

AGRICULTURE'S ROLE IN THE RENEWABLE FUELS MARKET

HEARING

BEFORE THE

COMMITTEE ON AGRICULTURE HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

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AGRICULTURE'S ROLE IN THE RENEWABLE FUELS MARKET

THURSDAY, JUNE 29, 2006

HOUSE OF REPRESENTATIVES,
COMMITTEE ON AGRICULTURE,
Washington, DC.

The committee met, pursuant to call, at 10:05 a.m., in room 1300 of the Longworth House Office Building, Hon. Bob Goodlatte (chairman of the committee) presiding.

Members present: Representatives Lucas, Moran, Gutknecht, Johnson, Osborne, Bonner, Rogers, King, Neugebauer, Boustany, Schwarz, Foxx, Conaway, Fortenberry, Schmidt, Sodrel, Peterson, Etheridge, Baca, Cardoza, Herseth, Cuellar, Costa, Salazar, Barrow, Pomeroy, Boswell, Larsen, Davis and Chandler.

Staff present: Kevin Kramp, Craig Jagger, Ben Anderson, Tobin Ellison, William B. Farris, Josh Maxwell, Tyler Wegmeyer, Callista Gingrich, clerk; Lindsey Correa, Chip Conley, and Anne Simmons.

OPENING STATEMENT OF HON. BOB GOODLATTE, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF VIRGINIA

The CHAIRMAN. Good morning. This hearing of the House Committee on Agriculture to review agriculture's role in the renewable fuels market will come to order. I would like to welcome our distinguished witnesses to the Committee on Agriculture.

The purpose of today's hearing is to review the role of the agriculture community in the renewable fuels market. With gasoline prices consistently hovering around \$3 a gallon, I believe it is appropriate to discuss how agriculture commodities, the source of most ethanol and biodiesel, can make a larger contribution to our Nation's energy supply.

Earlier this month I introduced House Concurrent Resolution 424 with Ranking Member Collin Peterson and Representatives Musgrave, Herseth and a number of other bipartisan original cosponsors. This resolution, also known as 25 x '25, recognizes the importance of agriculture in meeting our energy needs and sets a noble goal for America whereby the year 2025, 25 percent of the total energy consumed in the United States will be provided by renewable sources from America's agriculture, forestry and working lands.

Although corn is often the first commodity that comes to mind in discussions about ethanol, there are a wide variety of agriculture products and byproducts that can be converted to clean, renewable energy sources. For example, the forestry industry in my State has

enormous potential to contribute to renewable fuels. Trees are an abundant resource and are available for conversion into both paper and biofuels year round. Wood and wood waste could produce enough electricity to power 43 million households or enough ethanol to increase our domestic supply by almost tenfold. It would be possible for more than 4 billion gallons of ethanol to be produced a year from forestry biomass without negatively impacting paper and packaging production and still ensuring that forest land owners have strong markets for timber.

Like forestry, Virginia's many agriculture commodities and animal waste products would be an essential and beneficial resource for renewable fuels.

Today we will hear from the Under Secretary, Tom Dorr, who will speak about the President's advanced energy initiative. We will also hear from General Motors, who has recently initiated a large public information campaign for flex fuel vehicles, as well as Iogen, who is about to break ground on one of the first cellulosic ethanol plants in the United States. We will hear from the research side of this issue from Al Christopherson, who represents the Agricultural Utilization Research Institute, and finally from agriculture producer groups who will produce the feed stock for our biofuels. I would like to also thank our subcommittee chairman, Gil Gutknecht, for his assistance in planning this hearing and providing several experts from Minnesota.

As energy prices continue to rise and we work to reduce our dependency on foreign oil, it is important to continue to promote the development of alternative fuels and create new markets for agriculture products in the energy markets. At the same time, we must also ensure that we continue to have a reliable and affordable supply of feed. The benefit of reduced energy prices and new markets for agriculture products cannot be replaced by the risk of increased input costs for livestock producers. While agriculture's contribution to renewable fuels has incredible potential, we must ensure it does not result in unintended economic risks.

I look forward to the testimony and the participation of my colleagues as we discuss this important issue, and I now turn to the ranking minority member, Congressman Peterson, who is one of the strongest advocates for renewable fuels in the Congress. The gentleman is recognized.

OPENING STATEMENT OF HON. COLLIN C. PETERSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MINNESOTA

Mr. PETERSON. Thank you, Mr. Chairman, and thank you for calling this hearing and for your leadership on this issue as well.

Today's hearing on agriculture's role in biofuels is an important one because it impacts both our domestic and our foreign policy. With gas prices as the chairman said around \$3 a gallon or more in some places, all the issues that we have in the Middle East, Nigeria and Venezuela, there has been no greater time to utilize renewable fuel technology. Renewable energy provides a great opportunity for U.S. agriculture and for rural America to be leaders in this new future of energy.

My home State of Minnesota has a long tradition in supporting production and use of renewable energy. We have had a mandate that 10 percent of our fuel be ethanol. The legislature has raised that to 20 percent. We have a mandate on biodiesel. We have been leading the country in that regard and we are the State that has the most E-85 pumps of any other State in the country. We currently have about 210. We have 16 ethanol plants, 13 of which are farmed owner, as well as three operating biodiesel plants. Potential for continued growth in Minnesota and throughout the United States as I said is tremendous, and the excitement level is high in farm country and in our small communities.

What we need to do now is to help these renewable industries such as ethanol gain greater access to the American consumer. We need to promote expansion of new plants, aid research in improving industry technology and to encourage gasoline stations to supply E-85 in their pumps as well as manufacturers continue to increase the amount of flex fuel vehicles that are available to the American consumer.

The future of ethanol production technology is evolving as we go along to meet these energy demands of this country. Currently there are cellulosic ethanol plants that are up and running or about to be in Canada and in Spain, and as the chairman said, hopefully there will be plants here that are going to be started here shortly in the United States. Currently what they are using, as I understand, is wheat and barley straw but eventually the cellulosic technology will allow us to use any kind of biomass and including switchgrass which the President mentioned in his State of the Union speech and had a lot of Americans scratching their heads but folks are learning about it and it has some tremendous potential not only for making fuel but it does a lot of other positive things for the environment, wildlife and so forth. Cellulosic ethanol will expand our Nation's ability to produce more efficient energy and complement ethanol production. We are going to continue to make ethanol out of corn. We are going to probably grow more corn but my position is that we ought to be doing whatever we can to produce fuel in this country from whatever source it is so we can get off of this foreign oil.

Commercializing these technologies will lead us to greater production capacity, maybe cheaper energy in the long run and give us the ability to have a significant inroad to getting energy independent. Brazil as I understand it is probably going to be energy independent this year and that would be a great thing if we could do that here in the United States, and that is my goal and I think a lot of people's goal.

The future of energy production from agriculture I think is the most exciting thing that has happened in rural America in a long time, maybe 100 years. Renewable energy from corn stovers, switchgrass, wind turbines, animal waste, other biomass will all contribute to reducing our reliance on foreign oil and providing a welcome boom to rural America. So I look forward to hearing from the testimony of our panelists, I thank them all for being here, and I want to recognize my good friend and constitute, Al Christopherson, who is going to be testifying on the second panel. Al has been a long time leader in agriculture, head of the Farm Bu-

reau in Minnesota for many years. He retired from that. He is now the chairman of the board of the Agricultural Utilization Research Institute, which is a leader in research in this area. We appreciate him being here all the way from Penock, Minnesota, which is a big metropolis outside of Willmar, Minnesota.

So again, thank you all for being here and we look forward to hearing from the witnesses.

The CHAIRMAN. I thank the gentleman for his statement. We have three panels of witnesses who have very interesting things to tell us, so without objection, all other opening statements will be made a part of the record.

[The prepared statements follow:]

House Agriculture Full Committee
Hearing to Review Agriculture's Role in the Renewable Fuels
Market
Opening Statement
Congressman G. K. Butterfield
June 29, 2006

Chairman Goodlatte, Ranking Member Peterson, it gives me great pleasure to be able to share with you the importance of renewable fuels to North Carolina Agriculture.

Mr. Chairman, I represent one of the most rural and agriculturally diverse districts in the nation. Stronger investment and more research for renewable fuels would open another market for North Carolina farmers. If we were to build several biodiesel and ethanol facilities in the state, and take steps to ensure that produced biofuels make it to the market, it would certainly benefit our farmers. Almost every grower I have spoken with likes the idea of getting involved in biofuels production industry. However, farmers are reluctant to make such a high risk investment by growing a crop for a market that doesn't exist. That is why facilities such as the biodiesel plant located just outside of my district in Mt. Olive, North Carolina are so important to our nation's biodiesel industry. A successful venture such as that getting off the ground would enable farmers from all over the area to grow soybeans for a specific market in their own backyard.

Mr. Chairman, it is imperative that more research is conducted to improve our ability to use other crops, like sweet potatoes, for renewable fuels. Currently, we can use sweet potatoes for this purpose, but the process needs to be more cost effective to take hold. There are a number of crops that are promising with regard to biofuels, but our researchers need time and support to develop quality products.

Finally, we must urge and encourage increased use of renewable fuels in the market. Without the implementation of more flex fuel vehicles on the road, and more gas stations that offer renewable fuel options; this task will remain difficult. There are some stations in my home state that offer biodiesel, E-85 and E-10. However, we can't expect consumers to start using these products if it is not readily available.

Mr. Chairman, the problem is quite simple. It doesn't make good business sense to offer a product with a limited consumer base. I urge my colleagues on the committee to join with me in investigating ways to help develop the industry from the market side as well. Thank you Mr. Chairman – I yield back.

Opening Statement of Congressman Lincoln Davis
Hearing to Review Agriculture's Role in the
Renewable Fuels Market
June 29th, 2006

I'd like to thank Chairman Goodlatte and Ranking Member Peterson for holding today's hearing on Agriculture's Role in the Renewable Fuels Market. I'd also like to thank our panelists for participating in today's hearing.

I think a lot of American people are filling up their trucks and cars today and they are looking at how much it costs to do so and they are wondering why? They are wondering why the price of gas continues to rise, and they are wondering why their government is not acting to help alleviate the cost of energy and fuel in this country? They are wondering how the Congress can pass an Energy bill and yet the cost of energy, as far as the consumer is concerned, continues to rise. The American people have a lot of concerns when it comes to cost of fuel and energy, and quite frankly, Congress and the Administration have not done a very good job of responding to those concerns. We must do better, and we must not be afraid to try something new.

Now there are some that think we can drill our way out of this problem, or that we can just build a bunch of new refineries and that will end the problem of supply and demand. While I've never been an opponent of drilling, far from it in fact, I think we need to drastically broaden our resource base. I think we should be doing more with clean coal technologies. I think we should be doing more in the area of nuclear power. And I certainly think we need to vastly expand our use of agriculture-based renewable energy production.

Perhaps we need to have a broad-based energy title in the next Farm Bill. At the very least we should discuss the idea and have hearings on the different possibilities—much like we are today. What we can't do is stick our heads in the sand and ignore the realities of today and the demands of the future. We also can't be afraid of change.

