol to markets at a cost comparable to gasoline has yet to be demonstrated on a commercial-scale;
- E-85 use is also constrained by a number of additional factors. Corn-based ethanol is not sustainable at levels that would support widespread use of E-85. Moreover, E-85 requires flexible-fuel vehicles which currently comprise only 3 percent of the existing vehicle fleet. EIA estimates that flexible fuel vehicle (FFV) penetration of the vehicle fleet will not rise above 10 percent until sometime after 2030. Even in 2030, new owners of FFVs, like many of the current owners, might fill up with E-10 rather than E-85. Moreover, E-85 also requires special service station fueling equipment and storage tanks;
- In increasing biofuels usage, the government should address secondary impacts including the impact on food supplies and the environment (e.g., water use and water quality degradation, pesticide use, and increased VOC/NO_x emissions). Because of the potential for widespread effects on the environment, regulatory agencies will need to develop metrics for assessing the relative life-cycle impacts and benefits from potential large-scale increases in biofuels use;

- Government policy should encourage the utilization of the existing national refinery infrastructure for the co-processing of renewable feedstocks that can result in products with a renewable content that is compatible with the existing fuel distribution infrastructure;
- State-by-state ethanol mandates create additional boutique fuels, interfering with the reliable supply of fuels during times of supply disruptions and increasing distribution costs. State-by-state mandates also conflict with the flexibility and efficiencies provided in the Energy Policy Act of 2005 (EPACT05) with respect to where biofuels are supplied and product type. Just last week, for example, an eighth state passed another, different biofuels mandate. One state law allows and encourages the mixing of clear gasoline and ethanol-blended gasoline in the same retail tank. When this occurs, not only are emissions actually increased but the fuel violates federal environmental regulations. Congress recognized the potential problems from the proliferation of boutique fuels in gasoline and eliminated their expansion in the EPACT05. In that same legislation, the Renewable Fuels Standard stresses maximum fuel flexibility;
- Another example of restrictive state requirements can be found in the Southeastern U.S., where most states currently fail to provide exceptions or modifications to their gasoline standards to accommodate ethanol's impact on fuel volatility. As a result, refiner/marketers face potential non-compliance with state gasoline standards if they blend ethanol with fungible conventional gasoline. Tailoring the base fuel at the refinery to assure compliance by the finished blend would reduce gasoline supplies and increase fuel cost, thereby removing any incentive to blend ethanol;
- All mandates for increased renewable fuel usage should be accompanied by periodic technology/feasibility reviews that would allow for appropriate adjustments so that energy companies are not penalized due to the economic and technical hurdles that might prevent reaching biofuels usage targets or goals. All mandates for increased renewable fuel usage should also include contingency provisions that suspend requirements for increased biofuels usage in the event of significant supply or distribution disruptions.

While we have made progress over the past year, important questions remain. These must be addressed if we are to build on our joint progress and ultimately realize the full potential for ethanol within our nation's transportation fuels portfolio.

EPA also offers these specific comments concern S. 987, the proposed Biofuels for Energy Security and Transportation Act of 2007:

Restrictions on Federal Requirements in Energy Policy Act of 2005 (EPACT05) Should Continue

- A federal alternative or renewable fuel mandate should not:
 - Have a per-gallon requirement;
 - Require any particular alternative fuel to be used to meet a mandate;
 - Require an alternative fuel to be used in any particular geographic area; and
 - Require an alternative fuel to be made from particular feedstocks or restrict the use of any feedstock or processing scheme.

States (and Political Subdivisions Thereof) Should Be Preempted From Setting State Alternative or Renewable Fuel Mandates

- There should be an explicit, complete federal preemption of states from setting standards/controls of any type for alternative fuels.
- An alternative would be to set out restrictions on the states in lieu of an explicit preemption.

EPA Should Be Provided With Additional Authority To Grant Temporary Waivers During Supply Emergencies—EPACT05 Section 1541(a)

- There should be federal (EPA) preemption of existing state fuel and ASTM performance regulations when a waiver is issued during a supply emergency. During Hurricanes Katrina and Rita, EPA waived certain federal fuel requirements promptly to increase fuel supplies. However, in many cases state action was also required and frequently the state responses were not prompt. The result was unnecessary delays in increasing fuel supplies. EPA should be provided with authority to waive both federal and state environmental and product quality (situations where a state adopts its own product quality regulations and situations where states adopt ASTM specifications) fuel requirements during "an event of national significance."
- There should be emergency waiver authority for up to 90 days. The 20-day limit for waivers provided in EPACT05 is adequate for most situations but proved inadequate during Hurricanes Katrina and Rita. Thus, the timeframe for waivers

should be increased to “up to 90 days” for an event of “national significance” so designated by the President. This increased time will provide much needed flexibility in terms of arranging for additional fuel supplies, particularly longer lead time product imports.

- Waiver authority should remain with the EPA Administrator. EPACT05 language should be retained so that the EPA Administrator—not the President—has authority for fuel waivers and preemption of state regulations. To change authority to the President would prevent speedy implementation of waivers, which is what was intended.
- Additional adjustments should be made to the emergency waiver language in EPACT 2005. EPA interpretation of the waiver language has caused some confusion and concern regarding supplying waived fuel. Several changes to the waiver language would help to correct these problems.

Alternative Fuel Technology Review Should Be Required With Report to Congress and Adjustment of Alternative Fuel Standard and Phase-In Schedule

- All mandates for increased renewable fuel usage should be accompanied by periodic technology/feasibility reviews that would allow for appropriate adjustments so that energy companies and consumers are not penalized due to the economic and technical hurdles that might prevent reaching alternative or biofuels usage targets or goals. We recognize that S. 987 provides for a National Academy of Sciences review of this type.

In summary, the U.S. oil and natural gas industry continues to make good progress in meeting our nation’s growing energy needs and improving environmental performance. Looking ahead, we need to develop all economically viable energy sources including fossil and renewable fuel sources. By relying, to the greatest extent possible, on market forces, understanding consumer impact and preferences, encouraging development of new technologies, and addressing secondary impacts of expanded renewable fuel usage, I am confident that our industry and the nation will meet the energy challenges in the years ahead.

API and its member companies stand ready to work with the Committee and to provide whatever additional information or assistance we can on the issues I have addressed, as well as other related issues that may arise during the course of Committee deliberations.

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

STATEMENT OF BRIAN FOODY, PRESIDENT AND CHIEF EXECUTIVE OFFICER, IOGEN CORPORATION, OTTAWA, ONTARIO, CANADA

Mr. FOODY. Thank you. Good morning, Mr. Chairman and members of the committee, and thank you for the opportunity to comment on S. 987. My name is Brian Foody. I am the CEO of Iogen Corporation. We’re one of the leading companies making cellulose ethanol. We’ve been working in the field since the late 1970’s and we’ve designed and built and now run a cellulosic ethanol demonstration plant. We’ve been making cellulosic ethanol since April 2004.

Now, in the course of our development, we’ve established a number of important partnerships, including both with Shell and Goldman Sachs. I, myself, have been working in the field of cellulosic ethanol now for over 25 years. So we hold a long-held commitment to this area.

In regard to S. 987, we believe it is an excellent bill and we fully support its passage. We’d like to congratulate the committee on its work in offering a concrete and realistic vision for the future of American energy and economic security. We believe it can and will make a contribution toward driving the markets forward, establishing the expectations and the clarity that are necessary to see significant investment flows into the production of biofuels, and

building the secure, domestic renewable fuel supply America is looking for.

I'd like to specifically address the bill's volume targets for advanced biofuels, the 21 billion gallons by 2022. I believe these targets are realistic and doable, and let me explain why. First, with respect to the volume, the DOE and USDA recently completed a study called the Billion-Ton Study that asked the question, "Does America have the capability to produce enough cellulosic biomass resources to displace 30 percent of its present petroleum consumption? That's three times more than your present target." And the short answer was, "Yes, America has the capacity to deliver on your targets."

Second, cellulosic ethanol technology is not some far-off esoteric technology—it's real, practical and being made today. When I drove to the airport yesterday, I drove in a car fueled with cellulosic ethanol, the same cellulosic ethanol that fuels our company's fleet of flexible fuel cars, and I've been doing this for the last 3 years. So cellulosic ethanol is very real.

If anyone doubts this, I'd be pleased to invite them out to see our demonstration plant in Ottawa, about a 1-hour flight from here.

Now, Secretary Karsner, in testifying, talked about the targets for 2012, the technology development targets. It's very important to realize that those targets are essentially aiming at what I believe is a cost, something like \$1.10 a gallon. Very cost-effective, but keep in mind, we're talking about a world now where our gasoline is \$2.00 a gallon wholesale and ethanol is \$2.50 a gallon. The DOE's own estimates would suggest that cellulosic ethanol technology can be competitive today. Clearly, there are hurdles we have to have for the initial rollout of the technology, but this is very real.

Finally, if you're concerned about the ability to build these facilities and deliver this volume, let me say that the energy industry has enormous capability to deploy energy technology. Just as one small example to put this in context, you may have heard of the Tar Sands in Northern Alberta in Canada. Well, last year, over \$30 billion was invested in developing this unconventional resource, and the capacity commitments in 2006 alone would add 10 billion gallons per year of annual production capacities. Now, I have to say that if the energy industry can do this, they can certainly meet the much less ambitious objectives set out in your bill.

Now, with respect to the bill, I'd like to make just three brief points. First, I believe there is a real value in fine-tuning the bill's safety valves. Now, by safety valves, I mean what do you do if the price goes too high, or what do you do if there isn't enough volume to meet the targets? S. 987 now provides for essentially a discretionary waiver. That, I think, will protect against the problem, but it creates tremendous uncertainty and risks, robbing the bill of its power to spur investments.

Essentially, we don't want a situation where people can sit on the sidelines, betting that the discretionary waiver will get them off the hook for contributing and working on America's energy security. It's not fair to the country. It's certainly not fair to those who are committing to the business, and it won't get you what you hope to achieve.

Now, as I said, there are many approaches you can take, but one thing you should keep in mind—the more clarity and certainty you have, you can provide, the better and the more investment you'll take.

I think in terms of the way to tackle this—I can illustrate just one simple approach: as to volume, it doesn't make sense to force people to buy product that isn't there. If the volume doesn't materialize, the safety valves should simply adjust to the volume that is there. And as to price: you might ensure that prices don't go too high by setting a buy-out price, say \$1 a gallon, for the advanced biofuel credits. That's simple. It would solve the problem and would create much more certainty for investors.

My second point is managing the dual structure of the market. S. 987 provides for two kinds of ethanol—regular ethanol and advanced biofuels. This would create two markets and two prices, even though in your gas tank, ethanol is ethanol. We think the dual structure you propose makes sense, but that you need to be very careful to ensure that it can be practically implemented. We might suggest, for example, that you set up a system to certify advanced biofuel production facilities and issue the advanced biofuel credits to them. Then, as the ethanol leaves the plant gate, you can let ethanol be ethanol in a single market.

My third point is infrastructure. The automobile industry is a critical part of the transition that is envisioned by this legislation. It's critical that they be given equally clear and reliable signals about what fuel their products will be expected to run on, and they will need to have sufficient time to allow transition to new fuel blends. No matter whether Congress decides to pursue main grade blends of ethanol, like E-15 or E-20, to achieve your targets, or alternative blends like E-85. If the cars can't accept them, the refining and blending industry won't be able to deliver them.

So I would urge members of this committee to give these three issues their attention—first, setting safety valves; second, managing the dual nature of the market; and, third, the vehicle infrastructure. Thank you.

[The prepared statement of Mr. Foody follows:]

PREPARED STATEMENT OF BRIAN FOODY, PRESIDENT AND CHIEF EXECUTIVE OFFICER,
IOGEN CORPORATION, OTTAWA, ONTARIO, CANADA

Good morning to you Mr. Chairman and to the Members of the Committee. Thank you for the invitation to appear before you this morning. I appreciate the opportunity both to comment on the tremendous potential of cellulose ethanol and to offer our thoughts on S. 987.

My name is Brian Foody and I am the President and CEO of Iogen Corporation. Iogen Corporation is one of the world leaders in the cellulose ethanol field. We are proud to have been selected as one of the winners of the recent Department of Energy cellulose ethanol grant solicitation and look forward to a successful completion of our negotiations with the DOE.

At Iogen, we have been producing cellulose ethanol in our demonstration plant in Ottawa since 2004. To attend this hearing, I drove to the airport in a cellulose fuelled E85 flexible fuel Chevy Impala. In fact, we have been producing sufficient volumes of cellulose ethanol—primarily from wheat straw—to fuel our own fleet of FFVs as well as the fleets of two Canadian government Departments.

Before commenting on S. 987, let me say a few words about the benefits of cellulose ethanol and its potential to help America achieve several important policy objectives.

There are at least three important government policy objectives that cellulose ethanol can help achieve.