America is the most innovative country in the world. Our country doesn't fear difficult challenges or the need to change, but rather, we embrace and lead the rest of the world by example. We've done so in the areas of defense, economic development, and social and environmental responsibility. This trend should continue in response to our energy needs.

Again, I thank the Chairman and Ranking Member for holding today's hearing and I look forward to hearing the ideas of our panels.

Statement by Representative Jeff Fortenberry

House Agriculture Committee

Hearing to Review Agriculture's Role in the

Renewable Fuels Market

June 29, 2006

Mr. Chairman, thank you for holding this hearing to review agriculture's role in the renewable fuels market. I appreciate having this opportunity to provide comments on this important issue.

In Nebraska, our entire state, urban and rural, benefits from a strong bond with agricultural life. We Nebraskans are rooted in the land. The values of hard work, family life, neighbor helping neighbor, and personal responsibility are found most profoundly on the family farm. Strong families

and strong communities are built upon these formational values. Working to create profitable opportunities for our farmers and ag producers will strengthen rural communities.

Ag-based energy production is an emerging opportunity that I believe will shape agriculture and farm policy for years to come. Last year's energy bill at long last gave ethanol, biodiesel and other forms of bioenergy a seat at the national energy policy table, significantly expanding the development and use of renewable fuels in America.

This is tremendously meaningful to Nebraska. We are currently the nation's third largest ethanol producer and will soon move into second place. Twelve plants are now in

operation, and nearly 30 are in various stages of construction or consideration. More than one-quarter of Nebraska corn now goes for ethanol production.

I believe renewable energy should become a hallmark of good federal farm legislation, just as it has in federal energy policy. Rural America benefits greatly from the jobs and economic stimulation that clean, environmentally responsible renewable energy production sites bring to rural areas. And increased domestic energy production helps farmers control input costs in an age of ever increasing energy prices.

Eastern Nebraska is quickly becoming a national leader in innovative bioenergy production. We are home to a facility that produces corn-based bioplastics as well as

ethanol. We are also home to two very unique renewable energy projects. When construction is completed later this year, a new plant will be the world's first "closed loop" ethanol energy facility. It is powered by methane captured from its cattle feeding operation, which feeds cattle the corn byproducts of ethanol production. In another pioneering project, a producer captures methane from hog manure on his farm, converts it to energy, and sells the energy to our Nebraska Public Power District.

New development and signs of interest in renewable fuels production are booming. Local investors are enthusiastically supporting new projects in both ethanol and biodiesel production. In addition, developments in biomass and wind energy are very encouraging.

Rural America can benefit exponentially from these trends. Production of renewable fuels and renewable energy meets multiple policy objectives. It decreases America's reliance on foreign sources of energy, creates new farm income, and fosters good stewardship of resources. With sensible public policy support, the continued growth of home-grown renewable energy will strengthen our nation and help revitalize rural America.

Congressman John Salazar
Opening Statement—Committee on Agriculture
Review of Agriculture's Role in Renewable Energy
June 29, 2006



- Thank you Chairman Goodlatte and Ranking Member Peterson for holding this important hearing today.
- Agriculture is the backbone of our economy.
- By increasing the use of renewable energy such as ethanol, biodiesel, and wind energy, agriculture can be the backbone of our energy supply as well.
- I am really excited that our nation's agriculture producers are being considered as a solution to help address our nation's current energy crisis.
- While I understand that fossil fuel development is a key part of our energy policy, I believe we must diversify our energy resources in order to meet the nation's long term energy needs.
- Renewable energy offers a strong substitute to our dependence on fossil fuels.
- Promoting production and use of renewable fuels will benefit rural economies, keep the environment clean, and improve our national security.
- My state is an example of how agriculture is playing an increasing role in energy development

- The voters of Colorado choose to implement a Renewable Portfolio Standard, requiring 10% of the state's electricity come from renewable resources by 2015.
- The rural communities in Colorado will benefit from this because they have the available land for the wind and solar development.
- As an example, in Southeastern Colorado, a 162 megawatt wind farm has been built.
- That wind farm occupies very little ground, therefore still allowing the farmers and ranchers to get the agricultural benefit of their land and yet still providing electricity for Colorado's residents.
- That wind farm has benefited the local communities by adding jobs and increasing the tax base in those counties, as well as lowering the nation's dependence on fossil fuels.
- That is one of many examples throughout the nation of how agriculture can be a part of the nation's energy sector.
- There are also two new ethanol plants producing over 100 million gallons of ethanol per year and plans to build at least two more.
- Feasibility studies are being conducted all over the state including two I have helped spearhead.
- Renewable Energy has multiple benefits and I very excited to see what it does for rural development.
- I am sure this will be a very exciting hearing and look forward to hearing the testimony of the two panels.

The CHAIRMAN. And we will proceed now to welcome our first witness, the Honorable Thomas Dorr, Under Secretary for Rural Development of the U.S. Department of Agriculture. Mr. Under Secretary, we are always delighted to have you with us and pleased to have your testimony regarding the Department's involvement in this very interesting and now very dynamic aspect of American agriculture. Welcome.

STATEMENT OF THOMAS C. DORR, UNDER SECRETARY, RURAL DEVELOPMENT, U.S. DEPARTMENT OF AGRICULTURE

Mr. DORR. Thank you, Mr. Chairman, members.

It really is a distinct pleasure for me to appear before you today to discuss USDA's role in our Nation's energy strategy. That role is significant and it is growing. Bottom line, distributed agriculture or rural-based renewable fuels have a very significant potential for enhancing our national security, our economic competitiveness as well as our environment. They are also the biggest new opportunity for wealth creation to emerge in rural America for many years, and this is a very high priority and I look forward to working with this committee to realize that full potential.

But before we get into specifics, I would like to share a story. Last month I was in Indianapolis for an ethanol event at the Indianapolis Motor Speedway. The 500 is shifting to ethanol, the Indy Racing League is. The race was run this year on a 10 percent blend and they are planning on 100 percent ethanol next year. While I was there I met Tanya Dana, the wife of Paul Dana. Paul is the younger driver who was killed back in March during practice for another race, not the 500, but Paul was also the young man who had the idea and then persuaded Tony George, who is the president and the owner of the speedway, to switch the Indy 500 and the Indy Racing League to ethanol. Now, Paul was a farm kid from Missouri. Tanya is a farm girl from North Dakota. They met in college at Northwestern University, where he studied communications and she studied music. How they got from Northwestern to race cars is another story for another time. But Paul was driving cars in 2001 when the September 11 attacks occurred, and as a Midwestern farm kid he knew about ethanol and he connected the dots. He thought it would be great if racing would make a statement about energy independence, so Paul started working out the details and lining up the support, and before long he was ready to approach Tony George, who said yes.

And one of the things that strikes me about this, one of the things that makes this such a great story is how grass roots all this still is. Paul and Tanya Dana were a couple of farm kids with an idea and Tony George runs a family business, and most people probably don't think of the Indy 500 that way but it is a third-generation family business. Tony is the grandson of Tony Holman, who bought the speedway in 1946 right after World War II.

I think of that and then I think of my own father, who was one of those who worked very hard to pass the first ethanol check-off back in Iowa over 30 years ago. I think of all the other farms in co-ops that have invested and keep this moving forward for many years. Today all that hope and investment and energy is truly paying off. Now, obviously Government has helped. Federal and State

incentives kept the ethanol industry alive for many years when low oil prices were boxing alternative fuels off the market. Today with oil at \$70, that investment is clearly paying off.

In addition, the 2002 farm bill and the 2005 energy bill have given us significant and important new tools to support renewables across the board, and as a result from 2001 through 2005, USDA and USDA's rural development alone have invested over \$350 million in 650 renewable energy projects but that is just the tip of the iceberg. Biofuels and wind have reached a tipping point and they are starting to move on their own, assuming the continuation of the production tax credits, and that is great. The economics of solar are a little further out but there are exciting things on the horizon for that as well.

The challenge today is to keep that growth on track. We are working with the Department of Energy to ensure that our activities complement one another. The President has called for an advanced energy initiative that results in research and development to make cellulosic ethanol cost-competitive by 2012. We do need to find ways to move emerging technologies through the proverbial valley of death into full commercialization, and we of course look forward to working with Congress to craft a strong farm bill that takes full advantage of the remarkable new opportunities facing rural America today.

Thank you all very much, and I look forward to engaging in this dialog with you.

[The prepared statement of Mr. Dorr appears at the conclusion of the hearing.]

The CHAIRMAN. Mr. Secretary, thank you for your testimony. I wonder if you might tell us from the perspective of the Department of Agriculture what role you think the Secretary and yourself and others in the Department should play in examining the overall picture of this energy supply from agricultural products. By that I mean, we are dramatically increasing agricultural production right now and we have got to make sure that it gets to the consumer, and in doing that, it has got to be in a way that is usable to the consumer. So obviously your Department doesn't have jurisdiction over automobile manufacturers or the transmission of fuel supplies and gasoline stations and so on but you also have got to have an interest in making sure that these products that we are encouraging increased production of make it to the consumer to benefit the consumer. What is your perspective on that? What role do you view the Department having in that?

Mr. DORR. Well, clearly the Department has had a historic role in providing oversight and responsibility for the things as charged by Congress relative to conservation issues, production issues, food safety issues and all the other ancillary things that are tied to it. As you I am sure are well aware, not too long ago there was what is now known as the billion-ton study that was completed in conjunction with the Department of Energy and USDA. The assessment was made in that study that there was more than an adequate supply of available biomass to provide up to 30 to 40 percent of the liquid fuels out of biomass without significantly impacting the levels of food production that were required out of corn or impacting the levels of CRP ground or other things. So I think be-

cause this is such a dynamic new and growing effort, that there is going to be a continual heightened level of evaluation and monitoring to make sure that we do understand what is happening but yet I hasten to reflect on something that has been obvious to me in all my years in farming, and that is that very time a potential new demand came along, we somehow have always managed to not only meet that new demand but keep commodity prices at levels that are far below what frequently are viewed as acceptable for an economic survival. So I am pretty optimistic that we are going to be able to sustain the kind of demand for liquid fuels and the other requirements that society has for us.

The CHAIRMAN. Thank you. You mentioned the President's plan to accelerate research into cellulosic ethanol and to make it cost-competitive. Do you have any perspective on what kind of timeline we are talking about there? I know we are going to hear from some of the folks who are in the process of making it right and it is an infant industry but has tremendous potential. The President mentioned it in his State of the Union address and I am wondering if you have a perspective on when you think this can be available on a large scale?

Mr. DORR. Well, obviously the advanced energy initiative as proposed by the President resides with the Department of Energy. We have had a history of working with them and to the extent that we have cross-pollinating dialogs and discussions, I am very encouraged with the potential of cellulosic ethanol and I think that technology will evolve in a very reasonable amount of time, and to the extent that we can be involved in facilitating the commercialization of that, we fully intend to do that. I do know that there are an ongoing number of research initiatives through the Cooperative Research and Extension Service of the Department of Agriculture and other areas and so we will be aggressively, I am certain, pursuing those as well.

The CHAIRMAN. You mentioned in your testimony that fundamentals are driving the need for renewable fuels and I also in my opening statement mentioned the high oil prices that certainly are having an impact on this. If these factors are no longer in place, will there still be a large drive to increase renewable fuel production in the country?