- Energy security
- New economic opportunities for rural communities
- Reduced greenhouse gas emissions associated with operating our cars and trucks

Of these, the most pressing is energy security. So the question many of us are asking is, how much can the emerging cellulose ethanol industry really deliver on its potential, and how quickly can it be done?

In order to answer that, we need to start with the feedstock opportunity. The Department of Energy and the Department of Agriculture worked together on a study of this issue. Their findings, published in an April 2005 report now known as the “Billion Ton Study”, found that even with conservative assumptions about yields from crop residues and dedicated energy crops, the United States can annually produce in excess of one billion tons of cellulose feedstock for conversion to ethanol and other bio-refinery products. That study is available online at http://feedstockreview.ornl.gov/pdf/billion_ton_vision.pdf.

At the current state of demonstrated efficiency, cellulose ethanol production facilities could convert that material into 30 billion gallons of ethanol. Now there are obvious hurdles between here and there that will greatly effect how much and how quickly ethanol can be produced from that feedstock material.

The first issue is commercial demonstration of the technology. This Committee’s work in EPACT established both a grant and a loan guarantee program to accelerate the demonstration of conversion technologies, and likely you are familiar with the state of implementation of those programs.

Next will be the challenges of building large-scale production facilities—as large as or larger than current starch ethanol facilities—in the feedstock basins around America. These challenges are common to any new production facility. Sites will have to be chosen and permits obtained. Feedstock supply contracts will have to be entered into and delivery programs will have to be established. Offtake contracts will have to be reached, and the transportation of the finished product will have to be arranged.

These challenges are not insignificant, but neither are they likely to prevent the rapid deployment of any robust cellulose conversion technology that has been proven to the satisfaction of likely investors. Investors are eager for opportunities to diversify energy holdings when there is an opportunity for sustained profitability.

One illustration of investor interest in new energy technologies is in the recent, steady expansion of integrated oil sands operations. That sector has been adding roughly 10 billion gallons per year of addition capacity with few signs of slowing.

In short, cellulose technology continues to face important business challenges, but I have every confidence that each challenge is manageable, and that ethanol from cellulose feedstocks will be a significant component in this nation’s fuel mix.

Regarding S. 987, first let me say that it is an excellent bill and we fully support its passage. We congratulate the Committee on its work in producing this vision for the future of American energy and economic security.

The bill creates a system that will allow cellulose ethanol producers to join the market in a way that does not undermine or conflict in any way with the established starch ethanol producers. That is critical because starch ethanol will remain the bedrock of the biofuels industry for some time to come. Without starch ethanol, the country would simply not be able to achieve the policy goals of this legislation.

Additionally, the bill sends a clear signal that the government is serious about a steady expansion of its commitment to cellulose ethanol. The goals of 3 billion gallons of advanced biofuels by 2016 and 21 billion gallons by 2022 are both ambitious and achievable. These targets set the fundamental precondition to the development of an advanced biofuels industry by establishing a clear market demand for the product.

Establishing these targets will further energize the industry to complete the commercial demonstration of its technologies and begin deploying them. Furthermore, these targets will establish a basis for confidence among all participants in the value chain that business opportunity of cellulose ethanol is very real. That confidence is an essential precursor to the preparations, planning, negotiations, and other business activities needed to grow this industry.

If S. 987 is enacted, farmers will begin to think seriously about the possibilities of selling their residues for profit, and managing their crops to enable them to do that. When the time comes for farmers to consider planting dedicated energy crops such as switchgrass, absent a clear signal that the market opportunity exists, they would be crazy to take such a leap. This legislation squarely addresses that need by creating clear targets for growth in the market.

The same is true of the capital markets that will be needed to support the deployment of cellulose ethanol production technologies. Investors will not risk capital if there is not confidence that the market will sustain adequate returns. This bill also squarely addresses that need.

Now some of your colleagues might ask why you need to offer market guarantees in this free-market system. My answer would be simply, that this is a case where we do not want the market to dictate the outcome unaided. The clear policy objective of this legislation is to secure for America the myriad benefits of a more diverse, and domestically produced, fuel supply. Left to its own, the market will not accomplish that outcome because absent a policy signal—such as S. 987—there is no means of valuing energy security in the marketplace.

Equally important, S. 987 will provide the key to unleashing market forces that will otherwise lay dormant. Once the industry has confidence that a sustained market demand has been established, business will engage aggressively to not only supply that market, but to do so better, faster and cheaper than anyone else.

But if there is one message I would like to leave you with this morning it is that there are some key areas where added clarity and certainty could enhance the Bill and improve the likelihood that the fuel program it would create will be a thorough success.

It seems clear that to deliver on 21 billion gallons of cellulose ethanol—a number, by the way, that we think is quite achievable—there is going to be a need for assurances and predictability going forward.

For example, the government needs to concern itself about over-committing to cellulose ethanol. Some of your colleagues will ask what will happen if the technology cannot deliver the desired volume. But not only will you and your colleagues want assurances that the cellulose ethanol industry can deliver, that delivery must come at reasonable cost. Nobody wants to commit the nation to buying ethanol at unreasonably high prices.

By the same token, the cellulose ethanol industry and its investors will need to know that, the significant investments needed to deliver the anticipated volume will not be stranded by future changes in policy. The private sector will need confidence that the Program can be relied upon not to disappear or change radically.

Some might expect that setting ambitious targets for cellulose ethanol will be sufficient incentive for capital formation. But mandates alone still carry risk to investors. Investors will ask, for example, how would policy makers respond if only 80% of the expected capacity can be on-line by the target dates in the bill? There is a waiver in the bill, but it leaves a great deal of discretion to the Secretary of Energy. Would there be pressure in such a case that would cause the Secretary to reduce the mandate below the level of already constructed capacity? Might the level of gasoline prices in the future lead to entirely suspending the mandate for cellulose ethanol? What happens if your appropriately ambitious goals cannot be fully satisfied for any reason?

In the investment community, these uncertainties will translate into risk premiums. That will drive up the cost of supplying the ethanol to meet your targets. Conversely, greater certainty will enable lower costs and, therefore, make the policy not only more durable, but also more popular.

So how do we manage these concerns? What mechanisms would we propose to ensure we can deliver 21 billion gallons of certifiable cellulose ethanol at reasonable price, and achieve the Senate's policy objectives?

Let me start by saying that we have given this question a lot of thought and we do not presume to have it all figured out. Having said that, it seems that enhancing the current safety valve in the bill—the Secretary's waiver authority—you could easily provide the certainty and confidence that both the government and the investors will require.

What we want to avoid is a situation similar to the California zero emission vehicle experience where laudable policy objectives were never achieved because the necessary safety mechanisms were not in place. In that case, there was clearly progress toward the goal, but not enough to sustain the program as originally envisioned. Those who invested based on the established public policy ultimately looked foolish, while those that chose not to invest in the new policy direction ultimately looked wise. Instead, public policy should reward and protect even incremental progress toward ambitious goals. At the same time policy should not hold the economy hostage when initial ambitions prove unreachable, because that creates political pressure to scrap the policy entirely.

Instead, it is important to create a safety valve that sustains the incentive to reach the overall goal—in this case 21 billion gallons of advanced biofuel—while at the same time temporarily backing off the target only to the extent that it is beyond reach. If the cellulose ethanol industry were to succeed only in producing 80% of

your ambitious targets by a given date, that should not precipitate a crisis. Instead, appropriate—and predictable—adjustments should be made that reward the progress and sustain the overall goal.

While exploring possible safety mechanisms to ensure success we have landed on some basic principles that could guide us. For example, we do not want to suspend market conditions within the market supplying the demand for advanced biofuels. We also believe that waivers should not reduce the Renewable Fuel Standard below current and planned production volumes unless additional volume can not come on-line at reasonable costs. Any safety mechanism should be both transparent and predictable. The waiver authority proposed in S. 987 should be enhanced along these lines. Doing so would improve the certainty offered potential producers and investors. It would also make the overall goal more sustainable and less subject to future changes in political moods and priorities.

Another area where more clarity would assist concerns how grain derived ethanol and cellulose derived ethanol will be differentiated. That becomes a concern because once ethanol is “out the door,” ethanol is ethanol. So it will be important to create a mechanism that allows the market to treat all ethanol the same, no matter the feedstock that was used to produce it, but at the same time, will enable certainty as the government attempts to track compliance with the dual ethanol requirements for blenders. This might most easily be accomplished by certification of individual cellulose production facilities as they come on-line and assigning specialized tracking numbers to the tradable credits generated by those certified facilities.

There is one other important topic I wish to touch on. The auto industry is a critical part of the transition that is envisioned by this legislation. It is critical that they be given equally clear and reliable signals regarding what fuel their products will be expected to run on. And there will need to be sufficient time to allow the fleet to transition to accept new fuel blends. No matter whether the Congress decides to pursue maingrade blends of ethanol like E-15 and E-20, or alternative blends like E-85, if the cars cannot accept it, the suppliers will not be able to sell it. I would urge the Members of this Committee to give that issue the attention it deserves.

But let me conclude by going back to my theme of certainty. Clearly the more certainty in the Bill, the less risk to the private sector and hence the lower will be the price of delivering the 21 billion gallons. Conversely, uncertainty creates greater risk and higher prices.

The Iogen team would welcome the opportunity to work with the Committee to explore possible safety mechanisms to achieve the Senate’s desired outcome.

Again, thank you for the opportunity to address this Committee.

The CHAIRMAN. Thank you very much. Thank you all for your testimony. It’s obvious that a lot of effort has gone into trying to analyze ways that this bill could be improved, and we appreciate your suggestions. Let me just ask a few questions, and then we’ll call on Senator Corker and Senator Craig, also for their questions.

Mr. Dinneen, let me start with you. One of the driving forces behind trying to set a higher renewable fuel standard is the concern that some have expressed about us winding up with an ethanol supply that has outpaced demand in the next few years. Could you give your view as to whether this is a real possibility, or whether you think that’s just not going to happen? If we fail to enact something like what we’re talking about here, are we in danger of seeing supply outpace demand?

Mr. DINNEEN. There is a great deal of angst throughout the industry that that may, indeed, be the case, because we don’t always control the marketplace in terms of getting our product to the consumer. I will tell you that I think the refiners have recognized ethanol’s value as an octane component. They’ve recognized ethanol’s value in terms of being able to meet clean air standards and are indeed, utilizing ethanol in more and more markets across this country.

We have 140 billion gallon gasoline market. Currently, EPA limits ethanol blend use to 10 percent. That implies that you could

saturate the potential market in this country when you reach 14 billion gallons of ethanol produced. We see that much ethanol production on the horizon, which is why I think your bill contemplates doing research to look at whether or not that 10 percent blend level could be raised without harming the existing fleet and doing programs and incentivizing greater E-85 use. Those are critically important components. You have to have the market as well as the production.

The CHAIRMAN. Let me ask Mr. Lashof: in your testimony, you talk about how plug-in hybrid electric vehicles powered by renewable electricity could qualify for renewable fuel standard credits—I believe you have that suggestion. I certainly strongly favor trying to incentivize more production and use of plug-in hybrids, but I'm just not clear how that dovetails with the renewable fuels standard. I guess one of the questions was, do you envision that this renewable electricity that would receive RFS credits would also be counted as under the renewable portfolio standard? If so, are we essentially paying utilities to fulfill their renewable portfolio standard requirements?

Mr. LASHOF. That's an excellent question and I think I should have probably expanded a little bit more on the proposal in my testimony. The idea here is that if electricity is being used for transportation purposes, then it could be treated as a fuel. There is a conversion factor that EPA has actually developed that is actually one aspect of the administration proposal that I think makes sense. I think it's 6.4 kilowatt hours is equivalent to 1 gallon, so you have a conversion factor that you can rely on for doing that.

The idea, though, would not be to allow double counting. It would be an opt-in for the electricity providers, and they could choose to credit their renewable electricity generation either to the renewable fuels standard, or to the renewable electricity standard, which we certainly also very, very strongly support.

So it's possible that the value of the credit might be higher in the fuels market than in the electricity market, and I think it would make sense to allow electricity producers to make that option. They would be required to use a smart meter to do that, so that you could track the electricity and be sure that it was actually being used for transportation, and that it was only renewable electricity that counted.

I think there is a way to integrate these that provides potentially some more incentive for renewable electricity, but you certainly want to avoid double counting.

The CHAIRMAN. Okay. Since my time is nearly over here, let me ask Mr. Cavaney a question about—we always are talking about E-10 and then E-85. What about E-15? Is it your view that there are significant barriers to moving to E-15, if the judgment were made that we could produce enough biofuels to accomplish that? Is there some significant problem with doing that as you see it?

Mr. CAVANEY. Mr. Chairman, we've looked through EPA and the auto manufacturers and their willingness to warranty amounts of ethanol beyond 10 percent in a regular, non-FFD car. But from our perspective and there's not a challenge at this particular point, we see the blend market as a much more attractive way to increase volumes of ethanol than we do leaping all the way to mandating

E-85. We think E-85 fits in certain areas in certain conditions, and those ought to be individual owner's choices, but higher blends are being looked at. We're actually studying them with the State of Minnesota and others, and so there is an opportunity there.

The CHAIRMAN. My time is up.

Senator Corker.

Senator CORKER. Thank you, Mr. Chairman and to Mr. Dinneen and Cavaney, the goals that were laid out in this bill are very different than the goals that were laid out by the administration. I just wondered if you'd give brief editorial comments about the attainment of either, and what you feel is more productive from the standpoint of moving toward these alternatives.

Mr. DINNEEN. I think the goal that is at the centerpiece of both proposals is the same, and that is to displace petroleum. I give great credit to the President for moving this debate forward and recognizing that we have to reduce our dependence on imported petroleum and to move forward with programs that will, indeed, incentivize domestic renewable and other alternatives. But I would think, honestly looking at the Energy Policy Act of 2005 is pretty instructive, because it had a very specific requirement for renewable fuels. It provided the kind of clarity and certainty that has been discussed here. While I understand the desire to take a more ecumenical approach and to encourage all kinds of different alternatives—and that's a laudable goal and one that should be pursued—I'm not certain that doing it in an ecumenical alternative fuel standard provides the kind of certainty to the marketplace that the renewable fuel standard does.

Perhaps another way of looking at it would be, if you want to incentivize coal-to-liquids or you want to incentivize electricity or other alternatives, I think quite frankly, that's great. But you ought not try to do it in the framework of an alternative fuel standard. Doing it in terms of focusing on renewables has proven to be a very effective motivator to the investment community, and I think is the more effective approach.

Senator CORKER. Mr. Cavaney.

Mr. CAVANEY. Senator, looking at both of these proposals, there is a lot in 987 that we like, particularly the study efforts that are there to try and answer some of the big questions that need to be answered before you're going to get a reliable supply to the consumer on a consistent basis going forward. Both plans rely, in large part, on being able to provide massive amounts of scale for cellulosic ethanol. If that doesn't materialize on a timetable that is set forth, a lot of time needs to be spent understanding what those pathways are. This proposal, S. 987 acknowledges that with the study by the National Academy of Sciences to take a look at this issue. That's one of the key things we think we can help bring to the table. While we don't know a lot about a first generation foreign ethanol manufacturer, we know a great deal about what's needed to be able to reliably get fuel around this entire Nation, particularly fuel under different kinds of conditions.

So we look forward to working with the committee on this. We think there are a number of items here, which can be further refined, and we think the timetable here is a little better than the timetable the administration set forward, because it calls for many,

many large volumes of cellulosic at a timetable that we're not absolutely convinced can be delivered.

At the end of the day, what all of us need to remember, whether we have a fossil fuel or renewables in the field that we deliver, is customers want it reliably. They want it inexpensively, and they want a quality fuel, and if we don't meet those three things, we're all going to fail the test. That's what we hope to be able to work on with the committee, and with my colleagues on the panel, to deliver.

Senator CORKER. Do you agree with Mr. Dinneen in the fact that this is a more narrow bill? It isn't as broad at bringing lithium and coal-to-gas and all that. Do you agree with the statements that he just made?

Mr. CAVANEY. Well, I agree certainly that it's a narrower bill. Our industry's perspective, since we provide energy broadly, including natural gas, is when we look at any global or even U.S. demand forecast into the future, we need all the energy that we can get. Whether or not it's all done in one bill or whether it's done in several, we think all of the elements that can deliver viable energy to the consumer are going to be pathways that this Congress and the administration and the next administration ought to pursue. So we look to you all and we'll take our guidance and work with you in that regard.

Senator CORKER. Mr. Lashof, as far as the coal-to-liquid technology, I look over here and see a big, black bar on the scale. Are there technologies out there today that you see on the horizon, that would allow us to use those technologies in a way that you would find environmentally friendly?

Mr. LASHOF. Senator, unfortunately the problem is, if you take a fossil fuel and whatever process you do, even if you capture all the CO₂ in the processing plant and you put that fuel in the tank, there is no way to capture CO₂ that comes out of the tailpipe of 200 million vehicles. That's fossil carbon and it goes into the atmosphere. There really is no way to avoid those emissions.

There was a discussion earlier about a Princeton study that I am familiar with, that talks about the potential to get a 30 percent benefit. That benefit really comes from the biomass blending. So the greenhouse gas reduction in that analysis comes from the biomass component of the fuel. If you're using just coal and making a liquid fuel, there's just not—there's just no feasible method that exists or that really could be imaged to do that.

Now, the situation is a little bit different if you make electricity. If you make electricity from coal and are capturing the CO₂ at the electricity plant, the electricity that goes into the vehicle, when you say a plug-in hybrid, obviously there's no CO₂ emissions at the point of use for that electricity. So there is an opportunity to use coal, if it's produced in an environmentally sustainable way and converted to electricity in a plant that captures CO₂ in a way that would be compatible with our climate goals, but I really don't think that's the case with liquid fuels.

Senator CORKER. Mr. Chairman, thank you for your testimony and Mr. Foody, I thank you for your great work. I appreciate it.

The CHAIRMAN. Before calling on Senator Salazar for his questions, Senator Craig had a statement or question that he wanted to ask.

Senator CRAIG. Well, I wanted to ask questions. Ken has been sitting here very patiently waiting to do so. Mr. Chairman, let me thank both you and Senator Domenici for this bill. Senator Dorgan and I introduced a similar bill earlier that has a couple of other components, and we are eagerly co-sponsoring your bill. I don't think there is any energy security pathway that does not include this bill, in my opinion, and that's why I think it is tremendously important. I'm pleased to hear the testimony that is before us today.

Senator Dorgan and I also agree that a balanced approach has to still include some offshore production. I think it has to include a CAFE standard that I've been slow to come to but I'm now there. I think these are also very, very critical as we look across the spectrum in doing so. But I thank both you, Mr. Chairman and the ranking member for the approach. It's clearly a step in the right direction. It augments EPAct in a way that broadens it toward our energy security. Obviously, we dealt primarily with, as you know, electrical production there, and now we're dealing with transportation. That is a critical component that expands the overall capacity in this country.

I'll simply add that maybe we want to look at, if we can't get cellulosic up to the level we hope we can get it, that I know the bar doesn't look as appropriate as it should, as it relates to coal-to-liquids. Maybe we can offset that production volume with coal to liquids in the short-term. But I would hope that we can get cellulosic where we think we can get corn-based as quickly. Thank you.

The CHAIRMAN. Thank you very much and Senator Salazar, go right ahead.

Senator SALAZAR. Thank you very much, Senator Bingaman. I want to follow up on the questions that I asked Secretary Karsner in terms of how far we ought to go. Let me preface my question, and I'd like Bob Dinneen and Brian Foody to respond to this question.

I'll preface my question this way. When we in 2005 said we're going to have an RFS at 7½ billion gallons, I think a lot of people thought it was realistic and it was, indeed realistic. In fact, as you were saying, Bob, it's been significantly surpassed.

I know in Colorado—not dealing with this part of the renewable energy equation but when we looked at an RPS—several years ago, I was the lead signature on a RPS for Colorado that was citizen-initiated. We said there that we were going to produce 10 percent of our electricity from renewable resources by 2015. We are on the pathway to surpass that significantly. In fact, the legislature just adopted a new RPS in Colorado with the support of industry, our utilities, that is going to get us to 20 percent by the year 2020.

So we set these goals and we are good in terms of getting there and surpassing them. My fundamental question here is whether or not we are being bold enough with this 36 billion gallon RFS by 2022. If I look at 2022, we're going to see the Presidential election of 2008, 2012, 2016, 2020 and I don't know whether that's as bold or as courageous as we ought to be doing, given the new technology

that is unfolding here. Yet at the same time, I realize that staff and others have worked very hard to come up with a goal here that is realistic.

So my question to you is simply this—do you think that it would be a wise thing for this Congress to establish an RFS of say, 35 billion with respect to biofuels, just biofuels, okay? Thirty-five billion by the year 2017. Could we achieve that goal? Let me start with you, Bob and Brian, you're doing the cellulosic ethanol piece, so go ahead.

Mr. DINNEEN. Well, part of me wants to say, "Never say never." But 35 billion gallons of biofuels by 2017, I think, would be awfully ambitious. I know what we can do with grain-based ethanol. I have a pretty good sense of where we will be in that timeframe. I don't know where we might be with respect to biodiesel, or cellulosic ethanol, or biobutanol, or some of the other renewable fuels. I think, quite frankly that the targets that are established in this bill are realistic and achievable, and I think while there is always going to be uncertainties with respect to just how fast cellulosic ethanol can come along, 3 billion gallons of cellulose by 2015, I think, is certainly realistic.

It is also ambitious. But what it does is, it sends a strong signal to folks to do the research, to invest in the technology, to commercialize the product and get it moving quickly. I think the timeframes, the timetable, and the carve-outs that are in this bill, are achievable and realistic and can be met.

Senator SALAZAR. So these goals, you think, are achievable and can be met, but might they also be surpassed in the same way that our 2005 RFS was?

Mr. DINNEEN. They certainly might be.

Senator SALAZAR. Mr. Foody, with respect to the contribution of cellulosic ethanol to this whole program, you are one of the lead companies in terms of the research in this issue. What's the contribution that cellulosic ethanol can make in terms of getting us to this goal and perhaps surpassing the goal? And go back to my original question that I asked Bob, can we go for 35 billion by the year 2017?

Mr. FOODY. If I think about the 35 billion by 2017, that would roughly equate to something like 20 billion gallons of cellulosic ethanol by 2017. America has the tremendous capacity to do new things, but that's a heck of a big step. It's really aggressive. I think the bill that is before us with 3 billion gallons in 2016 is as Bob said, achievable, realistic, but still aggressive. I think that things you could consider might be to advance and say, in 2015, have a target that might be 1 billion gallons and see a ramp-up at that time.

I certainly think, though, in the latter periods, if the cellulosic ethanol industry is capable of delivering 3 billion gallons a year, it will be capable of delivering 5 billion gallons a year, each year, in new added capacity.

I think what you've worked out in your bill is essentially a straight line of 3 billion gallons per year, each year as you move forward and I think naturally, you would expect the industry to be able to see a ramp-up phase and then to grow very rapidly. Remember my example of the Tar Sands in Alberta? They're actually

adding 10 billion gallons per year as we speak, in annual capacity. So I think if you were thinking about it, you might adjust your targets in that fashion.

Senator SALAZAR. My time is up, Mr. Chairman.

The CHAIRMAN. I did not have questions. If you have any additional questions, why don't you go ahead? Then we'll conclude the hearing.

Senator SALAZAR. If I may just, with your indulgence, Mr. Chairman, ask one more question, and that is of Mr. Cavaney, and that is with respect to the distribution. One part is a production side with respect to what we do relative to the goal that we aim for, and hopefully uncovering the technology that will get us there. The other is the distribution part of it, and that is very much addressed in the Chairman's mark here, and I very much appreciate the work that has been done there.

One of the concepts that several of us have talked about is the possibility of creating additional incentives for gas station owners to come in and to put in tanks that actually carry biofuels and incentivize them, putting in the kinds of pumps that would deliver the biofuel ethanol or whatever it might be.

Do you have any ideas on how we might be able to enhance that distribution capacity beyond what's already included in this bill?

Mr. CAVANEY. Senator, I feel the fact that you've acknowledged in the bill and put some things in there is very, very helpful. One of the things that most people overlook is that while the brands and the stations are very commonly known to everyone, you take the 170,000 retail gasoline outlets that are out there and about 5 percent of them are owned by the industry, the refiners. The rest are owned by independent businessmen and women who, whether they own a McDonald's or a family store, capital is very hard to come by. So acknowledgements and assistance and credits and however it's done is one way to approach that.

Another way is to provide some economic certainty, and to provide stable and reliable supplies, because that gives the owner the confidence that they are going to get a steady stream of business. They can forecast what their outcomes are going to be, and that's why the one thing we hope to bring to this debate is to try and, from our experience, help people understand how important it is to make sure the infrastructure is in place so when the production comes up, we can move this stuff very clearly.

We're very concerned about State mandates. For example, there are eight States that have mandated ethanol contents up to 10 percent. Of those eight States, no two are the same. It's like the boutique fuel problem we had with gasoline. One of those States, Missouri, actually has a regulation in place that if we comply with it, we'll be in violation of the Federal regulations. The point I'm trying to make here is if we can get the distribution and give those small business owners the confidence, I think the things that you proposed here are going to go a long way toward helping them.

Senator SALAZAR. I appreciate that. Mr. Chairman, I'd like to ask one more question of Mr. Lashof, if I can and that is: with respect to the coal-to-liquids concepts that have been talked about in this committee, is there an approach here that would allow us to move forward with promoting a coal-to-liquids program that would en-

sure that we might be able to keep from adding to the problem of global warming and greenhouse gases? That would be by creating some kind of a standard with respect to the CO₂ emissions from coal to liquid fuel as it is burnt.