Mr. DORR. Well, I don't think any of us really know what those price structures are that turn things on and turn them off but I think the consensus has obviously been that the demand for energy, particularly in the developing parts of the world, particularly in India and China and other places, substantial enough that with the new energy administration reports that were out recently, there is going to be substantial growth in energy demand and it my expectation that with the price levels that we have and the commitments that are obviously being made by major players in this industry, it has gone now beyond the start-up phase. How it evolves remains to be seen but I am very encouraged with what I have seen that there will be strong continued growth in this area and I think aside from the liquid fuels area, I would expect to see it in solar and in wind and other areas as well. We are going to have to recognize that are building out brand new industries. These are distributed production types of systems. They are going

to require new regulatory regimens. They are going to require new investment strategies, probably new business models and so it is going to take a concerted effort on all fronts to make sure that we enhance the smooth build-out of this industry.

The CHAIRMAN. Thank you. The gentleman from Minnesota is recognized.

Mr. PETERSON. I thank the gentleman.

Following up a little bit on that question, one of the problems that I am hearing about from the people that are working in the cellulosic area is the problem that we had some years ago when we were trying to get the original corn ethanol industry going and that is finding the financing and getting the comfort level up with the financing folks to do this, and it is apparently not there. So the question is, you have brought enough authority under the CCC to provide operating loan guarantee programs or grant programs to help us get this cellulosic industry off the ground or do you need some changes in that area?

Mr. DORR. USDA Rural Development has a fairly extensive loan guarantee background and program. We also have the ability to originate direct as well as guaranteed loans. We do not have access to the Commodity Credit Corporation. That is not in our portfolio. To the extent that we were given either statutory authority or an adequate funding, I am certain that we could facilitate doing some of these things in these areas.

I think it is important to point out that we have a long relationship with Department of Energy, particularly in the implementation of our 9006 portfolio, which is part of the 2002 farm bill. One of the things I did, and I think I mentioned this to the committee before, but realizing that we probably didn't have all the technical capacity to evaluate all of these applicants that came to us, we reached out and engaged them to help provide technical assistance as we were able to then make the grants and now ultimately a number of these loan guarantees, and that had worked very well. To the extent that Department of Energy is interested in involving us in any of this, I am certain that the Secretary and all of us involved would be more than willing to do so.

Mr. PETERSON. That 9006 program, isn't there some limitation on how much you can do there or something?

Mr. DORR. Right now I think this fiscal year we have about \$175 million in loan guarantee authority, and the regulations were developed back in 2004 and they have a maximum loan guarantee right now of \$10 million. We would have to revisit that regulation in order to expand the scope of those loans.

Mr. PETERSON. I mean, because if we are going to get these first couple plants up, there is some DOE money but it is going to take a lot more than 10 million bucks, so—

Mr. DORR. You are absolutely right.

Mr. PETERSON. So that is something we can look at as we move ahead with the farm bill. Have you been briefed on the work done, and this may be a little bit out of your area but I know that you have been very much interested in the work that is being done on switchgrass in Lincoln, Nebraska, and I know this is out of your area again but are there other places where USDA by themselves

or in conjunction with a university are doing research on switchgrass?

Mr. DORR. I have not been briefed on that particular project. I do know that there was a level of research that was done on this same issue in Iowa. There are a number of other areas of this going on but I have not been involved quite frankly in the research side of this nor recently had any kind of briefings on it. I am aware of a lot of the literature and I have had some visits from folks who are indicating that they are making some significant gains in the breeding programs and ultimately believe that the yields not just in switchgrass but in other species offer some significant opportunities and I think in the biotech arena in general, there is an elevated level of work going on and I think there are some elevated expectations of the outcomes that would lead one to think that there will be cellulosic raw materials available to sustain the kind of demand that I think we all collectively envision.

Mr. PETERSON. One final thing. Myself and some of my colleagues sent a letter to the President asking him to continue the CCC bioenergy program for biodiesel. Do you know where the Department is in terms of support for continuing that program? My folks tell me that they think that is very important and there is some concern about whether it is going to keep going or not. Do you know generally where the administration is, the Department is on that?

Mr. DORR. No, I am not. In all honesty, I am not. I can get back to you. I can tell you that it was a useful program to ramp up the industry. I think that we have to internally reflect on when you have industries that are generating 35, 40, 50 percent rates of return where the line is on how to utilize this. But to the extent that I can get you an answer, I will try to do so.

Mr. PETERSON. Are you the chair of the USDA Energy Council?

Mr. DORR. Yes, I am.

Mr. PETERSON. Because I met with Keith Collins last week and we were discussing this, and he had kind of deferred it to you, so maybe you guys can—

Mr. DORR. I am afraid I am becoming a good bureaucrat.

Mr. PETERSON. But that is something a lot of us are very interested in and we would appreciate knowing where you are at see if we can get some support to keep this going. Thank you.

The CHAIRMAN. The gentleman from Minnesota, Mr. Gutknecht is recognized for 5 minutes.

Mr. GUTKNECHT. Thank you, Mr. Chairman. I don't have that my questions for Mr. Dorr because he was in my office for over an hour yesterday and had a fascinating conversation. Let me just first of all thank the chairman for having this hearing. Great minds work in the same channel. We were going to have a subcommittee hearing about this time as well on the same subject. I do believe long term that agriculture and renewable energy play a very important role.

Let me use a part of my 5 minutes for some shameless self-promotion. I am a big advocate of what the chairman is going with 25 x '25 but let me just take a minute to explain to my colleagues and some of the folks who may be here why I think things like 25 x '25 or my bill, 10 x '10, which was recently introduced in the Sen-

ate by Senator Grassley from Iowa, why that is so important. The truth of the matter is, we have an enormous ability to produce energy in farm country. The problem is, we don't have access to market and I believe that success leaves clues and I think part of the reason we have such a viable renewable energy industry in the State of Minnesota, and you are going to hear from three Minnesotans today, is because the legislature and the Governor there have done something that most States have been unwilling to tackle and that is guarantee that 10 percent of the fuel supply in the State of Minnesota comes from renewable energy, ethanol, and what it has done, it has given our farmers access to market, and I think as we go forward, Mr. Dorr, I think that is going to be one of the most important things. Hopefully you will stick around. What I think is incredibly important, you are going to hear from some entrepreneurs today that have some really amazing technologies to talk about if we can get them to tell their whole story. They are being a bit protective right now because of patent issues that they filed for. But I think what you are going to hear, and this is where Rural Development can play a very important role. There are gaps right now. I mean, if you want to build a building, we can get some help from Rural Development. If you want to do certain things, there are ways that Rural Development can help, but taking a concept that may be a very good concept and finding the capital to get that concept to a working provable scaled technology is very difficult.

And so as we go forward, I just want to assure you, Mr. Dorr, that I will work with you and the Department in trying to figure out ways that we can give you some flexibility, give the Department some flexibility so long as the people involved are willing to put some skin in the game and we can protect to the maximum extent possible the taxpayers' dollars.

I think that the real opportunity for us long term is to figure out ways we can help these guys take some very interesting and promising technologies and get them to the next level because the pay-offs not only for American agriculture but for America and the world in general I think are just phenomenal. So I want to thank you for being willing to work with us and sort of look outside the box and see where we can go to help Rural Development become an even more important component in developing what I think will be the most exciting part of the future of agriculture in the United States.

That wasn't so much a question, Mr. Dorr, but you are more than welcome to respond to it.

Mr. DORR. Well, you have got a long list of witnesses and I will refrain from responding but I completely concur with you about these opportunities, and we will work with you.

The CHAIRMAN. I thank the gentleman. The gentleman from North Carolina, Mr. Etheridge, is recognized for 5 minutes.

Mr. ETHERIDGE. Thank you, Mr. Chairman, and let me thank you for calling this meeting. I think it is a very important one. It is very timely for what is happening in our country, and if anyone follows the price of energy and what the futures look like, the futures dictate what is happening any time there is a shock anywhere around the world. They don't act like a barometer, they are

more like a thermometer and they keep going up, they aren't coming down, sort of like the temperature in the summertime.

But Mr. Under Secretary, thank you for being here as well and your work in this area. A couple of questions. My district, as you probably know, is quite rural and yet in transition to an urban area. We are adjacent to a lot of pressures and also has an awful lot of military as well. There are a lot of needs for rural development obviously when you have a rural district in transition as you can appreciate, but probably one of the greatest strains we are seeing right now is in the very area we are talking about today is in energy. A lot of our agricultural folks are in the field today. Commodity prices aren't what they ought to be to compensate for the cost of energy and energy prices are putting tremendous pressure on them. They are spending the dollars today hoping the commodity prices will up in the fall, and if they aren't, there are going to be some people that may not be in business later on, and the people who commute to work are seeing the energy prices soar and unfortunately their salaries aren't soaring with the energy prices, so they are squeezed. And so that gets me to my question, and we have talked about it. We had a chance to talk earlier about the USDA, and Congressman Peterson raised part of the question on section 9006 program, and I am going to give you a chance to comment on that a little more if you would. Can you share with us why there wasn't more loans made under the program? I know there are caps but my recollection is that the loan level last year was somewhere over \$200 million but the actual amount that ended up being loaned was less than \$20 million. Is there a reason for those numbers? Are there things that we need to change so that obviously as we are talking about development of an energy source, that can be more flexible? And I know you alluded to it a few minutes ago but I would hope you would expand on it.

Mr. DORR. Certainly. I think it is important when you delve into a question like that to kind of put in perspective the background of renewable energy and ethanol and the history of it. It really did start out back in the 1970s as a supply management program. Over the years a number of small entrepreneurs began to develop and build this out but it was frequently always referred to as a sustainable agriculture marketing tool that was focused, and the assumption was it was focused on small producers, giving them other ancillary forms of income. What has happened is, markets have driven this. We now realize that these dry mills, these cellulosic facilities and others are going to be 100 to 150, maybe even \$200 million opportunities. They are substantially larger in scope and size than I think was originally envisioned 20 years ago certainly and maybe even 10 or 15 years ago.

When it comes to the 9006 program, it was statutorily authorized to provide grants and loans and/or loan guarantees. The loan guarantee program was stood up in 2004 and I was not at that time directly involved with the development of those regulations but apparently the Department at that time thought it wise to limit the size of those loans to \$10 million. Well, in retrospect, we now realize that a \$10 million loan guarantee that can only equate up to 50 percent of a total project, which means a \$20 million project, is not an adequate size to build out one of those. So that is No. 1,

a limitation on the demand for the program and we are talking about that and trying to address that now. Number 2, the loan guarantee program, actually the regulations were published and we were not ready to begin making loans until about the 1st of August last year so we really had 2 months in the fiscal year. This year we have had obviously the program set up the entire year. We have about \$176 million in statutory lending guarantee authority. However, we are running short on loans again there as well because of the size limitation, and that is what is driving us to revisit that issue.

Mr. ETHERIDGE. Let me follow that up if I may, Mr. Chairman. Will that require legislation or can you do that through administrative rules and the timeline?

Mr. DORR. We are looking at that now but I think we can do that through our regulatory process and the rural development process.

Mr. ETHERIDGE. Any timeline on that?

Mr. DORR. No, but knowing how long it takes to make rules, I am concerned that it will be longer than I would like to see but we are trying to hasten it along.

The CHAIRMAN. The gentleman's time has expired. The gentleman from Nebraska, Mr. Osborne, is recognized for 5 minutes.

Mr. OSBORNE. Thank you, Mr. Chairman, and thank you for being here, Mr. Dorr. Just one observation. First, we have a lot of people in universities and other places who are doing peer research. It seems to me that the missing link oftentimes is those people who can figure out what in the peer research arena is applicable and what isn't and can make the jump to something that is going to be profitable, that is going to make a difference, and so I would like to encourage you to think about that in terms of how do you identify those people, how do you fund those people. Because we have money for research and then we have money for projects but getting the two together sometimes is the difficult part, and those people that can do that are really kind of rare and anything we can do to fund those people I think would be important.

The second thing is that I am interested in the cellulosic issue certainly and the State of Kansas, aided by Mr. Moran, is interested in water from Nebraska. It surprises me that they would take that attitude. But anyway, we are now having to take some land out of irrigation and we are doing that with a CRP and a CREP program, and so we have gotten a lot of heat from people in agriculture who say well, you are using the multiplier factor idling this land, and so Moran is now talking, I have turned his switch on. But anyway, what I am concerned about is we could go switchgrass, which is allowable on CRP or CREP, the question is how much can we really harvest how much can we benefit because if we can tell these people in agriculture that we are going to make those usable, those 70,000 acres is what we are going to end up with down in the Republican valley, it would certainly ease the pain, and maybe somebody here can advise me as to how we do this but I just want to make you aware that if we are going to make switchgrass a player, if we can involve CRP and CREP in the process, it will certainly help. I realize that may subvert a little bit of the—but if you don't cut it off real short, you still have the bene-

fit of cover and you also have the wildlife aspects, and the big problem we have right now with wheat, it used to be a great crop but now we are cutting it so short that is no longer the cover it once was.

So anyway, I just thought I would ask you if you had any thoughts on particularly the issue of the CREP, CRP, and maybe using some of that land for switchgrass and cellulosic ethanol, and also the question is, how much money do you feel is available in grants and loans specifically for cellulosic production?

Mr. DORR. Well, the first thing I would point out, as you may remember the recent front-page article in the Post here a week or so again about the pile of corn stalks in Imperial, Nebraska, where they were actually researching the ability to store that cellulosic material. It wasn't mentioned, but it was the result of a grant from our, I am not sure if it was our value-added development or our 9006 program, and that is the kind of thing that we can do that translates to some on-the-ground research but essentially Rural Development is not a research vehicle. I mean, our funding is largely to provide funds for commercialization and so to the extent that we can do the small things like we did with the grant to the group of producers at Imperial, we are delighted to try to do it.

Relative to cellulosic, I am not a researcher and quite frankly it is not my arena. The only thing I do know about cellulosic is what I had indicated earlier, there is a considerable amount of research going on both in the public universities and the private sector. I think there is a lot of excitement that would suggest that then can perhaps double with the bioengineering work that they are doing. They can double the yields of switchgrass and manage it in a very responsible way so that it ultimately ends up being able to yield somewhere between 600 and perhaps as many as 900 gallons of ethanol at a very cost-effective number on a per-acre basis and I think that is what producers in the private sector will strive for. I am very confident that everyone intends to do this in an environmentally and cost-effective way so I frankly, as I said earlier, am encouraged that these things will occur probably quicker than we anticipate but as long as gasoline is \$3 a gallon, it will never be quick enough for any of us.

Mr. OSBORNE. Thank you, Mr. Chairman. I think my time has expired.

The CHAIRMAN. I thank the gentleman. The gentleman from North Dakota, Mr. Pomeroy, is recognized for 5 minutes.

Mr. POMEROY. Thank you, Mr. Chairman.

Secretary Dorr, I am pleased with the Department's enthusiasm for the biofuels as we are all on the Agriculture Committee. I quote many times a statement I saw attributed to Dr. Collins that it is a stunning development for rural America to get such an unequivocal and decided statement out of any economist, much less our friend Keith. It is a big deal and it shows the depth of our enthusiasm for all of this.

A couple of things. First of all, for farmers to get the most of this biofuels future, they have got to be in existence. I am going to do a drought tour over the break and I am terribly worried about the depth of the drought in areas of North Dakota and I understand

we are just more or less at the tip of what is a pretty severe drought through the Plains. Can you give us information on that?

Mr. DORR. I don't. I mean, I look at the drought monitors but I don't monitor the scope of the drought on a regular basis. I know that it has kind of ebbed and flow in my home State of Iowa as well as in Nebraska. I tend to look at rainfall patterns on a regular basis but the locale and the severity of it, I know in the upper Great Plains in the west varies considerably from what I am familiar with in the Midwest.

Mr. POMEROY. I reckon we have a third to a fourth of this committee representing farmers pretty severely impacted so I do encourage the Department to monitor this very closely. As one member of the committee, I have been very disappointed that the administration has been completely unsympathetic to the notion of disaster relief for the farmers from the 2005 production year. It looks like we are going to have a very serious situation in 2006 once again, and as it develops, I think if the Department at the highest levels really understands the depth of depletion of subsoil moisture imperiling this year's crop, maybe we won't have such a difference of opinion when it comes to 2006 disaster response.

Moving to biofuels, and I am pleased to also serve on the Ways and Means committee and work to make sure that supporting tax credit structure is in place both for ethanol, for biodiesel. We certainly need in that committee to take the lead I think in extending those tax credits. But one of the things that I have been interested in and hopeful for year in and year out here we talk about wanting to diversify the economy opportunity in rural America. Now we have, as Dr. Collins said, a stunning change in rural economies through the biofuels and I just so hope the farmers can get a piece of the production action.

I have a letter that I will enter into the record from Jim Nissen, who is the president of the North Dakota Corn Growers Association, which appeared in the Fargo Forum on June 28, and he notes with all of the enthusiasm in the markets now for biofuels, you are seeing venture capital come in, you are seeing plants that normally would have been running around having potential stockholders' meetings ad nauseam trying to get the farmers to pony up so they could get a start, now they have got it all funded before they even have to come to the farmers and the farmers aren't given a piece of the production action. I am wondering what strategies USDA is contemplating, if any, that we might consider as we approach a new farm bill that would allow this opportunity for farmers, some kind of loan incentive or loan program or loan guarantee. I rally don't know what full array of strategies we might use but I think it is going to be important and hope to have the Secretary's leadership in helping our farmers get a piece of the production part of this whole situation.

Mr. DORR. Well, I think you make an excellent point and it is one that I have talked about on numerous occasions. Clearly you have identified the issue. As the technology in these industries have matured, they are now beyond the point where larger investors and larger firms who have the kind of risk aversion necessary to invest big chunks of money to do so. It is interesting to note that last week I was at the third annual renewable energy finance

forum in New York. Last year I was there, it was the second annual. There were 570 participants. The organizers said they represented \$125 billion of capital interested in investing in renewable energy. This year there were about 700 participants, and the organizers suggested to me that there was somewhere between \$750 billion and \$1 trillion of investment capital there.

I will go very quickly, I don't want to take up too much of your time, back to the issue at hand. We are building out a new industry. It is a new distributed production energy business, whether is in liquid fuels, biodiesel, ethanol, wind, solar or whatever. These new industries will require different kinds of regulatory investment and business model regimens. Let me give you a very quick example. If you are going to build \$150 million ethanol plant, a 100-million-gallon facility, about 5 years ago you would have had to raise all the money locally, but today you can go to New York or you can probably go to Fargo and get one check for \$60 million or maybe two. If you are going to go out to the rural areas 3 miles down the road from my place where they have an ethanol plant and raise the money locally, it takes 3,000 or 4,000 transactions. It is not a limitation of capital. There is \$1.75 trillion of rural ranch, farm and forest lands. Only \$1.45 trillion of it is free and clear. There is no limitation of equity in rural America. We do have to look at how we can facilitate the development of disclosure, security and other sorts of things to enable a responsible investment vehicle with transparency in governance so those seeking equity capital can go to Fargo and there is a fund there that the barber, the plumber, the landowner, the tenant farmer has put money into and simultaneously let them stop there and get there one check for \$60 million is to go somewhere else. I don't believe in all due respect that we need to develop more levels of subsidies or more levels of guarantees so much as we need to look at how we develop the kinds of tools that enable people to invest comfortably and redirect some of this rural equity that is underleveraged. I am a responsible, serious way so that they can access these opportunities. That is going to be as much a State as well as a Federal responsibility to get done. In Rural Development, I have charged our people to begin doing some basic studies. We have not let all of those out yet for bid but we are going to try to begin delving into that to generally frame up some of those issues.

And finally, I mean, all of this is happening very rapidly and yet we are only at 4 or 5 billion gallons of ethanol and we are using 140 billion gallons a year. I think we have got a little time to figure out how to do this. I don't think it is going to get away from us but we have to focus on these issues aggressively and quickly if we are going to make it possible for these rural citizens to participate.

Mr. POMEROY. I know my time is almost expired. In North Dakota, the corn has been all committed so in a way it is moving pretty darn quickly, and your last comment it almost comes to mind a rural REIT type of thing. Mr. Chairman, these are very interesting ideas. We could have a lot of fun in this committee doing some constructive work on this topic.

The CHAIRMAN. I thank the gentleman. The gentleman from Michigan, Mr. Schwarz, is recognized.

Mr. SCHWARZ. Mr. Secretary, I am a very strong supporter of ethanol production. In fact, there are two very large, as you noted, \$100 million ethanol plants going up in my district in Michigan, one in Riga and one in Albion, but it takes energy to make energy, and ethanol plants will use a great deal of energy, electric, especially natural gas. Tell me how I should with a district that goes right up to Ann Arbor, which is one of the greenest cities in the United States, and East Lansing with our two major universities and many greens in those communities, how should I convince these people that biofuels, especially ethanol derived from corn but also soy diesel because that obviously in southern Michigan is a large crop as well, how is that a good thing understanding that it looks to me like a zero-sum game in the production of ethanol now as far as energy usage is concerned? I want to make that argument. I want to make it so people can understand it and be supportive because I believe it is the way to go for our country obviously politically but also for our farm communities, and I have probably the most intensively agricultural area in the State of Michigan. How do I make that argument?

Mr. DORR. Well, it is an argument that has been going on rather aggressively, particularly the last couple, 3 years but I would submit to you that, No. 1, the USDA did some studies recently that we were involved with that would suggest that we are getting about 1.25 to 1.35 BTUs out of a gallon of ethanol for every BTU that we invest with everything from beginning to end. The conversion ratios on virgin oil still is about 2.1 to 1. Those who have had some difficulty with these energy conversions, I would I guess suggest that are using a considerable amount of old data relative to the operation of the facilities, the conversion levels, the cost of fuel and the inputs that are involved in production agriculture. All of those have changed rather dramatically over the last 20 years and so subsequently what I think I am seeing is a toning down, a ratcheting down, a recognition that these technologies have clearly evolved in terms of their requirements of capital, their requirements of energy, their requirements of labor so that these ethanol-based and bio-based liquid fuel products are clearly coming into their own. There were a lot of folks, I remember when I was a kid 10 years old there were still some neighbors that were farming with horses because they were absolutely convinced that oats were cheaper than diesel fuel, and then about 10 years ago when they got tired of walking behind the horse they finally got rid of it, so I don't know exactly how you convince everybody as quickly as you would like but it seems to me the numbers are becoming more and more aggressive in our favor, so I think we will get there.