Mr. LASHOF. Well, Senator I do believe that a greenhouse gas performance standard for fuels generally, for renewable fuels, and for any other fuels that might be entered in the market, is the best approach to ensure that we achieve the outcome we're looking for, which is lower global warming pollution. I think the current bill tries to get at this by—

Senator SALAZAR. Let me focus you on coal-to-liquids.

Mr. LASHOF. On coal-to-liquid.

Senator SALAZAR. Coal is such a huge natural resource that we have in the West and we have in this country, in Kentucky and Virginia and a whole host of other places. So with respect to coal, is there a way in which we might be able to move forward with that program and yet, maintain some carbon neutrality with respect to the use of that fuel in our portfolio?

Mr. LASHOF. Well, as I said in response to Senator Corker's question, I think that the best way to use coal to help meet our transportation needs is through an electricity pathway. But if coal-to-liquids were to be used, which is not something that I would support, but were it to be used, it would certainly be much more reassuring if it was subject to a greenhouse gas performance standard that ensured that it was making—Senator Bunning talked about the possibility, with appropriate technology and blending of biomass, you'd make at least a 30 percent—if you get a 30 percent reduction in greenhouse gases relative to gasoline.

Again, I don't support modifying this bill to allow coal-to-liquids in, but were coal-to-liquids to be part of any kind of fuel program, if there was a performance standard that said you had to make a reduction in global warming pollution at least as large as what can be obtained through ethanol, then I think that would certainly be somewhat reassuring.

Senator SALAZAR. Okay. Thank you very much, Mr. Chairman.

The CHAIRMAN. Well, thank you, and thank all of you for your good testimony. I think this has been helpful to us and we appreciate your input we'd be glad to hear and any other thoughts you have. Thank you very much.

[Whereupon, at 12:25 p.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

RESPONSES OF THE AMERICAN PETROLEUM INSTITUTE TO QUESTIONS FROM SENATOR BURR

Question 1. Due to the increased corn demand for ethanol, feed prices have tremendously increased over the last two years, has anyone analyzed the effect on corn prices if this bill becomes law?

Answer. While the API is not aware of any completed studies concerning the potential impact on corn prices of the “Biofuels for Energy Security and Transportation Act of 2007,” other models, based on similar scenarios, have shown increased corn prices with higher renewable fuels standards (RFS). The Agricultural and Food Policy Center (AFPC) of the Texas A&M University System released a report in August of 2006 that showed the effects of various policies on the price of corn. One of the examined policies was an increased RFS, based on S. 2817, the “Biofuels Security Act of 2006” introduced by Sen. Harkin in May of 2006, where corn ethanol would reach 20 billion gallons by 2015. Under the AFPC study, the price of corn increases by about 60% between 2007 and 2012, when production of ethanol from corn begins to exceed 14 billion.¹

Question 2. By some estimates, about 30% of the U.S. grain harvest is likely to be devoted to ethanol production by 2008, up from 16% in 2006. What will be the percentage of grain harvest devoted to ethanol production under the mandate required by this bill?

Answer. Using a conversion rate of 2.77 bushels of corn per gallon of ethanol, based on data projections from the USDA, 15 billion gallons of ethanol produced from corn in 2015 would require 39% of the total projected corn harvest. However, this percentage could vary significantly from year to year given factors affecting corn supply such as weather.

Question 3. Due to the increase of corn prices, farmers are electing not to enroll high maintenance farmland into the national Conservation Reserve Program. Will this bill be harmful to protecting farmland which is environmentally sensitive?

Answer. While the API is not aware of any completed studies regarding corn ethanol and the Conservation Reserve Program (CRP) in direct connection with this bill, it is clear that increased production of ethanol from corn would have a negative impact on the CRP and the environmentally sensitive land protected by the program. As corn prices increase, farmers will have greater incentive to move land back into grain production. A recent study of the impact of corn prices on CRP acreage in Iowa indicated significant increases in sediment, nitrogen and phosphorous losses as farmers move CRP acreage back into production in response to higher corn prices. The study also suggests that the impacts of returning CRP acreage to crop production could be substantial for some wildlife populations in Iowa (e.g., the wild turkey).² According to Clayton Ogg of the U.S. EPA, increased corn ethanol production could present challenges to the CRP—“corn ethanol production could reduce en-

¹Bryant, H. and J. Outlaw, “U.S. Ethanol Production and Use Under Alternative Policy Scenarios.” Agricultural and Food Policy Center, Department of Agricultural Economics, Texas A&M University, August 2006.

²Decchi, S. and Babcock, B., Iowa State University, *Impact of High Crop Prices on Environmental Quality: A Case of Iowa and the Conservation Reserve Program, Working Paper 07-WP447, May 2007.*

rollment in the CRP.³ Also, corn farmers could move from a corn-soybean rotation to continuous corn planting that would lead to increased fertilizer use and nutrient runoff that could adversely impact water supplies.

Question 4. Given that in the near term much of the ethanol will be derived by corn, how much, if any, imported oil will be displaced?

Answer. The AEO 2007, published by the Energy Information Administration of the U.S. DOE, projects that net crude oil imports will reach 10.5 million barrels per day, or 160.7 billion gallons per year, by 2015.⁴ Adjusting the legislation's corn ethanol mandate to an energy equivalent basis with crude oil, 15 billion gallons of ethanol is equivalent to roughly 8.4 billion gallons of crude oil, or approximately 5% of U.S. crude oil imports. However, this percentage does not represent the amount of crude oil that could be displaced as there are several offsetting factors. Significant amounts of fossil fuels are required to produce ethanol and would have to be factored into any displacement estimate. An additional offsetting factor is the likelihood that product slates and product imports would change with increasing ethanol use. Each refiner, acting independently, could be expected to make adjustments to maintain efficient refinery operations. Making these adjustments would result in a lower percentage than that given above.

Question 5. What will be the overall environmental benefits of corn based ethanol, given the increased use of environmentally sensitive cropland?

Answer. Corn is by far the largest single field crop in the US, and USDA estimates that increased ethanol production will encourage the planting of about 90 million acres to corn in 2007—an increase of over 10 million acres from 2006 and about 33% more planted land than any other field crop.⁵ Collectively, corn cultivation uses more pesticides and nitrogen fertilizer than any other U.S. crop.⁶ Additionally, more soil erosion occurs in the Corn Belt than in other parts of the U.S., much of this from corn acres.⁷ In 2006, about 20% of the corn crop was used for corn ethanol production, and USDA projects that 27% of the 2007-08 corn crop will be used for ethanol.⁸ It is well-documented^{9,10} that corn production is responsible for significant environmental impacts to soil and water resources because of:

- Soil erosion that degrades land quality and also pollutes surface water sources with sediments (one reasonable estimate is that 20 pounds of soil loss occurs for each gallon of ethanol produced;¹¹ and
- Surface and ground water quality reduced by runoff or infiltration of fertilizers and pesticides, which can also have deleterious effects on aquatic organisms and ecology.¹²

Life cycle assessments of corn ethanol cited as evidence of its environmental and greenhouse gas benefits typically fail to include soil erosion and water quality impacts in their evaluations⁵, and those studies do not include environmental impacts associated with possible land use changes such as returning Conservation Reserve Program (CRP) acres to production, or increased corn acreage in other countries.¹³

³Ogg, C., "Environmental Challenges Associated with Corn Ethanol Production." National Center for Environmental Economics, April 2007.

⁴USDOE/EIA, Annual Energy Outlook 2007 Table 11. Liquid Fuels Supply and Disposition.

⁵USDA NASS. Projected Plantings, April 2007. <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1136>; and USDA March 30 2007 Press Release. *Corn Acres Expected to Soar in 2007, USDA Says—Ethanol, Export Demand Lead to Largest Planted Area in 63 Years.* http://www.nass.usda.gov/Newsroom/2007/03_30_2007.asp.

⁶USDA. Agricultural Chemical Usage, 2005 Field Crops Summary. May 2006 <http://usda.mannlib.cornell.edu/usda/nass/AgChemUsDistRate//2000s/2005/AgChemUsDistRate-12-23-2005.pdf>.

⁷USDA NRCS. Total water and wind erosion, 1997. <http://www.nrcs.usda.gov/TECHNICAL/land/meta/m5112.html>.

⁸USDA *Agricultural Projections to 2016*, February 2007. <http://www.ers.usda.gov/publications/oce071/>.

⁹Powers, Susan E. Quantifying Cradle-to-Farm Gate Life Cycle Impacts Associated with Fertilizer Used for Corn, Soybean, and Stover Production. Clarkson U. Technical Report U.S. DoE NREL/TP-510-37500. May 2005 <http://www1.eere.energy.gov/biomass/pdfs/37500.pdf>.

¹⁰*Beyond the RFS: The Environmental and Economic Impacts of Increased Grain Ethanol Production in the U.S.* WRI Policy Note, September 2007. http://www.wri.org/climate/pubs_description.cfm?pid=4185.

¹¹DeLuca, Tom. On Ethanol: Conservation Should Precede Biofuels Mania, Guest Writer, Feb. 28, 2007. http://www.newwest.net/index.php/topic/article/on_ethanol_conservation_should_precede_biofuels_mania/C73/L38/.

¹²Powers, Susan E. Quantifying Cradle-to-Farm Gate Life Cycle Impacts Associated with Fertilizer Used for Corn, Soybean, and Stover Production. Clarkson U. Technical Report U.S. DoE NREL/TP-510-37500. May 2005 <http://www1.eere.energy.gov/biomass/pdfs/37500.pdf>.

¹³EPA. Summary and Analysis of Comments for Regulation of Fuels and Fuel Additives: Renewable Fuel Standard Program. <http://www.epa.gov/otaq/renewablefuels/420r07006-sec>

USDA estimates that as much as 4.6 million acres or more could be lost from the Conservation Reserve Program (CRP) during the next several years,¹⁴ much of that expected to be put into corn cultivation, or into production of other crops whose current acreage is being converted to corn. The limited potential benefits of corn ethanol regarding greenhouse gas emissions that are shown in those studies may further diminish because of the use of less productive and erosion-susceptible land to grow corn, and the use of less sustainable, more fossil energy intensive crop management practices like continuous corn production, or corn-corn-soybean rotation.¹⁵

As it is unlikely that cellulosic ethanol will contribute even 10% as much as expected corn ethanol production for at least 7 years or more, these large environmental corn ethanol impacts will continue to occur year after year. Collectively these “unintended consequences” are severe environmental impacts that should be fully assessed.

RESPONSE OF THE AMERICAN PETROLEUM INSTITUTE TO QUESTION FROM SENATORS
BINGAMAN AND DOMENICI

Question 6. Some parties advocate that the Renewable Fuel Standard should include a “price trigger.” The price trigger would allow a blender or importer to pay a \$1 penalty per gallon in lieu of fulfilling its renewable fuel obligation under the RFS. From your industry’s perspective, how would this approach affect the implementation of the RFS?

Answer. The “price trigger” is an unfair penalty because a shortfall is likely to occur, regardless of the best efforts by industry. Moreover, the means to comply are beyond the control of the refiner. This would be a penalty against refiners for not finding the renewable or alternative fuels available in the marketplace. A penalty is supposed to deter future violations. Penalizing the refiner would not meet this objective because the refiner has no control over production or the availability of biofuels.

The penalty serves no beneficial purpose and in fact would be counterproductive in light of the tremendous capital investment the oil and natural gas sector needs to meet future U.S. energy demand. This penalty, as a cost of doing business, would ultimately likely be reflected either in the price paid by consumers for a company’s products or in reduced returns to shareholders.

Instead of a penalty, any mandates for renewable fuel usage should be accompanied by periodic technology/feasibility reviews that would allow for appropriate adjustments to ensure that energy companies and consumers are not penalized due to the economic and technical hurdles that might prevent reaching alternative or biofuels usage targets or goals.

tions.htm. Section X: Environmental Impacts <http://www.epa.gov/otaq/renewablefuels/420r07006chp10.pdf>.

¹⁴USDA. USDA Announces Results of Intentions to Re-Enroll and Extend CRP Contracts. March 2007 http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_10B?contentidonly=true&contentid=2007/03/0058.xml.

¹⁵Secchi, S. and Babcock, B., Iowa State University, *Impact of High Crop Prices on Environmental Quality: A Case of Iowa and the Conservation Reserve Program*, Working Paper 07-WP447, May 2007. <http://www.card.iastate.edu/publications/synopsis.aspx?id=1046>.

APPENDIX II

Additional Material Submitted for the Record

STATEMENT OF THE CLEAN FUELS DEVELOPMENT COALITION

The Clean Fuels Development Coalition (CFDC) appreciates the opportunity to provide testimony to the Senate Energy Committee on S. 987 (Biofuels for Energy Security and Transportation Act of 2007).