Mr. SCHWARZ. You believe the efficiencies are going to be there?

Mr. DORR. I believe there are positive efficiencies there today. I mean, in that same vein, I have read repeatedly a number of numbers that would suggest that you get about 7/10ths of a BTU out of a BTU of hydrocarbons that it takes to produce a BTU of liquid transportation fuel so everybody has a set of numbers that they work for but as long as these things are cost effective and people are making returns, there obviously is a positive output in them.

Mr. SCHWARZ. So if I make the argument that I am going to get more than 1 BTU out with ethanol for every BTU put in, the en-

ergy to manufacture the ethanol, that is not a specious argument today?

Mr. DORR. I firmly believe it is not. That is correct.

Mr. SCHWARZ. Thank you, sir. I yield back.

The CHAIRMAN. I thank the gentleman. There is approximately 6 minutes remaining in the first of three recorded votes so the committee will stand in recess.

[Recess]

The CHAIRMAN. The committee will be in order and the chair recognizes the gentleman from Kansas, Mr. Moran, for 5 minutes.

Mr. MORAN. Mr. Chairman, thank you very much. Thank you to you and the ranking member for this hearing.

There is no brighter spot in agriculture today than our opportunity to help our country meet its energy needs. Although we certainly are suffering from high energy prices in agriculture, it is a reason that I am anxious to cross the street and speak momentarily on behalf of the opportunity to drill for natural gas in places that we are not exploring and drilling and producing natural gas.

Mr. Secretary, thank you for your leadership. I am very pleased with your efforts at the Department of Agriculture and what they mean to Kansas farmers but perhaps more importantly the rural economy of our State and States around the country.

I just want to touch base with you, Mr. Secretary, on the issue of value added. That is a phrase we have used in economic development in rural communities for a long time. What is the policy at the Department of Agriculture within the administration in regard to trying to make certain that it is our farmers who benefit in significant ways from increasing production of renewable or biofuels. I think there is growing evidence that many larger companies, corporations, those in the energy industry, those in large agricultural businesses are becoming more and more engaged in ethanol, and I am not one to necessarily try to stop that but I think the goal ought to be not only do farmers have an additional market for their agriculture commodities but they enjoy the enhanced value of the product that they have grown and so is there a policy at USDA and what incentives need to be in place to try to make certain that farmers benefit in both ways from the production of ethanol and soil diesel and other grain-based fuels?

Mr. DORR. Well, the gentleman from North Dakota and I just had this discussion prior to the recess for the vote, and there is a recognition, as I indicated earlier, that as these projects become more financially feasible and the scope of the industry becomes more mature, that the ability for small investors to involve themselves in a way in which they did when we were trying to build the industry out has changed, and as I indicated to the gentleman from North Dakota, it really boils down to this, and that is, that if you are going to be a \$150 million plant and you need 40 percent equity, today you can go to Wichita or Kansas City or Oklahoma City and probably get a check or 1 or two checks for \$30 or \$60 million versus 3,000 or 4,000 transactions required to raise the same amount of money from constituents in Kansas or any other rural area. What I think we need to do and what we are doing at Rural Development is trying to sit down and ascertain the kind of regulatory business model and investment opportunities that per-

haps need to be addressed but I think it is much broader than us at USDA or Rural Development. I think it is going to be kind of an overarching issue for discussion to figure out how we enhance the ability of the small investor to be represented and to have the opportunity to participate and do it in a way that is responsible, that there is adequate governance and that there is adequate transparency so that there is a comfort level. We historically do not have a reputation of being particularly entrepreneurial and equity investments in rural America because of the risks inherent in production agriculture. It is incumbent upon all of us and we will do our part at USDA, but I think on all of us to try to figure out how to reinvigorate that entrepreneurial investment interest, and if we do that, I think we can all participate in this.

Mr. MORAN. Mr. Secretary, I apologize if I asked a similar or identical question to the gentleman from North Dakota, I did not hear his question, and it is also troublesome to me that Mr. Pomeroy and I may be thinking alike. I will have to express that to him. But if there are things legislatively, tax incentives, the co-op effort that we ought to be working on in this Congress in an attempt to try and create greater opportunities for farmers to benefit, I would like to be involved in that and I encourage USDA to develop policies that continue to cause the—we are anxious for capital in rural America and we will take it from whence it comes but obviously the better scenario is that our farmers get the benefit of both the market and the increasing appreciation in their equity investment, and I hope that is a goal at USDA.

I smiled when you said earlier in your testimony that in an effort to—you were worried about becoming a good bureaucrat and I want to raise an additional topic in an effort to keep you from becoming a good bureaucrat. We have had ongoing discussions with rural utility services in regard to another energy issue and an electric company in my district that have been ongoing now for 6 months. I just want to bring this to your attention and see if we can't get you to become engaged in trying to resolve some issues that ultimately would allow a significant investment in rural infrastructure and the generation of electrical capacity in Kansas and across our region of the country and so this is my opportunity to try to put this note in your brain and seek the opportunity to discuss it with you further at a later time.

Mr. DORR. I will review that with Mr. Andrews. I am somewhat familiar with the situation. I know he is doing a yeoman's job trying to get it resolved. Obviously it has been a difficult issue. I would like to, Mr. Chairman, if I had just a moment, in response to your earlier question, also indicate that we are as was announced by both Secretary Johanns and Secretary Bodman planning on sponsoring a renewable energy conference in early October in St. Louis. I believe the dates are October 10 through the 12th. And it is going to be specifically focused to identify some of these key incentives that are required or perhaps missing, elevate the awareness of the Federal and State regulatory issues that surround this whole industry as we are talking about, to identify some of the barriers for these rural communities in their ability to get involved in and to review ultimately a number of these challenges and ultimately result we hope in advancing a better understanding both in

the private and the public sector of what is required to make certain that these sorts of opportunities aren't missed by these rural constituents as you have suggested.

Mr. MORAN. Mr. Chairman, thank you for the time. Mr. Dorr, thank you for being here, and I would also agree that Mr. Andrews has been very generous in his time with me on this issue. We look forward to getting it resolved. Thank you.

The CHAIRMAN. I thank the gentleman. The gentleman from California, Mr. Costa, is recognized for 5 minutes.

Mr. COSTA. Thank you very much, Mr. Chairman. I want to thank you and the ranking member for drawing attention to this I think very important issue as we attempt to try to provide a strategy for our country's energy use that really reflects the challenges and the realities of this global planet we live in today and look forward to working with you in this effort, because I think agriculture does have an important role to play as we look at biofuels and a host of other fuels that are under the purview of American agriculture.

Mr. Secretary, you spoke of incentives, and I want to ask you, I believe Secretary Johanns was in my district in the valley earlier this year and visiting two ethanol plants that are under construction, and my concern that I keep hearing as it relates to not only those who are involved in the production of these two facilities but also farmers and ranchers that may be participating in one fashion or another is the distribution system and it seems to me that there is a role for the USDA to play as it relates to helping provide incentives or assisting in dealing with the sort of efforts to ensure that that distribution system comes into place. We got I think a very interesting letter from the presidents of the three automotive companies in the U.S. talking about their desire to produce more flex-fuel vehicles but as we all know, there is an entire process that has to be successfully undertaken if we are going to make this work in a way that makes it convenient and easy for American consumers to use these fuels. Could you tell me what you think the role ought to be with the USDA in providing these incentives to especially assist with the distribution system?

Mr. DORR. Well, as you know, that is a very key issue as we go about building out this industry, and at the risk of being redundant I go back to comments that I made earlier in the sense that this is a brand new industry. It is being built, it is being developed, and there are a number of challenges on refueling infrastructure distribution and a number of other things. My sense is that the Energy Policy Act of 2005 obviously has made available resources to help facilitate building out the infrastructure requirements for the refueling side of it. The distribution channels are ones that I think are going to be probably rapidly surfaced in the context of all of the players in the area whether they be railroads, whether they be pipeline companies, whether it be the Department of Transportation. What we will do at USDA is continually monitor and wherever possible using our research capacities and the Department as a whole and other economic analytical capacities to begin to continually identify where we think bottlenecks are, what we think opportunities are or challenges are that require special attention.

Mr. COSTA. Well, identifying those to the committee I think would be very important. I don't know if the story was accurate this morning that I read but it said that there are approximately 700 stations in the country that provide flex fueling. Obviously that is not nearly enough if we are going to complete the infrastructure that is necessary to sustain this type of alternative energy use.

Let me ask you, do you think it would be appropriate as we look at the 2007 farm bill and as we are setting the table as the chairman and the ranking member have attempted to so ably this year so far in holding hearings around the country if in the 2007 farm bill we provided a section that really dealt with trying to provide some incentives or, as you do your fact-finding from the USA, identify those areas where you think the 2007 farm bill might be appropriate in trying to provide kind of the seeds necessary to let this industry grow?

Mr. DORR. I think all of those things ultimately are helpful. I reflect back again on some things that I mentioned earlier but it was USDA and DOE's ability and willingness to work together in implementing the section 9006. We have also under the guidance and the counsel of the Secretary, we appointed an energy council, and in the course of those council and internal meetings we have taken the opportunity to visit with some of the folks with the Department of Transportation. There is a large focus within the administration and direction by the Secretary to reach out wherever there is expertise and to the extent that these things are outside of our jurisdiction, we are more than willing to do whatever is necessary to foster these debates, these discussions and ultimately developing solutions for these issues.

Mr. COSTA. Well, Mr. Chairman, I have exceeded my time, but I do think it would be appropriate, we may exceed our jurisdiction as well but if the three departments were to propose where you think we could play the appropriate role before the 2007 farm bill gets underway, that would be helpful. Thank you very much, Mr. Chairman.

Mr. DORR. Thank you.

The CHAIRMAN. I thank the gentleman. The gentleman from Texas, Mr. Conaway, is recognized for 5 minutes.

Mr. CONAWAY. Thank you, Mr. Chairman. A point on, Mr. Costa's anecdotes are difficult to make policy off of but the market does work. There is a large regional grocery store chain in Texas based out of San Antonio called HEB, and they have announced that they are putting E-85 tanks in every one of their stores across their distribution area so the market does work, does respond, and I am always cautious about the relatively indelicate touch the Federal Government has on any program it every touches so the market does work.

Mr. Dorr, I apologize if you have already answered this question but in terms of the natural market competitions for the uses of corn between ethanol and feedstocks for cattle, should we just leave that alone and let the market drive those decisions, or how do you see that tension being resolved?