CFDC is a broad based organization supporting the development of domestic and renewable transportation fuels with a particular emphasis on ethanol. The organization is a true coalition with membership that includes ethanol producers, research and development groups, design-build companies, and automobile manufacturers. Now in its 20th year of operation, CFDC has witnessed firsthand the phenomenal growth of the biofuels industry and has had a direct hand in the formation of many of the federal programs that have been a catalyst for this growth.

We were among the first supporters of the oxygen standard in reformulated gasoline and testified before this committee in 1989. We were part of the regulatory negotiation for the fuel provisions of the Clean Air Act Amendments and later worked with the House and Senate as part of the industry negotiating team to craft the first renewable fuels standard. Our support for the oxygen standard some 18 years ago was based on our firm belief that the market certainty provided by that provision was the perfect compliment to the tax incentive and would be the catalyst for the domestic ethanol industry to significantly expand. While the emergence of the non-renewable oxygenate MTBE stunted ethanol growth to some degree, the combination of tax and market incentives was effective. As the oxygen standard gave way to the RFS, renewables have finally been given the clear path to growth they have needed, and responded accordingly.

We believe S. 987 embodies the fundamental principles of providing market certainty that will overcome the institutional barriers ethanol and other renewable fuels have faced.

Ethanol is faced with an obstacle unlike any other commodity in the world in that it is sold into a market controlled by its competitors. Ethanol is not sold directly to consumers but rather sold to the petroleum industry whose product is being displaced. It is practically a conflict of interest for petroleum companies to voluntarily purchase ethanol, which is the reason for the creation of the partial excise tax credit. This credit is designed to make ethanol more attractive financially which is a key factor in overcoming this unusual and difficult situation. The other key part of this puzzle lies in the legislation before your Committee and that is essentially to continue to require renewable fuels, such as ethanol, to be part of our fuel mix.

From 1990 to 2000, even though ethanol was in part required for clean air programs, it took 10 years for production to double, due to the uncertainty of the market those programs provided. As the RFS began to develop and expectations were that it would indeed pass, U.S. production doubled again over just the next four years (1.65-3.3BGPY). When the RFS did become certain, counting ethanol capacity under construction the industry doubled again from 2004-2007, with more than 6 billion gallons coming on line. The next doubling of the industry is likely to take place sometime in 2009 or 2010 with another 6 billion gallons ready to enter the fuel market. Can any one question that the RFS was clearly the catalyst for this growth? We have had a tax incentive in place for 25 years and it never drove the market like this provision.

There are numerous precedents we can look at from all facets of our society that draw comparisons to the RFS, whether it be Buy American provisions for U.S. content in defense acquisition; small business preference or minority business set-asides; equal employment opportunity programs; and handicapped provisions. These are all adjustments the Congress has made because if left to their own devices, the free market would not have done these things which Congress deemed to be in the public interest. Continuing and expanding a program under which renewable fuels

would have the certainty needed for private investment dollars to flow is justified and necessary and the results are undeniable.

There are some insightful and innovative provisions in this bill that we fully support. The studies to address pipeline issues with ethanol are long overdue. Studies to advance the use of higher blends of ethanol could have a profound impact on the demand for ethanol. But the heart of the bill, the very core, is the schedule of increased use that would continue to provide the benefits achieved over the past several years. Given our modest history, some might call it unrealistic. Yet others question if it is aggressive enough. The answer will be determined by how the program is finally designed and implemented. CFDC is an ardent and long time supporter of the RFS but we respectfully offer the following suggestions as to how this bill could be modified.

Percentage Based Requirement.—We have some concerns with the basic approach of being so prescriptive with respect to the annual requirements. We would recommend that rather than such specific annual requirements the legislation would establish that a percentage of the gasoline and diesel pool be required to be renewable fuels by a certain time. In what could be considered as the first phase of the program from 2008–2012, that requirement would be 10%, or approximately 15 billion gallons. As a renewable requirement this could be met with ethanol, biodiesel, or higher alcohols as long as they were derived from renewable feedstocks. This would allow for the market to either front load the requirement if it made economic sense, or let some periods go by to allow for delays in construction, fabrication, financing or any number of other related areas. We know this level is attainable, we are within sight of it today. For every year after (until the 2023 end date this bill would authorize) the renewable requirement would increase by 2%. At projected fuel consumption levels in the U.S. it would be close to the 3 billion gallons called for in the legislation from 2015 to 2023, but again would have a carry forward type allowance with the intent of providing maximum flexibility so that the total is achieved within the time period. This type of approach also would not give any cause to suspend or need to open up the program if something were to cause a delay in a single year. The diesel market should have its own renewable requirement from 2012 on. We do not have a position on the exact numbers for that requirement but the biodiesel industry would certainly have the best feel for a growth rate that is achievable. By separating the two, the diesel market will have its own clear path and will not be limited if ethanol exceeds the floor of the RFS. We have members who can make a biomass-based diesel (not biodiesel) and this represents a tremendous opportunity, particularly for clean air purposes.

Elimination of Feedstock Restrictions or Caps.—CFDC believes the definition of advanced biofuels that does not include corn, is unnecessary and restrictive. Current concerns over the use of corn often fail to reflect the dramatic increases in yield from both the amount of corn produced per acre as well as the amount of ethanol yield per bushel. By the year 2015 there may be dramatic improvements in both and to cap the most effective feedstock we have at this time seems unnecessarily restrictive. Certainly as we get closer to the limits of corn that can be used other feedstocks will become more economically feasible. Increased corn demand will provide the incentive to look beyond corn and accelerate the development of these feedstocks. The market will determine the pace of that transition from corn. Previous legislation and the tax code clearly define what is renewable. Picking losers and in effect forcing technology is not the answer.

Re-Direction of Financial Resources from Capital to Market.—Looking at the success of the original ethanol partial excise tax exemption, providing financial rewards when fuel actually reaches the market has been a proven approach. The accelerated depreciation provision for biomass ethanol property passed in the 2006 tax bill—if expanded to all cellulosic technologies—is a helpful capital incentive. The compliment to that would be an increased tax credit or payment for these advanced biofuels at some significant level. All renewable ethanol would be eligible for the excise tax credit, but these advanced biofuels would be eligible for payments. There are several advantages to this approach. First of all the federal government, and the American taxpayer, only pay out if the project actually produces fuel. Secondly, as an incentive for renewable fuels, it would not be tied to the tax base and would promote the development of a wide range of biofuels beyond just ethanol. There is a generation of renewable fuels on the horizon. Bio fuels, bio oils, hybrids, biomass derived diesel, and even a green gasoline is under development by one of our member companies. Lastly, it would obviate the need for specific technologies to be chosen by the federal government which is a process that to date has not yielded a gallon of cellulosic fuel on the market. Rather than authorize and appropriate money for capital projects, funds could be appropriated for a biofuel fund. We believe this would provide more results for our money. Ultimately it could be a CO₂ reduction

program since all of these fuels, by virtue of their renewable feedstock, would be displacing fossil fuels.

Mr. Chairman, the benefits of the RFS are clear. By virtue of the fact that you and Senator Domenici have introduced legislation to expand it shows you recognize that fact. We implore you to provide direction, but at the same time be as flexible as possible in how we approach this issue.

A final thought for the Committee's consideration with regard to talking the lead in expanding the RFS is that knowing demand is out there will continue to drive technology. Industry and government alike will look harder, develop further, and go faster when it comes to demonstrating feedstocks and technologies. If the perception settles in over the industry that requirements have been met and we will enter a period of detente, it is quite likely the current interest we are seeing in renewable technologies will slow down considerably, if not stop all together. For that reason we also believe it is critical to clearly maintain the definition of renewable fuels, rather than a broader alternative fuel category as has been proposed by the Bush Administration. Fossil fuel-based alternatives to importing oil and gasoline from hostile and unstable regions should be a complement to a renewable requirement, but never should it replace renewables. Clearly the carrot on a stick approach of having identifiable programs and objectives out in front will continue to drive American agriculture and many other industries to maximize all of its available resources to produce ethanol and other biofuels to the benefit of the entire country.

On behalf of our members, we thank you again for the opportunity to submit these comments and look forward to working with Congress and the Department of Agriculture on these very important subjects.

JOINT STATEMENT OF DEFENDERS OF WILDLIFE, ENVIRONMENTAL WORKING GROUP, FRIENDS OF THE EARTH, INSTITUTE FOR AGRICULTURE AND TRADE POLICY, THE MINNESOTA PROJECT, NATIONAL ENVIRONMENTAL TRUST, NATURAL RESOURCES DEFENSE COUNCIL, SIERRA CLUB, SUSTAINABLE AGRICULTURE COALITION, U.S. PIRG, WESTERN ORGANIZATION OF RESOURCE COUNCILS, WORLD WILDLIFE FUND

On behalf of our millions of members and activists we urge you to support sustainably produced bioenergy as a key component of a comprehensive strategy to reduce America's dangerous dependence on oil and to help solve global warming. Done right, bioenergy holds great potential to advance essential environmental and energy security goals. Pursued without adequate guidelines, however, bioenergy production carries grave risk to our lands, forests, water, wildlife, public health and climate. We therefore urge you to support the energy efficiency policies and performance standards that will ensure bioenergy meets its promise while avoiding collateral environmental damage.

The starting point for any constructive bioenergy policy, from increasing the size of the renewable fuel standard to enhanced biofuels programs in the Farm Bill, has to be much greater end-use energy efficiency. Efficiency policies such as raising Corporate Average Fuel Economy standards for vehicles and promoting smart growth in our cities are essential to reduce oil demand and ensure that our lands are not put under excessive pressure to produce biofuel feedstocks.

If not carefully managed, increased production of biofuels has the potential to cause widespread environmental devastation. Accelerated corn cultivation for ethanol, for example, threatens to deplete water tables, magnify contamination by fertilizers, pesticides, and herbicides, and undermine vital conservation programs like the Conservation Reserve Program. On farms and in forests across the country and abroad, imprudent biomass harvesting would cause soil erosion, water pollution, and habitat destruction, while also substantially reducing the carbon uptake of land. Advancing a biofuels policy that leads to conversion of land into a type that lowers its carbon uptake potential is a particularly perverse result for a policy that is intended to reduce global warming pollution.

Fortunately, we can manage and mitigate these bioenergy impacts through thoughtful legislation. Developing a sustainable bioenergy industry will require low carbon and other environmental performance standards. Attached, we respectfully include a set of guiding principles that provide the basis for such standards.

New policies are also needed to accelerate the transition to bioenergy produced from feedstocks such as cellulosic crops grown in sustainable systems. These policies include research and development on feedstocks such as native perennials, incentives for bioenergy production facilities with a preference for local ownership, and programs that help farmers make the transition to growing feedstocks in sustainable agronomic systems.

Again, bioenergy holds great promise as a tool for reducing global warming pollution, breaking our dangerous oil addiction, and revitalizing rural economies, as long as we shape the nascent bioenergy industry to provide these benefits in a sound and truly sustainable fashion. We look forward to working with you on this important and challenging issue.

BIOENERGY FEEDSTOCK GUIDING PRINCIPLES

- *The use of bioenergy must reduce greenhouse gas emissions.*—Depending on how it is produced, bioenergy can significantly lower or increase greenhouse gasses. Key factors include the amount and sources of energy used to produce biofuels, and the potential direct or indirect conversion of carbon-sequestering forests and grasslands to lower carbon bioenergy feedstocks. To assure benefits, new incentives and requirements for increased use of biofuels need to be tied to significant reductions in the greenhouse gas intensity of these fuels. Practices that negate the greenhouse gas benefits of biofuels include conversion of native grasslands to produce biofuel feedstocks, loss of old growth forests, intensified tillage, and use of coal to power ethanol plants.
- *Biomass used for bioenergy has to be renewable.*—Biomass must be regrown on site, recapturing its released carbon, so that it is genuinely sustainable—unless it is the by-product of activity with independent, over-riding social utility (like removal of vegetation immediately around wildland-interface homes).
- *Bioenergy feedstocks must not be grown on environmentally sensitive lands.*—Such lands include: old growth forests; wilderness study areas; roadless areas on national forests; native grasslands; important wildlife habitat; ecosystems that are intact, rare, high in species richness or endemism, or exhibit rare ecological phenomena.
- *Conversion of natural ecosystems must be avoided.*—Habitat loss from the conversion of natural ecosystems represents the primary driving force in the loss of biological diversity worldwide. Activities to be avoided include those that alter the native habitat to such an extent that it no longer supports most characteristic native species and ecological processes.
- *Exemptions and waivers from environmental rules must not be used to promote biomass production or utilization.*—Trading one serious environmental harm for another is poor policy. Our environmental laws and regulations act as a fundamental system of checks and balances to guard against just such collateral damage and the promotion of bioenergy production and utilization must in no way be exempted.
- *Conservation and Wetland Reserve Programs supported by the Farm Bill must be managed for their conservation benefits.*—These programs protect marginal lands, water quality, soil, and wildlife habitat. Enrolled lands need to be managed principally for these important values, not bioenergy feedstocks.
- *Independent certification, market incentives, and minimum performance requirements are necessary to ensure that bioenergy feedstocks are produced using sustainable practices.*—Certification standards for biomass from private lands must address key environmental and social objectives, such as protection of wildlife habitat, prevention of erosion, conservation of soil and water resources, nutrient management, selection of appropriate feedstock species, and biologically-integrated pest management. New policies are needed to ensure that producers, refiners and distributors adhere to minimum performance requirements and have incentives to maximize environmental performance at each step.
- *Stringent safeguards must be established for bioenergy production from feedstock derived from federal land.*—Federal lands, including wildlife refuges, BLM lands, national forests and grasslands, are held subject to the public's interest in their non-commodity values. They are not appropriate for large-scale, sustained biomass sourcing.

STATEMENT OF DAVE HEINEMAN, GOVERNOR, STATE OF NEBRASKA, AND CHAIRMAN,
GOVERNORS' ETHANOL COALITION

Mr. Chairman and members of the Committee, my name is Dave Heineman, Governor of Nebraska and Chairman of the Governors' Ethanol Coalition. The Coalition represents thirty-five of the nation's governors and is committed to expanding the environmental, economic, and security benefits of ethanol production and use to all regions of the nation. We greatly appreciate the opportunity to provide this testimony in support of key provisions of the Biofuels for Energy Security and Transportation Act of 2007—S. 987.

This legislation's core elements build upon and include many of the governors' recent and past policy recommendations to Congress and the President. Our recommendations were developed because of the governors' concern for the serious security, economic, and environmental risks associated with the United States' dependence on oil from unreliable and unstable nations. We believe we must transform the nation's transportation fuel system and the vehicle fleet so that the fuel we use does not threaten our way of life. Consider the following:

- Oil is the largest contributor to our trade deficit, accounting for more than \$1 billion a day in funds that are largely sent—not to the shareholders of major publicly owned oil companies—but to increasingly unstable oil exporting countries;
- Oil accounts for more than 32 percent of U.S. carbon dioxide emissions—with each gallon of gasoline burned producing 28 pounds of carbon dioxide from the combination of tailpipe emissions and the refining and distribution of gasoline; and,
- Oil supply and price volatility have demonstrated repeatedly a capacity for worldwide economic disruptions.

Recognizing the seriousness of this matter, the governors worked with Congress and the President to pass the Energy Policy Act of 2005, which established the Renewable Fuels Standard (RFS) and dramatically expanded biofuels research and demonstration. The result is unprecedented growth in ethanol production and the beginning of a shift in our oil dependency. For example, the production of 4 billion gallons of ethanol in 2005 resulted in the United States importing 170 million fewer barrels of oil—this means that \$8.7 billion was not transferred to oil-producing nations from our nation that year.

In a matter of months, we will exceed the 2012 goal of 7.5 billion gallons of ethanol a year set by the RFS contained in the Energy Policy Act of 2005. This seemingly overnight achievement is a modest demonstration of what the nation can achieve with sound policy signals and adequate resources.

However, our continued oil dependency suggests the need for a far greater response. Production of 10 or 15 billion gallons of ethanol a year can aid in mitigating these risks and is a goal that can be met with existing feedstocks and technologies. Nevertheless, such a goal falls short of both our potential and the challenge we face. Instead, the Coalition members believe we must establish far more ambitious goals than those envisioned only a few years ago.

In order to assess the potential for adopting such an expansion, the Coalition commissioned the University of Tennessee to conduct a study of the economic, environmental, and agricultural impacts of increasing levels of ethanol production and use. The results of the study show that further expansion of production—10 billion gallons in 2010, 30 billion gallons in 2020, and 60 billion gallons in 2030—is well within the capability of the industry and farmers under conservative grain yield improvement assumptions, and use of modest amounts of cellulosic derived ethanol production by 2012, growing to far greater quantities over time.

Emboldened by both the study results and the need to address the nation's and the states' energy policies, the governors' consulted a group of environmental, energy, agricultural, and biofuel experts to aid them in developing a new set of policy recommendations. The governors adopted these recommendations four months ago in a report entitled *Ethanol From Biomass: How to Get to a Biofuels Future*. The recommendations include:

- *Expanding the RFS.*—The RFS should be expanded to a short-term target of 12 billion gallons a year of ethanol and biodiesel use by 2010, and a longer-term BTU-based target of 25 percent of total motor fuels consumption by 2025, or about 60 billion gallons.
- *Assigning a value to the RFS cellulosic ethanol trading credit.*—This non-financial credit should be converted to a Cellulosic Ethanol Production Tax Credit.
- *Establishing a timetable for delivering higher blend ethanol infrastructure—expanding from several major metropolitan areas to entire regions within five years.*—This expansion would be synchronized with the production of not less than 70 percent of new vehicles sold being flex-fuel capable within 10 years.
- *Providing adequate funding for the Energy Policy Act of 2005 authorized biofuel research, demonstration, and incentive programs.*—Critical efforts must be fully supported on a range of cellulosic feedstocks. This support is key to the development of advanced ethanol production, the launch of plug-in hybrid flex fuel capable vehicles, and the expansion of higher blend ethanol infrastructure. Support for these efforts will cost less than one-half of what America spends in one day for imported oil.

The combination of the above actions aim to achieve a goal of providing 25 percent of our transportation fuel, about 60 billion gallons, from renewable, domestically produced ethanol by 2030.

SUPPORT FOR S. 987 COMPLEMENTARY PROVISIONS

The Governors' Ethanol Coalition supports components of the Biofuels for Energy Security and Transportation Act of 2007 (S. 987). In particular, we believe the legislation's expansion of the RFS and emphasis on stimulating rapid cellulosic biofuel production are essential to addressing the nation's energy challenges. Moreover, the bill's attention to regional differences, which recognizes the need to support ethanol production and feedstock development in all areas of the nation, is a key principle of the governors' policy recommendations.

However, the Coalition believes S. 987 could be strengthened in several important ways and we respectfully request your consideration of the following additional elements derived from the governors' policy recommendations:

RFS Expansion

S. 987's RFS targets are excellent, but would benefit from greater near-term expansion of cellulosic derived ethanol. The current RFS includes a requirement for the utilization of 250 million gallons of cellulosic derived ethanol by 2013. Since enactment of the RFS, cellulosic ethanol research and development efforts are making rapid progress. Commercial scale demonstrations are being constructed around the nation and smaller scale production is already underway at a few sites. In Nebraska, we have 13 ethanol plants in operation and 10 under construction and, I am proud to say, we are home to a state-of-the-art bioplastics production facility—a key to the biorefinery concept that is a part of our vision for the future of ethanol. Following are a few examples of the exciting development underway around the nation:

- Georgia Governor Sonny Perdue announced that Georgia would be the site for a cellulosic ethanol plant that will use wood waste as a feedstock. The plant will have the capacity to produce over 1 billion gallons of ethanol a year and employ 70.
- New York announced that two companies have been selected to develop and construct pilot commercial cellulosic ethanol facilities in New York.
- Oklahoma Governor Brad Henry announced creation of a world-class \$160 million Bioenergy Center to be created over the next four years at the Universities of Oklahoma and Oklahoma State.
- Tennessee Governor Phil Bredesen announced a \$72 million alternative fuels initiative that included the construction of a \$40 million pilot biomass plant.
- Kansas Governor Kathleen Sebelius, last year's Coalition chair, announced that she would make cellulosic ethanol a priority and make Kansas a national leader in biofuels research and production.
- Wisconsin Governor Jim Doyle announced plans to make Wisconsin home to the first cellulosic ethanol plant in the United States.
- Governor Arnold Schwarzenegger announced a low-carbon fuel standard for California that will drive biofuel production and use by setting a far-reaching goal and relying on the private sector to deliver clean renewable fuels and innovative vehicle technologies.

It appears that the 2012 RFS cellulosic goal could easily be exceeded. Thus, the governors recommend an expanded cellulosic ethanol goal of 500 million gallons a year beginning in 2012. The addition of this language to the RFS expansion provisions of S. 987 should lead to a dramatic expansion of private sector investment in cellulosic ethanol production facilities.

Cellulosic Ethanol Production Tax Credit

Providing a cellulosic production tax credit, built upon the existing RFS cellulosic trading credit, would immediately advance cellulosic and potentially other "low carbon" ethanol production. Congress included a 2.5:1 trading credit for cellulosic ethanol when it approved the RFS in the Energy Policy Act of 2005. The trading credit meant that each gallon of cellulosic ethanol would count as 2.5 gallons for purposes of meeting the RFS requirements. Because the expansion of conventional ethanol production far exceeded expectations, there is no financial incentive for ethanol blenders to pay more for cellulosic ethanol, and therefore the trading credit has no financial value. Monetizing this credit is one of the principles envisioned by Congress and the President in passage of the RFS, but not realized because of the volume of conventional ethanol produced.

This monetization goal can be achieved with a simple policy modification. The Coalition recommends that a value be assigned to the trading credit by converting the trading credit to a ten year Cellulosic Ethanol Production Tax Credit that would be worth an additional \$0.765 a gallon compared to conventional ethanol, or \$0.765 plus the value of the regular ethanol Volumetric Ethanol Excise Tax Credit. This approach differs from the current credit for conventional ethanol in that it would be available to producers. The current tax credit for conventional ethanol accrues primarily to the petroleum blender. Properly structured, these measures incentivize a range of new ethanol production technologies that reduce fossil fuel inputs and increase the competitiveness of domestically produced ethanol.

Infrastructure Development

S. 987's provisions expanding higher blend ethanol infrastructure development are extremely important. The corridor approach provides consumers with more biofuel retail options, is consistent with the successful infrastructure actions of many states and cities, and is supported by the governors. Nevertheless, the Coalition believes that Congress must take extraordinary steps to overcome the ethanol infrastructure-vehicle stalemate and enable real competition among transportation fuels. The governors find no evidence that the current entrenched fuel system will afford a timely transition to a more dynamic and resilient system that includes higher blend renewable fuels. Federal, state and private actions are needed to open the door for new market entrants and create a more vibrant domestic biofuels industry.

The governors recommend adding a regional approach to S. 987 to address the infrastructure challenge. The city-to-region strategy should be used that includes the adoption of performance standards for major gas station owners and branders (e.g., owners of 100 or more fueling stations, high-volume stations) that would provide at least one higher blend ethanol pump at 95 percent of their stations in at least one region over five years. This should be synchronized with the adoption of a timetable for the transition to uniform flexible-fuel vehicle requirements that not less than 70 percent of new light duty vehicles sold in the United States be fuel flexible within 10 years. Modest tax incentives (e.g., \$100 for each vehicle) would be provided to aid auto manufacturers in transitioning to this standard.

As a part of this strategy, the Coalition also recommends the addition of a market-oriented "kick start" for this city-to-region approach that would create a partnership among our states, cities, industry, and the federal government that concentrates higher blend ethanol efforts in key markets. This concentrated effort would maximize private, state, and local investments in marketing and infrastructure and would provide evidence of the potential of a flexible-fuel system. Moreover, this approach would allow other state and private efforts of a similar nature to occur throughout the nation.

Expand Blend Study

The Coalition recommends that Section 302 of S. 987, which direct the U.S. Department of Energy to study the feasibility of nationwide consumption of a range of ethanol blends, be expanded from the indicted levels of E15 through 25, to E10 through E85. The modest additional cost of this work would provide policy makers at the state, local, and federal levels with important data on a range of blends and offer the market place and consumers a greater range of blend solutions.

Loan Guarantees and Low Carbon Fuel

The legislation's Section 204 Loan guarantee provision is an important refinement of the current U.S. Department of Loan guarantee program. The governors believe structuring these guarantees in ways that encourage both low carbon biofuel development and low carbon options for all the alternative energy projects eligible under the program is essential. This approach ensures that taxpayer funded federal support for clean energy options will benefit our states economies and environment.

Ethanol Expansion Impacts

The Governors' Ethanol Coalition recognizes the temporary but real problem that has emerged regarding food and fuel tensions due to higher corn prices. For example, in Nebraska, which has a large and vibrant livestock industry, high corn prices are affecting profitability, even though byproducts of the grain ethanol refining process can substitute for some corn in livestock diets. While the results of the growing season and harvest will not be known for some time, there is reason for optimism. Secretary of Agriculture Mike Johanns addressed this issue recently, saying:

The U.S. Department of Agriculture's economists calculate that ethanol production could rise to 10 billion gallons by 2010 without forcing us to choose between corn for food or for fuel. We believe that corn-based ethanol

will be a part of our ethanol future. But the next generation is cellulosic ethanol.

We are also conducting research, as is the private sector, to make Distiller's Dried Grain a better source of feed. Right now on one bushel of corn used for ethanol creates about 17 pounds of that byproduct. The goal is to develop a way to fracture the kernels before processing so that both high value feed and ethanol can be produced from the same corn.