Mr. DORR. Well, in response to those questions, they are probably best deferred to Under Secretary Penn or Chief Economist Keith Collins but I will reflect simply from the standpoint that as a farm-

er until about 5 years ago, I spent my entire life looking for the proverbial silver bullet that was going to take No. 2 yellow corn to a level that looked like it was profitable without Government subsidies and we have never yet attained it on a very consistent basis. It never ceases to amaze me that whenever we create a new market whether it is an export market or some other additive market for agriculture commodities in this country, we continually seem to be able to produce more of it in a more environmentally sound way and we never seem to be able to elevate the price to where we farmers think we ought to have it, so I guess my tendency is to concur with your observation that the market will probably deal with most of these issues in a very effective manner. I have a lot of faith in the market.

Mr. CONAWAY. Thank you, Mr. Dorr. Mr. Chairman, I yield back.

The CHAIRMAN. I thank the gentleman. The gentleman from Texas, Mr. Cuellar, is recognized for 5 minutes.

Mr. CUELLAR. Thank you very much.

Could you tell me if there are any researchers there at the USDA that are doing anything to develop crops such as growing sorghum that farmers or ranchers could use to expand this for renewable fuel?

Mr. DORR. I can't give you a specific answer. I am sure there is research being done in this area but we will try to get some information on that and get it back to you.

Mr. CUELLAR. Could you just, if you don't mind, Mr. Chairman, copies to the members and a copy to myself?

The CHAIRMAN. Certainly.

Mr. CUELLAR. Thank you.

The CHAIRMAN. I thank the gentleman.

Mr. Secretary, you have been with us almost 2 hours now and we thank you very much for your contribution. We are very interested in this and we are very interested in the role of Rural Development in trying to connect farmers with this exciting new business prospect, and I agree with much of what has been said here and we look forward to working with you as we move in that direction.

Mr. DORR. Thank you very much. On behalf of the Secretary, we look forward to working with you as well.

The CHAIRMAN. Thank you, Mr. Secretary.

We would now like to welcome our second panel to the table. Mr. Mark Gaalswyk, president of Easy Automation from Welcome, Minnesota; Mr. Robert Walker, chairman and CEO of Bixby Energy Systems from Rogers, Minnesota; Dr. Richard Hamilton, president and CEO of Ceres and board member of the Biotechnology Industry Organization from Thousand Oaks, California; Mr. Al Christopherson, chairman of the board of the Agricultural Utilization Research Institute from Crookston, Minnesota; and Mr. John Burke, forest landowner and president of the Virginia Forestry Association from Richmond, Virginia. We are pleased to welcome all of you as witnesses. We will remind you that your full testimony will be made a part of the record and ask you to limit your oral testimony to 5 minutes, and this time is my pleasure to recognize the gentleman from Minnesota, Mr. Gutknecht, to welcome our first two witnesses.

Mr. GUTKNECHT. Well, I will welcome two of the first three from Minnesota. First of all, Mr. Mark Gaalswyk is from a very friendly little town in southern Minnesota by the name of Welcome, and Mark has been extremely helpful to USDA on a number of fronts. He has a company called Easy Automaton which has a combination of hardware and software technology for mixing and blending feeds, and through that has really in sort a back-door way, and then I will tell the story of how I got to know him. I was out campaigning actually and visited his operation in Welcome and he told me about the feed mixing and blending operation. I was very excited about that. But then he took me in the back room and he showed me a piece of technology and I got very excited about that and what he has and is working on and perfecting is essentially a new way to make ethanol, and it has enormous application and I hope he will tell a little more about it because I have been like a priest. I have been walking around carrying these secrets with me now for almost 2 years.

Let me also welcome Mr. Bob Walker. Bob came into my office a few years ago and introduced himself and said he wanted to talk about renewable energy, and before he did, to sort of establish that he had some level of business credibility, he told me that about 20 years ago he started a little mattress company on the west side of Minneapolis called Select Comfort. Now, I sleep on a Select Comfort bed both here and in Washington. I am one of their best salesmen. And so he had my interest immediately, and then he began to talk about renewable energy and some of the technologies that he is now working on. So Bob brings with him an enormous amount of expertise in business, in marketing and now has become one of the leading spokesman in the United States for new technologies in renewable energy, and he has got a great story to tell as well.

And finally, let me welcome Mr. Christopherson. Let me correct the pronunciation slightly, Mr. Chairman. Al has been a leader in Minnesota agriculture for as long as I can remember. I think I remember listening to farm broadcasts when I was in high school and Al Christopherson was talking about agricultural issues and perhaps the ranking member, Mr. Peterson, may want to say more when it is his turn to speak. But we are just delighted to have these entrepreneurs here to talk about some of the things that they are working on because I think the news about renewable energy is good but I think when they finish their presentations, I hope all of us will recognize that the news is not only good today, it is getting better in the future, so I want to thank them for coming out to testify today and I hope the committee and the staff and others who hear this will be as excited as I am about the future of renewable energy.

Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman. Mr. Gaalswyk, we are pleased to have you and your testimony. Welcome.

STATEMENT OF MARK GAALSWYK, PRESIDENT, EASY AUTOMATION

Mr. GAALSWYK. Mr. Chairman, members of the committee, thank you for having me here today.

Just to give you a 10-second background, I am a farm boy. I attended St. Olaf College for physics, math, computer science, went a couple years and came back farming. I got bored and started developing a way of making animal feed software and automation for that. I started selling them out of the back of my pickup traveling around the country, and things grew. You should have gotten an enclosure. I currently have 3,000 feed mills that we have done around the U.S., and kind of in a nutshell, my goal is to turn every one of those customers also into an ethanol plant by linking those two technologies together.

The last few years we have been quietly working on some innovative really two forms of technology for improving the usage of renewable fuels. Our patent pending process, I don't know what the right phrase is to call it. You can call it gas in a box, but what it is, it is a complete self-contained ethanol plant about the size of a shipping container. It is all pre-wired, all pre-plumbed. All the software and automation is all part of it, and what the idea is that these can be dropped in any unused facility across rural America and start making ethanol. A small unit will make 750,000 gallons a year or you can put a bunch of them together and make a 200-million-gallon plant. These can all be connected through the Internet and monitored in our offices back in Welcome.

Some of the advantages of this technology is our feeling is to really make this renewable fuels technology utilized, it needs to be built in a factory kind of like Henry Ford made the automobile and so that is what we are gearing up to do. Another advantage is that it enables the value-added to be moved much closer to the producer themselves. Now, most of our customers are large farmers, they are rural cooperatives that have been kind of standing on the side and watching this renewable fuels things come and like to be a part of it and so our philosophy is that these systems will be able to be financed almost like trailer houses that you can just set them in place and get started small, make sure you are doing it right and then keep adding more of them together.

We expect this decentralized approach to making ethanol to be fought by many of the agriculture conglomerates who prefer more of a centralized business model than a decentralized business model, and part of the reason for pushing for the centralized model, they would tend to try to create a certain amount of magic, if you will, of making ethanol. It is not that tough. And so what our goal is, is to take any magic or things involved in the process and embed it in the software and distribute those units.

So in addition to the modular technology, we have also been working on the process of making ethanol itself, and what we have done there is, we have been playing around and stumbled on some different technologies, if you will, and what we are playing with is, think of it as beaming energy at the mixtures and stimulating greater molecular activity, which greatly reduces the use of energy in making the ethanol and also reduces the pollution-related emissions. A byproduct, and you will say, how does this fit in, you are a feed company. It improves the feed byproduct by not cooking off many of the nutrients, they are not polluting and they are staying in the feed so it can work with a feed mill.

Our initial patent pending on this process and research related to it, it looking like we can drive the conversion ratio from the industry standard of 2.8 gallons per bushel to 3.2 gallons per bushel, and our costs, we are driving them down to 70 percents per gallon of ethanol produced. That is compared to a current industry standard of about a dollar. And so our goal is to improve efficiencies, reduce impact on the environment and put that technology back in the farmers and rural cooperatives.

On the environmental side, because we need to bring the temperatures up to the level, we are not needing these big steam plants. We don't need to burn natural gas. We don't have to use as much water, which is an issue, and so we are excited about that. Also by locating these ethanol plants next to our feed mill customers, and again, that is our end goal to turn every feed mill into an ethanol plant, is that corn can be grown, ethanol produced and feed byproduct consumed without ever leaving the farm. Otherwise you expend a lot of energy just shipping it all back and forth, drying it, and right before you feed it to the animals you mix water with it again and so that is what we are working on.

So I guess in conclusion, the ethanol industry is going through a rapid transition in improving technologies. I appreciate your support of that, and we ask for your support in supporting the ethanol industry. Thank you.

[The prepared statement of Mr. Gaalswyk appears at the conclusion of the hearing.]

The CHAIRMAN. Thank you very much.

Mr. Walker, welcome.

STATEMENT OF ROBERT WALKER, CHAIRMAN AND CEO, BIXBY ENERGY SYSTEMS

Mr. WALKER. Thank you. Chairman Goodlatte, Congressman Peterson, committee members, thank you for allowing me to speak here today. My apologies in advance because I have so many good things to tell you, I am afraid I couldn't get it down to less than about 6 minutes. So please beg my forgiveness in advance.

I am the founder, chairman and CEO of Bixby Energy Systems, a Minnesota-based alternative energy company. Bixby is in the business of creating energy from the waste products of the world. We figured out to make engineered fuels from agricultural materials, municipal solid waste, sewage, wood waste and even rubber tires. We have developed furnaces and energy systems designed to extract the maximum amount of energy possible from these fuels and we are building a delivery system nationwide so that we can provide our fuels dependably to our customers.

I realize this committee's interest is with agriculture's role in the renewable market so let me focus on that part of our business. Biomass, of course, is the generic name for anything that grows, and there are more than 10,000 biomass materials in the U.S. alone. Everything from grape waste, rice stocks and olive pits in the West, sugar beet waste, turkey litter and cranberry waste in the Midwest, peanut shells, tobacco waste and cotton gin trash in the South. And talk about fast renewables, most grow in less than 6 months and some like grass grow in as a little as a week. Compare that to fossil fuels that take 70 million years to develop and you

begin to appreciate the alternative energy opportunity that exists. When you add wood waste, municipal solid waste, sewage and rubber tires, we have an enormous materials base to draw from. To convert these fuels to heat energy, we developed the Max Fire Stove with an incredible 99.7 percent combustion efficiency. Since there has been a large surplus of dry shell corn and it is cheap, we have been using that as our flagship fuel. Last winter, using corn as the fuel source, thousands of our customers were able to heat their homes very economically. Here is an example. Customers in our home State of Minnesota with cold winters heated 2,500-square-foot homes for about \$1.50 a day. That is a savings of about 70 percent over fuel oil and propane.

Bixby Energy continues to develop compelling products. In 2 years we will be introducing the Omni system to American consumers. It is designed to be your furnace, your hot water heater, your air conditioner and it will also generate your electricity, all from biomass or other non-fossil fuel sources. It will provide these benefits for 50 percent less than what consumers are currently paying.

Working with the University of Minnesota, Bixby Energy is also commercializing a revolutionary pyrolysis process that is simply to operate and could literally turn every farmer's barn into a miniature oil well. Imagine the possibilities.