The other thing I would say is the market works. The interest in corn for ethanol production is spurring research into increasing corn yields at seed companies . . . We also believe that most cellulosic materials that will be used for ethanol production in the future will not compete for good pasture. These grasses and other biomass products do well on marginal ground.

Renewable energy is changing the face of agriculture and that involves a period of adjustment but it also creates opportunities for ranchers and rural America.

The Secretary's views mirror those of the many energy, agricultural, and environmental experts from around the nation that the governors consulted in developing our recommendations.

In closing Mr. Chairman, the Coalition believes that S. 987 includes many of the key elements needed to achieve a biofuels future for America. We also urge your consideration of the governors' recommended additions to the bill as a means to more rapidly meet the important goals set forth by Senators Bingaman and Domenici. Thank you for the opportunity to provide the governors' input and ideas today. We look forward to working with Congress and the President to advance the opportunities of biofuel production and use in all regions of the nation.

STATEMENT OF H2DIESEL

OVERVIEW

S. 987 is a strong proposal that moves in the right direction, but it focuses largely on unproven technologies that may address U.S. energy dependency problems. In fact, American companies are already producing the next generation of bio fuels that have many advantages over traditional biodiesel. However, these companies cannot compete on a level playing field due to the narrowly defined energy tax incentives that only encourage the production of tradition biodiesel.

S. 987 does an excellent job of recognizing that the current definition of biodiesel has limited use, and does not encourage new, innovative technology that can truly address U.S. energy needs, reduce U.S. dependence on foreign oil, support America's rural economy, significantly reduce harmful environmental emissions, and encourage domestic, 100 percent renewable energy resources. H2Diesel applauds the inclusion of "Advanced Biofuels" and "Renewable Fuel" definitions in S. 987 that will encourage U.S. technologies and production techniques for the next generation of bio fuels that can meet the policy objectives identified by S. 987. However, unless this broadened definition is translated into the energy tax policy area, the updated definitions may have limited impact where it truly matters—in the marketplace and for U.S. consumers.

H2DIESEL

H2Diesel is a U.S. company (Boca Raton, Florida and Houston, Texas) that holds an exclusive license for North America, Central America and the Caribbean to proprietary technology for the manufacture of an alternative "bio-fuel" from domestically produced vegetable oils and animal fats that can be used for power generation, heavy equipment, marine use and as a heating fuel. H2Diesel's product is the result of a blending—or emulsion—process in making a proprietary bio-fuel that provides a cheaper, 100 percent renewable alternative energy source with significantly lower emissions than traditional fuels and a cleaner and more efficient alternative to heating oil.

MAJOR ASPECTS OF CURRENT BIO DIESEL TECHNOLOGY PRODUCTION

- Requires a complex and energy-intensive production method that is very expensive
- Produces chemical by-products that must be handled and disposed of, which adds cost to production and creates potential environmental problems
- Has limited use and is not suitable for all climates, especially in colder climates

- Can only be used in fuel blends up to 20%
- When blended, results in a product that is still 80% foreign oil and still emits some harmful pollution

H2DIESEL HAS SIGNIFICANT ADVANTAGES OVER TRADITIONAL BIO DIESEL

- Proprietary manufacturing process results in dramatically lower production costs and no harmful by-products
- Produced from any number of vegetable feedstocks, animal fat, and renewable oilseed crops, including soybeans, canola, flaxseed, sunflower, GMO, cotton seed, mustard seed, and restaurant waste oil
- Is a domestic fuel that reduces our nation's dependence on foreign oil, improving energy security
- Improves the rural economy by creating farming jobs
- Can be used as heating oil, power generation fuel, and as a motor fuel
- Produces approximately 80% less carbon dioxide emissions and almost 100% less sulfur dioxide than traditional petroleum diesel
- Is a renewable "carbon neutral" fuel, which results in no net emissions of harmful CO₂
- Contains virtually no sulfur; reduces emissions that can cause acid rain; eliminates formation of sulfates which cause particulate pollution
- Emits significantly less nitrogen oxides than either traditional bio diesel or petroleum diesel. Nitrogen oxides are a significant component of urban smog and have been linked to asthma
- Small production plant footprint allows for less environmental impact
- Can be used by any conventional diesel engine at 100% strength and extends the life of diesel engines because it is more lubricating than petroleum diesel fuel
- Facilitates process automation that results in reduced labor and energy costs

However, H2Diesel and other innovative U.S. companies face significant barriers to competing on a level playing field because current law and tax policy designed to encourage companies to explore renewable energy technologies is too narrowly focused to allow true innovation and fully encourage new technologies that can break the United States' continuing dependence on foreign energy suppliers.

For example, the current tax code definition of "biodiesel" is limited to products that are methyl esters that meet the requirements of ASTM specification 6751. The tax code also has a fairly limited definition that excludes many other domestically produced, renewable, vegetable oil-based products that have equivalent or superior properties to the narrowly defined "Biodiesel."

Current tax policy focuses heavily on encouraging the production of "biodiesel," principally a \$1.00 per gallon blenders income tax credit. Without this credit, the cost of producing biodiesel would be prohibitive.

U.S. companies have and are continuing to develop new technologies to create new bio fuels that hold great promise to more fully address U.S. energy needs, which go well beyond just motor vehicle fuel consumption (home heating oil, power generation), today and in the future.

These bio fuels are potentially far superior to traditional biodiesel, with greater applications, lower production cost, greater environmental benefits (cleaner burning product) and can be produced from a wide range of agricultural products.

U.S. law and tax policy should acknowledge this reality and encourage greater innovation in U.S. technology by creating a new definition of "bio fuels" that will help speed new technologies and production techniques into the market place while supporting America's rural economy.

S. 987 does a good job in this respect, especially the new definitions for "Advanced Biofuels" and "Renewable Fuel." However, these definitions need to be included in U.S. energy-related tax law to truly encourage U.S. innovation and level the playing field for all bio fuels producers. Moreover, U.S. tax law should be revised to ensure that a revised definition is carefully tailored to make certain that it benefits those innovative companies that truly can make a difference.

STATEMENT OF THE NATIONAL BIODIESEL BOARD

Good morning Mr. Chairman, Ranking Member Domenici, and committee members. On behalf of the National Biodiesel Board (NBB), we appreciate the committee holding this hearing on S. 987—the Biofuels for Energy Security and Transportation Act of 2007—and the opportunity to provide comments on this important piece of legislation. The NBB is supportive of the aim of S. 987 to enhance national energy

security through increased utilization of renewable fuels; development of new technologies and working through potential barriers to renewable fuels entering the marketplace. Our comments will focus on several primary components of the legislation where NBB is supportive, as well as areas where we'd appreciate the opportunity to work further with the committee as this process moves forward.

INDUSTRY BACKGROUND AND OVERVIEW

The NBB is the national not-for-profit trade association representing the commercial biodiesel industry as the coordinating body for research and development in the United States. The NBB was founded NBB in 1992 and since that time has developed into a comprehensive industry association, which coordinates and interacts with a broad range of stakeholders including industry, government, and academia. NBB's membership encompasses over 400 members and is comprised of biodiesel producers; fuel marketers and distributors; state, national, and international feedstock and feedstock processor organizations; and technology providers.

Biodiesel is a cleaner burning, renewable diesel fuel replacement made from agricultural fats and oils meeting a specific commercial fuel definition and specification. Soybeans are the primary oilseed crop grown in the United States, and soybean oil makes up about half of the raw material available to make biodiesel. The other half consists of all other vegetable oils and animal fats. Biodiesel is made utilizing a chemical reaction process where the oil/fat is reacted with an alcohol to remove the glycerin in order to meet specifications set forth by the American Society for Testing and Materials (ASTM), D 6751. Biodiesel is one of the best-tested alternative fuels in the country and the only alternative fuel to meet all of the testing requirements of the 1990 amendments to the Clean Air Act.

TITLE 1: RENEWABLE FUEL STANDARD

The applicable volumes for the Renewable Fuel Standard (RFS) outlined under Title 1 of S. 987 are aggressive and will have a dramatic positive impact on our nation's energy security, while additionally providing needed environmental and economic development benefits. The NBB views the concept of a Renewable Fuel Standard (RFS) as a piece of public policy that can provide a solid foundation for the introduction of new renewable fuels. Equally important, a RFS can dramatically assist in the sustainable growth of existing, emerging domestic renewable fuels, such as biodiesel.

The biodiesel industry has shown slow but steady growth since the early 1990's, however, in the past two years, it has grown exponentially. In 2004 there was approximately 25 million gallons of biodiesel sales. That increased to approximately 250 million gallons in 2006. Likewise, we went from 22 biodiesel plants in 2004 to 105 biodiesel plants currently (865 million gallons of production capacity). There are 77 more plants currently under construction and expansion (estimated additional 1.7 billion gallons of production capacity). We are encouraged the legislation incorporates alternatives in the diesel sector; and feel biodiesel should play a significant, specific role in meeting the overall Standard.

From our industry's perspective, confidence in the fuel by consumers and engine and vehicle manufacturers is essential to the success of renewable fuels in the marketplace. Development of appropriate ASTM fuel standards for new fuels entering the marketplace will be important. Undergoing proper in-use testing and evaluation needed to secure an appropriate ASTM fuel standard provides a significant level of confidence to engine and vehicle companies that the use of these fuels will operate properly in their equipment.

TITLE 2: RENEWABLE FUELS INFRASTRUCTURE

Title 2 addresses several critical needs that can help further develop the infrastructure necessary to enhance the production and distribution of renewable fuels, including the Infrastructure Pilot Program for Renewable Fuels. The need exists for the development of renewable fuel corridors as envisioned under the Pilot Program. As an example, the National Biodiesel Board is fielding numerous inquiries from consumers, particularly in the trucking industry, regarding fueling locations that offer biodiesel. In response to this demand, the NBB has established a 24 hour service to provide such information. Development of these corridors we feel will help enhance availability of renewable fuels in a strategic manner.

Additionally, the provision establishing Loan Guarantees for Renewable Fuel Facilities will provide needed security to encourage development of new technologies in the ethanol sector. Extending these guarantees for biodiesel production facilities would also provide added security for our emerging industry, particularly in times of fluctuating market fundamentals.

TITLE 3: STUDIES

A key factor in the development of renewable fuels will be efficient distribution. The most efficient means of moving large volumes of fuel is via pipeline. We are seeing biodiesel moving through pipelines in Europe today. Extending that capability in the U.S. would be substantial. However, significant work remains to be done in this area before it is a reality domestically. The National Biodiesel Board and biodiesel industry have committed funds to study the technical needs required for moving biodiesel through U.S. pipelines. Additional support from the federal government could be significant in helping complete needed research and tackling potential technical barriers.

In conclusion Mr. Chairman and committee members, support for advancing renewable fuels is critical to enhancing our nation's energy security and provide needed environmental and economic development benefits. S. 987 proposes aggressive policies that would substantially increase the development and utilization of renewable fuels. Biodiesel can and should play a significant role in helping to enhance our nation's energy security. While biodiesel has proven itself with consumers, our industry remains an emerging industry. Biodiesel's ability to play a specific, realistic role in achieving the targets identified under the Renewable Fuel Standard can dramatically assist in the sustainable growth of our promising industry. Additionally, many of the bill's provisions regarding infrastructure and studies to address technical barriers could significantly benefit the biodiesel industry and its development.

Again, we appreciate the introduction of S. 987 and the opportunity to provide these comments to you. We look forward to continue working with the committee and staff.

STATEMENT OF THE NGVAMERICA

INTRODUCTION

NGVAmerica appreciates the Committee's initiative to include biogas as a renewable fuel in S. 987, and we appreciate the opportunity to provide the Committee with some additional comments and suggestions concerning that bill.

NGVAmerica is a national organization of over 100 member companies, including: vehicle manufacturers; natural gas vehicle (NGV) component manufacturers; natural gas distribution, transmission, and production companies; natural gas development organizations; environmental and non-profit advocacy organizations; state and local government agencies; and fleet operators. NGVAmerica is dedicated to developing markets for NGVs and building an NGV infrastructure, including the installation of fueling stations, the manufacture of NGVs, the development of industry standards, and the provision of training.

RECOMMENDATIONS

NGVAmerica proposes the following changes to S. 987. The changes in Section A below concern broadening the types of biogas that are encouraged by the bill. There are three primary biofuels: bio-ethanol, biodiesel and biogas (which can be purified to make a natural gas-substitute called biomethane). The proposed changes offered here would broaden the language of the bill to include biogas and more specifically, biomethane, in all the incentives and programs of the bill. Section B below requests that the Committee expand portions of S. 987 to include the alternative fuels recognized under section 301(2) of the Energy Policy Act of 1992.