Prior to starting Bixby Energy, I founded a company that today is NASDAQ traded with \$1 billion market cap so I believe I can speak with some authority when I say that I know opportunity when I see it. Developing alternative energy solutions for the world is one of the most compelling business opportunities of the future. Agricultural materials can be a significant contributor to this exciting new business sector.

Now, I would like you to believe that Bixby Energy has all the answers to America's energy problems but that simply isn't true. Bixby has been able to develop its technology because it was able to raise \$22 million from the private investors in the United States. However, there are literally hundreds of people in companies in America with great ideas and great products of great potential who don't have the capital or other resources necessary to commercialize them. What is critically needed is a system for locating, qualifying and funding these technological gems that are waiting to be discovered. Great ideas have no political boundaries. They are neither Republican or Democrat. America's energy situation is not a partisan issue. We are all in this together. I can tell you from personal experience that the biggest hurdle to any entrepreneur's success is being undercapitalized. Even at Bixby Energy where we have successfully raised funds, we now need additional investment to support rapid growth and the commercialization of our technologies.

The President has turned talk into action by establishing the advanced energy initiative. Congress has pending before it H.R. 4435, a bill that would create an innovative energy research technology develop into an employment program. It is called ARPA and represents a venture capital-like approach to this process. Its focus is on out-of-the-box private energy research that currently isn't supported by other Federal programs. It is designed to assist those small companies where many great ideas are born. I urge you to

support this legislation which will allow the ARPA staff to act like venture capitalists by going out into the private sector to find the individuals, the struggling start-up businesses, the researchers in universities. If they prove to have compelling potential solutions to our energy problem, fund them to support their development. Give them the assistance they need, help them provide us with domestically based solutions to ensure this country's energy independence. The President and this Congress won't find solutions to the problems that the advanced energy initiative seeks if they stick to the tired Governments approaches in place today. Our energy needs are daunting and require a bold approach. The high-risk, high-pay-off approach of Incutel and ARPA has produced results and failures too but the road to success has never been a straight one.

Now, I am not here today just to tell you about the great technologies we have developed or how an ARPA venture capital-type program could benefit not only Bixby but the other compelling ideas that are out there. I am also here to suggest that the playing field we are trying to work in needs to be leveled. We are not here like everyone else that comes to you with their hands out. We are playing the game with people who have an advantage. Have you ever figured out why we are paying the oil companies subsidies? Can you tell me that they need it at \$70 a barrel? And what about the subsidies that—I am sorry. Let us make it fair. Let us remove these subsidies. Let us both benefit. Don't give them a subsidy and don't give me one either. We, you and the American people all win when free market prevails.

Mr. Chairman, I hope I have effectively described to you and your committee members the challenges we face on the front lines of alternative energy development. I also you that you, this committee and other Members of Congress will explore creative ways in which those of us in the private sector can form partnerships with the Federal Government to advance this country's goal of energy independence. Thank you all for your attention.

[The prepared statement of Mr. Walker appears at the conclusion of the hearing.]

The CHAIRMAN. Thank you Mr. Walker. Dr. Hamilton, welcome.

STATEMENT OF RICHARD HAMILTON, PRESIDENT AND CEO, CERES, AND BOARD MEMBER, BIOTECHNOLOGY INDUSTRY ORGANIZATION

Mr. HAMILTON. Thank you. Good afternoon, Mr. Chairman, members of the committee. Thank you for having me here to appear before you.

I am here representing my company, Ceres, as well as the Biotechnology Industry Organization, where I am a member of the board of directors. The Biotechnology Industry Organization, or BIO, believes in the future of biofuels from all sources. Our Nation's cornfields, soybean fields, forestlands and future fields of switchgrass and other crops will all combine to help make America less dependent on foreign sources of oil. BIO believes that agriculture is key to further reducing our foreign petroleum needs by utilizing and expanding current and future sources of renewable energy.

Ceres is a plant genomics company with several commercial interests, one of which is the development of dedicated energy crops such as switchgrass and miscanthus to serve as cellulosic feedstocks that can be digested and fermented into biofuels such as ethanol and butanol.

As many of you already know, most of the ethanol produced in the world today is produced from either sucrose or starch. However, most of the carbohydrate in the plant is in the form of cellulose and hemicellulose, which is found primarily in the leaves, stems and stalks of plants. Because plants can generate much more cellulose per acre than starch or sucrose, cellulosic feedstocks have a much greater potential to make a significant contribution to our overall fuel supply. Cellulosic ethanol has the potential to generate a substantial fraction of our transportation fuel supply, over 100 billion gallons, while creating new jobs to build and operate biorefineries and increasing farm income.

One barrier to this future has been the historical difficulty to break down or digest cellulose in an economically attractive way. Through research funded by the Department of Energy, biotechnology has successfully addressed this bottleneck by dramatically reducing the costs of producing cellulose-processing enzymes. As biorefineries are commercialized, it is likely that they will be initially fueled in part by currently available crop residues such as wheat straw or corn stover. To achieve the full potential of cellulosic biorefining technologies, improved feedstocks will need to be developed to maximize the amount of fuel that can be generated on each acre of land. While many people have suggested that agricultural residues and forest thinnings will be the preferred feedstock used to supply cellulosic biorefineries, I would like to suggest that high-density energy crops will be in many geographies a superior choice of feedstock.

What is Ceres doing to develop dedicated energy crops? We are taking technology such as high throughput DNA sequencing and microarray technologies that were developed for deciphering the human genome and applying them to plants. During the past 8 years we have discovered and characterized more plant genes, over 70,000, than in the whole of human history. Recently we entered into a long-term collaboration with the Noble Foundation of Ardmore, Oklahoma, the world's premiere research institute for perennial grasses such as switchgrass. By combining our leading genomics capabilities with the Noble Foundation's breeding and agronomic expertise, we will significantly accelerate the development of high-yielding, low-input optimized energy crops. We also have collaborations with the USDA for sequencing switchgrass genomes with the National Renewable Energy Labs for the compositional analysis of energy crops, and with the Department of Energy to study carbon sequestration by enhanced poplar trees.

What kind of traits are we developing to improve the characteristics of energy crops such as switchgrass? There are several important characteristics that will improve the economic competitiveness of energy crops as feedstocks for biofuels.

However, if there is one thought that I leave you with today, it is the importance of yield density. Yield density, or tons per acre, is the single most important characteristic a biofuel feedstock can

have. Feedstock costs at the refinery gate is the single largest cost element in biofuel production and harvesting and transportation costs are the single largest component of feedstock cost. Imagine a 10,000-ton-per-day biorefinery using a 2-ton-per-acre agricultural residue as a feedstock. It would require a 5,000-acre-per-day footprint which would expand every day. The cost of transporting low-density biomass to the biorefinery quickly becomes prohibitively expensive.

At Ceres we are using genomics to impact yield density by improving plant physiology, plant architecture and photosynthetic efficiency, amongst other things. Preliminary results indicate that we can achieve biomass yield increase of over 300 percent in some grass species, making the goal of a 15- to 20-ton-per-acre feedstock well within the realm of feasibility. This would mean that the radius of cropland needed to supply a cellulosic biofuel refinery could be reduced by as much as 90 percent.

There are many other valuable characteristics of energy crops including the ability to grow on marginal acreage such as land that is too dry, to require lower amounts of fertilizer, to have enhanced carbohydrate content and to have superior processing characteristics. At Ceres we are developing traits for all these characteristics and deploying them into energy crops such as switchgrass, miscanthus and poplar.

How might public policy support the development of a domestic cellulosic biofuel industry? One, we could support programs for the construction of commercial cellulosic biorefineries including appropriating legislation that has already been approved. It is imperative that we get the first few commercial biorefineries built as quickly as possible so that we can begin riding the learning curve associated with operating them. We could establish pilot programs to encourage farmers to plant small acreages of energy crops so that the yield potential for various geographies can be established and biorefineries attracted to those geographies. We should consider extending programs like crop insurance and other farmer protection programs to dedicated energy crops and we should support programs at the USDA to establish agronomic best practices for the planting, harvesting and storage of dedicated energy crops.

In summary, high-yielding energy crops have the potential to provide a significant fraction of our domestic transportation fuel supply while reducing carbon dioxide emissions, increasing farm income and stimulating rural economies. How quickly this future is realized will depend on Federal policy that can either slow down or speed up our transition to a more secured energy future.

This concludes my remarks. Thank you.

[The prepared statement of Mr. Hamilton appears at the conclusion of the hearing.]

The CHAIRMAN. Thank you, Dr. Hamilton. Mr. Christopherson, welcome. We are delighted to have you with us.

STATEMENT OF AL CHRISTOPHERSON, CHAIRMAN OF THE BOARD, AGRICULTURAL UTILIZATION RESEARCH INSTITUTE

Mr. CHRISTOPHERSON. Thank you very much. Good afternoon.

My name is Al Christopherson. I am chairman of the board of directors for Ag Utilization Research Institute, which is a nonprofit

corporation formed to improve the economy of Minnesota through the development of new and value-added uses for agricultural commodities. I certainly appreciate the opportunity to appear before you at a time when tremendous strides can be made in the way we produce and consume energy in this country.

As outlined by the President's advanced energy initiative, there are numerous opportunities for advancement. AURI knows that agriculture can play a leading role in the development of new sources for transportation of fuel and power generation. To make that happen, a national focus and policy supporting the development of renewable energy is necessary to develop clear goals but more importantly consolidated by implementation. Policy development is often necessary to create the change in the President's initiative provides vision. What is needed now is the implementation.

For nearly 20 years AURI has provided scientific technical expertise to projects utilizing agricultural commodities in new and rather innovative ways including facilitating the development of new renewable energy enterprises. This includes significant work in ethanol, biodiesel, biomass energy advancement. AURI also works in areas such as biogas production from anaerobic digesters, gasification of agricultural biomass, turbine fuel assessment and wind and biodiesel hybrid applications.

Minnesota has been a proactive leader in the advancement of renewable energy. Minnesota entered the ethanol industry in 1983 with the opening of the first farmer-owned plant. In 1997 we became the first State that required 10 percent ethanol to be added to gasoline year round statewide. As a result of these opportunities, Minnesota now has 16 operating ethanol plants with more in development, all totaled currently producing more than 550 million gallons per year. In 2005 we became the first State to mandate 2 percent biodiesel be added to every gallon of diesel fuel. Now we have four biodiesel refineries operating in the State producing over 60 million gallons annually.

Recognizing the opportunity created by forward-thinking policies on renewable energy, the AURI created the Minnesota Center for Producer Owned Energy. Now, this center was established through USDA's Agricultural Innovations Center's demonstration program which, as you probably know, is a part of the 2000 farm bill. The Center serves as a ready working for implementation model for spurring ag-based renewable energy production in the U.S. and provides a roadmap for supporting the President's initiative. The Center facilitates the development of farmer-owned enterprises that utilize agricultural commodities, biomass and coal products for energy production. The Center establishes partnerships with commodity groups, public and private organizations, universities and other agencies. These partnerships result in maximized impact, access to resources and expertise and encourage the leveraging of additional funds.