Biogas-related Recommendations

NGVAmerica proposes the following changes to S. 987 (noted in red and italics below). The results of the changes would be to treat all renewable biogas technologies and sources the same as other renewable biofuels:

Definition of "Advanced Biofuels"

Page 3, lines 8-9

"Advanced biofuels" is currently defined as follows: (v) biogas produced by anaerobic digestion or fermentation of organic matter from renewable biomass; and

Proposed language: (v) biogas produced by anaerobic digestion, fermentation, or *pyrolysis* of organic matter from renewable biomass; and

Rationale:

Pyrolysis is a form of thermal treatment that reduces waste volumes and produces a methane-rich fuel as a byproduct. While most organic materials can be converted to biogas using anaerobic digestion or fermentation, cel-

lulosic materials require the use of a pyrolysis process. Since it is hoped that cellulosic materials will be an increasingly important feedstock for energy production, pyrolysis should be added here.

Definition of “Renewable Biomass”

Page 4, line 17

This line describes “renewable biomass” as including: (IV) municipal solid waste.

Proposed language: (IV) municipal solid waste *and sewage*.

Rationale:

Disposal of sewage sludge accumulated in wastewater treatment facilities is costly and energy-intensive. Sewage sludge is also an excellent biogas feedstock. Sewage, however, was omitted from the definition of renewable biomass and should be included. Note that sewage is included in the final rule for the Renewable Fuel Standard just issued by EPA. See Renewable Fuel Standard (Final Rule; definition of renewable fuel; to be codified at 40 CFR § 80.1100(a)(1)(i)(B); (<http://www.epa.gov/otaq/renewablefuels/rfs-regulations.pdf>).

Definition of “Renewable Fuel”

Page 5, lines 3-7

The definition of “renewable fuel” includes the following: (ii) used to replace or reduce the quantity of fossil fuel present in a fuel mixture used to operate a motor vehicle, boiler, or furnace that would otherwise operate using fossil fuel.

Proposed language: (ii) used to replace or reduce the quantity of fossil fuel present in a fuel *or fuel* mixture used to operate a motor vehicle, boiler, or furnace that would otherwise operate using fossil fuel.

Rationale:

In the past, regulatory agencies (e.g., the IRS) have interpreted the term “fuel mixture” as excluding fuels that are 100 percent non-petroleum fuels (i.e., neat or dedicated fuels). Neat fuels include B100, E100, renewable hydrogen and renewable biogas. It was probably not the intention of the Committee to exclude fuels that are 100 percent renewable but not a “fuel mixture.” Clarifying that dedicated or neat renewable fuels qualify as renewable fuels also is consistent with the approach taken by EPA in the final regulations issues for the Renewable Fuel Standard.

Focus on Cellulosic Biomass Ethanol Only

Page 3, lines 13-14; Page 12-13, lines 24-25 and 1-4; Page 33, lines 2324; Page 37, line 14

In these lines, S. 987 refers to “cellulosic biomass ethanol.” All these references should be changed to “cellulosic biomass biofuels.”

Rationale:

As discussed above, in addition to ethanol, cellulosic biomass can also be converted to biogas. In addition, it may be possible for a cellulosic process to also produce a renewable diesel substitute. Producing ethanol from cellulosic materials may turn out to be the most economical and efficient use of these materials. But, until this becomes clearer, the production of other fuels from these materials also should be encouraged and supported by federal assistance. Congress should provide as much flexibility as possible in this program to convert cellulosic biomass into useful energy and not just limit it to cellulosic ethanol.

Infrastructure Pilot Program for Renewable Fuels

Page 21, lines 1-5

These lines define the scope of the grant program as follows: (b) GRANT PURPOSES.—A grant under this section shall be used for the establishment of refueling infrastructure corridors, as designated by the Secretary, for gasoline blends that contain at least 85 percent renewable fuel or diesel fuel that contains at least 10 percent renewable fuel . . .

Proposed language: (b) GRANT PURPOSES.—A grant under this section shall be used for the establishment of refueling infrastructure corridors, as designated by the Secretary, for gasoline blends that contain at least 85 percent renewable fuel, diesel fuel that contains at least 10 percent renewable fuel *or natural gas (both compressed and liquefied) that contains at least 10 percent biogas* . . .

Rationale:

The addition of biogas-related fueling infrastructure would allow biogas distributors to be treated the same as bio-liquid distributors.

Loan Guarantees of Renewable Fuels Facilities

Page 30, lines 10-15

These lines define the minimum production volume for biofuels plants in order to qualify for a loan guarantee: (4) PROJECT DESIGN.—A project for which a guarantee is made under this subsection shall have a project design that has been validated through the operation of a continuous process pilot facility with an annual output of at least 50,000 gallons of ethanol.

Proposed language: (4) PROJECT DESIGN.—A project for which a guarantee is made under this subsection shall have a project design that has been validated through the operation of a continuous process pilot facility with an annual output of at least 50,000 gallons of ethanol-equivalent of renewable fuel.

Rationale:

As currently stated, loans guarantees would only be available for ethanol production facilities. Biodiesel, biogas and other biofuels facilities would not qualify. This change would treat all renewable fuels equally.

Add: Sec. 306. Study of Biogas/Biomethane Potential and Technologies

Add at end of the bill

Add a new National Academy of Sciences study on the production potential of biogas (including biomethane) from landfills, sewage waste treatment facilities, animal waste, crop waste, and cellulosic biomass sources.

The scope of this biogas/biomethane study could be as follows: SCOPE—In conducting the study, the Academy shall—

- (1) evaluate the potential of producing biogas/biomethane in the U.S. from landfills, sewage waste treatment facilities, animal waste, crop waste, and cellulosic biomass sources.
- (2) include an assessment of the maturity of biogas/biomethane production technologies and the potential for technical and economic improvements in these technologies;
- (3) consider the technical, economic, regulatory and other barriers to increased production of biogas/biomethane;
- (4) evaluate the potential of and barriers to using biomethane as a transportation fuel—both as 100 percent biomethane and as a natural gas/biomethane blend;
- (5) make policy recommendations to accelerate the development of biogas/biomethane technologies, commercial production of biogas/biomethane and the use of biomethane as a transportation fuel.

Rationale:

Several studies have looked at the feasibility of producing biogas/biomethane from readily available renewable sources. However, there is no current comprehensive national assessment of the production potential of biogas (including biomethane) from landfills, sewage waste treatment facilities, animal waste, crop waste, and cellulosic biomass sources. Some existing studies are very targeted (e.g., biogas from dairy farm manure in California). Others are old or have other limitations. For instance, the U.S. Department of Energy did a cursory study in 1998 that concluded that it would be feasible to produce 1.25 quadrillion Btus (about 10 billion gasoline gallon equivalent) from landfills, animal waste and sewage. However, that study did not investigate the potential of crop waste and cellulosic biomass sources. Further, biogas/biomethane technologies have evolved significantly during the past nine years. The new section would call for a study by the National Academy of Sciences on the production potential of biogas/biomethane as well as an evaluation of the conversion technologies currently being used in the U.S. and around the world and the potential for technology improvement. This study could be included in the advanced biofuels study detailed in Section 301. That study currently is worded broadly enough to include such a review. But given the current national focus on liquid fuels and cellulosic ethanol, the potential of biogas/biomethane likely would not be given the same priority as a separate study.

Alternative Fuels Versus Just Renewable Fuels

A number of experts have argued that it would be very difficult (if not impossible) for America to produce the amount of renewable fuels domestically to achieve the petroleum displacement goals called for in S. 987 or that the President called for

in his 2007 State of the Union address. The President has submitted to Congress a petroleum displacement proposal built on both renewable and alternative fuels. At the April 12 Senate Energy & Natural Resources Committee hearing, representatives from the coal industry advocated that coal-to-liquid (CTL) fuels should be included in S. 987—despite the fact that coal obviously is not a renewable fuel. This recommendation received support from some members of the Committee. In addition, U.S. DOE Assistant Energy Secretary for Energy Efficiency and Renewable Energy Alexander Karsner said at that hearing that the Administration “generally supports the vision” of S. 987, but the White House would like to see the bill apply to fuels and technologies other than biofuels.

NGVAmerica believes that adding only one non-renewable alternative fuel would be inappropriate. Rather, NGVAmerica recommends that the Committee expand the scope of S. 987 to include all renewable and alternative fuels—especially natural gas.

As is well known, natural gas is primarily a domestic fuel, which, when used to power vehicles, reduces urban air pollution. What is less widely appreciated is that, on a well-to-wheel basis, natural gas vehicles produce 15 to 20 percent less greenhouse gases than comparable gasoline and diesel vehicles. This is comparable—or in some cases better—than some renewable fuels on a well-to-wheels basis.

Importantly, natural gas vehicles can make a major impact in the high fuel-use commercial urban fleet market—a market that is often over-looked in discussing petroleum displacement. America uses about 50 billion gallons of petroleum in diesel vehicles. While there has been some effort to use ethanol as a substitute for diesel fuel, it is expected that ethanol will be used almost exclusively as a gasoline substitute. Biodiesel can be used when blended in low percentages with petroleum diesel. However, because of engine and production limitations, it is expected that biodiesel could displace not more than 2 or 3 billion gallons of petroleum diesel by 2017. According to The U.S. Energy Information Administration’s 2007 Annual Energy Outlook, NGVs displaced about 350 million gallons of the 177 billion gallons of petroleum used for on-road vehicles in the U.S. last year. However, with proper incentives and government support, NGVs could displace up to 10 billion gallons of petroleum by 2017. Note that, if the changes proposed in Section A (above) are adopted and enacted into law, a significant percentage of this could be renewable biomethane.

STATEMENT OF THE SOAP AND DETERGENT ASSOCIATION

The Soap and Detergent Association (SDA) appreciates the opportunity to submit comments on S. 987 on behalf of the United States oleochemical industry. SDA is a 110 member national trade association representing the formulators of soaps, detergents, general household and institutional cleaning products as well as the suppliers of ingredients and finished packaging for those products. Among these suppliers are the manufacturers of oleochemicals made from animal fats and oils.

The United States oleochemical industry is primarily based on tallow, an animal fat. The viability of the industry is, in fact, based on the fact that tallow is competitively priced against foreign palm oil. Because of the substitutability of palm oil for tallow, if tallow’s advantageous price differential is lost; the future of a United States based oleochemical industry, and its customers, becomes tenuous.

Unlike corn and soybeans for which plantings can be expanded to accommodate new biofuel applications, tallow production is relatively fixed, usually fluctuating less than 2% from year to year. There is no real elasticity in the tallow supply. Cattle herds are not expanded to produce tallow; it is a by-product, not a crop. Consequently, biofuel subsidies disadvantage the oleochemical industry not only by creating upward price pressures on tallow, but by diverting it from a, non-expandable, finite raw material pool. The issue is supply availability itself, not just price.

Existing biofuel subsidies, including those for ethanol, have created a series of economic incentives that divert tallow from traditional uses to fuels. The cascade of incentives began with the tax credits for tallow-based biodiesel in the VEETEC provisions of the American Jobs Creation Act of 2004. These were followed by a subsidy for direct burning of tallow as a fuel and finally the “renewable diesel” incentives found in Section 1346 of the “Energy Policy Act of 2005.” In guidance issued earlier this month, the Internal Revenue Service held that so-called “coproduced fuel,” where animal fats are mixed directly with crude oil going to a cracking tower, was considered to be “renewable diesel” produced by the thermal depolymerization (TDP) process and therefore was available for subsidies.

These three credits create direct economic incentives to divert tallow away from oleochemical production. The oleochemical industry receives no subsidies. It has his-

torically purchased its tallow in a classic free market, supply and demand environment. Those traditional conditions no longer exist, however.

The situation is further complicated by the fact that ethanol incentives have served to divert corn from traditional livestock feeding operations. This has caused an additional draw down of the tallow pool as tallow, in part, is substituted for the diverted corn in animal feed. Currently, tallow prices are in the \$0.22–\$0.23 range. Traditionally, tallow prices have been in the low to mid teens. This represents a nearly 50% increase and has every indication of being a sustainable price given the current subsidy structure.

The conditions in the corn market which have led to this new tallow price level are generally viewed as attributable to the confluence of the long standing ethanol subsidy combined with an enhanced renewable fuels standard. This was the perfect biofuels storm, the effects of which have been widely felt and publicized.

Consequently, the exemption of corn-based fuels from S. 987 is no surprise. In fact, it is an important recognition of the impact on food and feed prices of biofuel subsidies. And, while the threat of biofuel subsidies to the American oleochemical industry is less public and well known, it is no less dire and deserving of redress.

In our view, based on the experience with corn prices, the renewable fuel standards proposed in S. 987, will, when combined with the commodity incentives already in place, significantly threaten the oleochemical production in the United States and create the conditions for its demise.

SDA recognizes that the potential benefit of biofuels to the nation is significant. However, that benefit should not be purchased at the cost of driving a well established, traditional industry either out of business or overseas. There must be a balance and the impacts on related industries must be understood before decisions of the magnitude contemplated in S. 987 are made.

Based on the foregoing, we respectfully urge that all references to animal fats be removed from S. 987 for the same reason that corn is excluded. S. 987 should, instead, take the first steps to reestablish a balanced approach to the incentivization of the American biofuels industry.