The key to success is AURI's development of a solid implementation plan to carry out that effort. In concert with the scientific technical resources of AURI, the Center has successfully implemented 17 projects impacting more than 9,000 producers in the last 2 years. Activities include the formation of several corn-based ethanol plants in underserved areas, the development of possibly the

Nation's first commercial cellulose-based ethanol plant and the gasification of agricultural biomass for electrical power, and we have additional projects on the drawing board as well.

In addition to strong commodity and grower support groups, Minnesota Center for Producer Owned Energy has established a strong relationship with the Bio Business Alliance of Minnesota linking agriculture with organizations such as 3M, the Mayo Clinic and Metronic. These relationships will move agricultural commodities into new nontraditional markets and in some cases supplant petrochemicals. Associations that we have with Bemidji State University and Southwest Minnesota State University will result in the Nation's first advanced degree in renewable energy management, promoting best practices and quality in energy production. The Center for Producer Owned Energy and AURI are Minnesota-based but the framework could be replicated elsewhere. Providing feasibility analysis and scientific technical expertise coupled with a sound implementation plan is vital to realizing a successful enterprise. Merging technology with markets, best manufacturing and quality practice with a train renewable energy workforce creates a strong foundation for energy development and business success.

Now, this country was formed as an agrarian society but moved to an industrial focus. We are now in an era where ideas and innovation are driving our economy. We have seen how this innovation is linking the past with the future. Innovative technology is providing opportunity for strong agricultural activities which leads to industrial development. Nowhere is this cycle more evident than in the promise of renewable energy.

If I might make one additional comment, we are very proud of what we have accomplished in Minnesota as a State and certainly as the AURI but we are not so naive as to believe that Minnesota can do this alone for an infrastructure to develop that will make all this work in the long term. It is obviously something that has got to spread all the way across the Nation and we are hopeful that we have had a little part of developing part of that template to do just that. Thank you.

[The prepared statement of Mr. Christopherson appears at the conclusion of the hearing.]

The CHAIRMAN. Thank you, Mr. Christopherson. Mr. Burke, pleased to have your testimony.

**STATEMENT OF JOHN W. BURKE, FOREST LANDOWNER AND
PRESIDENT, VIRGINIA FORESTRY ASSOCIATION**

Mr. BURKE. Thank you for this opportunity to testify on behalf of the role of America's forest resources in providing renewable fuels and energy.

Mr. Chairman and other members of the House Committee on Agriculture, my name is John Burke. My professional life is focused on technology, intellectual property and business law. In particular, I assist companies in putting cutting-edge technology to work. In my private life, I manage forestland in Caroline County, Virginia. I am also active in a number of forest-related organizations and currently have the privilege of serving as the president of the Virginia Forestry Association.

As is evidenced by the Energy Policy Act of 2005, renewable energy is a concept whose time has come. We are all told by our financial planners that we should balance our portfolios. It is time for this Nation to balance its energy portfolio by including in that portfolio more energy from bio-based renewable sources. The solutions to the renewable energy puzzle are factually and geographically complex and the solutions must be analyzed and addressed on a customized basis tailored to each locality and to each specific situation.

I will utilize a three-part framework in my discussion. First, it is feedstocks; second, processes and technology; and third, commercial scale and profitability. To succeed in a renewable energy project, the feedstocks must be available in sufficient quantities and on a consistent basis 7 days a week, 52 weeks a year rain or shine. The feedstocks must be available without excessive transportation costs and must be relatively easy to store. Further, successful feedstocks must be available over a long period of time on a sustainable basis and without damage to our environment.

Now, let me focus specifically on the forest resource and its role in that feedstock. Forest-based cellulosic feedstock as an energy crop will typically take the form of small wood. Small wood is a term that is used for the smaller wood that tends to be thinned out and serves as good feedstock for two reasons. First, the thinning or removal of that small wood is important to the management of forest stands, whether hardwood or pine, because that removal takes the less competitive trees away, allowing the crop trees to mature for higher value. The second reason is obvious, and that is, the small wood is not a food source. In addition, our forest resources can play a role in providing a hedge in connection with other types of feedstock. For example, certain annual energy crops like wheat straw or switchgrass can be subject to seasonal drought. A forest-based feedstock typically will develop over a 7- to 18-year period and harvesting or thinning those stands will provide the balance in the feedstock supply.

Moreover, this country's pulp and paper industry has one of the world's best fiber procurement systems. A renewable energy economy balanced to include more biomass would provide additional markets and additional uses for that available wood fiber and the bio-based waste materials from the manufacture of forest-related projects.

Part 2 involves processes and technology. The ingenuity of scientists in our colleges and universities, within our companies and at governmental agencies is simply amazing. These technologies and processes must, however, be staged in various levels one after the other to maximize the yield of energy and products from that biomass. The conversion of biomass from our forests will be a key component to the renewable energy solutions. Interconnected processes and technologies must be identified, licensed and fit together in a cohesive fashion to meet this need, thus allowing the conversion of various bio-based feedstocks to a renewable food source.

The third component, commercial scale and profitability, is key. There are many different embodiments for a renewable fuel initiative. The full spectrum should be explored and encouraged. In addition to greenfield activities, our pulp and paper industry has exist-

ing facilities, labor and infrastructure that can be expanded and refocused to produce in addition to paper other consumer products, biofuels, bioenergy and other carbohydrate-based products. The paper mill of the future should be a fully integrated, side-by-side operation including pulp procurement, paper production, a biorefinery producing renewable fuels, energy and other bio-based products. These new capabilities will require financial investments, the development and sharing of technology, facility construction and other infrastructure coordination.

I will end where I started. The renewable energy is a concept whose time has come. Biomass is a key element to that renewable energy initiative, and America's forest resources can and should play a major role in the supply of that biomass. It is my request that this committee and Congress continue to encourage and to incentivize the production of renewable fuels. Thank you.

[The prepared statement of Mr. Burke appears at the conclusion of the hearing.]

The CHAIRMAN. Thank you, Mr. Burke. I will start the questioning with you, Mr. Gaalswyk. Are you expecting your smaller customers, those who may just buy only one unit and place it on their farm or other facility, to use the gasoline themselves, the ethanol blend themselves or do you expect them to be distributors as well?

Mr. GAALSWYK. From our research, we would see a close relationship with the rural cooperatives so many of the rural cooperatives have many convenience stores that they would use. I could imagine the local rural cooperative buying ethanol from the farmers in their immediate area, using them in their own convenience stores, but them also if you study these convenience stores, they are hauling the gasoline now back from a central facility and they are interested in having a back haul for the ethanol back to the blender.

The CHAIRMAN. And so who will be the blender? The individual producer or—

Mr. GAALSWYK. I am a firm believer in rural co-ops scattered across the country so I see the rural co-ops being really the blenders, and if you think a little bit about the dairy industry, they run all their trucks and bring it to the local co-op. I see the same thing happening in ethanol.

The CHAIRMAN. And can other grains be used in your unit such as sorghum or is it only corn?

Mr. GAALSWYK. No, any grain.

The CHAIRMAN. How long does it take to produce the ethanol from the time the grain is poured in at one end and ethanol is ready for use for sale at the other end?

Mr. GAALSWYK. It is kind of fun to watch. I don't know if you ever looked at a corn dryer. You don't really get it until you watch it sitting there and then the little corn heel, the auger is coming out of the corn bin and ethanol is pouring out a hose on the other end, and total process is probably about 44 hours, something like that.

The CHAIRMAN. Less than 2 days. Mr. Burke, I hear concerns occasionally that the demand for wood fiber as a feedstock or biomass energy could wind up driving up fiber costs for other traditional uses that currently convert wood fiber to paper and other uses. What is your view of that?

Mr. BURKE. Well, I think that the stimulation of additional markets will be good for the industry generally. I submit that the paper industry should embrace the concept of having a biorefinery coupled with paper production and this will allow it to be a participant in that. There may be limited areas where there is not enough feedstock to support existing fiber-based industries and new fuel industries, and I suspect that the industry will just not locate their facilities there. Virginia, for example, has underutilized tobacco lands that would be great locations for a combination of switchgrass and for hybrid poplars. I think this underutilized land could be put to work and those new green fibers utilized. Residual fibers are also very important to any biomass renewable energy process and today there are many residual fibers that are left in the forest, the tops, the limbs. In many instances there is not a viable market to encourage those to be brought out of the forest and a biofuels market would encourage and provide a market for that material, that biomass material to find its way to market as well.

The CHAIRMAN. I am inclined to agree with you. In fact, when I have traveled around many parts of the country, particularly further south, I have heard lots of complaints from lots of woodlot owners that there just isn't a market for the abundance of trees, of wood fiber that they have available and it is not an economically very viable product right now. So it would seem to me that there is a pent-up supply, if you will, for this.

Mr. BURKE. I think that is true in many areas where landowners have been encouraged to plant and grow trees and they can't maintain that forest resource properly without a market, and in many instances the thinning of those forest resources to encourage higher value products to be grown, that thinning cannot occur without a market and biomass would provide that market, as you have observed.

The CHAIRMAN. Very good. Mr. Hamilton, in your opinion, would high-yield-density feedstocks grown within close proximity to a biomass ethanol facility prevent the need for our CRP land to be harvested for biomass ethanol production?

Mr. HAMILTON. Essentially, sure. There is a lot of debate about whether or not you should use CRP land. I would say that some CRP land can be used if you develop the appropriate agronomic practices for doing so, and we talked about it earlier, about leaving sufficient stock residue on the ground so that you can do that in a sustainable way.

The CHAIRMAN. Thank you. And Mr. Walker, who are you marketing your home heating products to and who are the people who are buying them?

Mr. WALKER. Well, currently we are marketing our product to just the average homeowner but our target market are those people who are already heating their homes using propane or fuel oil, so it is essentially the rural market.

The CHAIRMAN. Does this have potential in urban areas, and what would you need to do to be able to expand into those areas?

Mr. WALKER. It has great potential in urban areas. As a matter of fact, if we looked at what we did last year, 80 percent of our market was in the rural areas in the Midwest. This year our early orders, to give you an example, last year our goal was to do \$3 mil-

lion in sales. Our fiscal year ended May 31 because we are really a winter business. We didn't do \$3 million. We did \$8.3 million. And as I said, 80 percent of that was in the Midwest. This year we have already in one month had orders of \$20 million or \$23 million for our stove product and 90 percent of that is in the East Coast. That is because they have discovered us and because they heat with oil. We are moving into the urban markets in that area very rapidly.

The CHAIRMAN. What are the environmental implications? How does your product compare with people who are using traditional oil products for—

Mr. WALKER. Actually, we burn cleaner fuels. Our engineered fuels burn much cleaner in our stoves and our furnaces because we achieve a 99.7 percent combustion, we absolutely, positively burn just about all the energy there is to get out of it so we have a very emissions. We actually come in two-thirds under EPA's emission requirements.

The CHAIRMAN. Very good. Is there an additional environment benefit that the product that you are using is a CO² consumer, pulling things out of the atmosphere before it ever gets through, your product as opposed to some of the more traditional petroleum-based products?

Mr. WALKER. Well, the real advantage is, we have a net gain because the agricultural materials that we are using are producing oxygen in the beginning and of course when we burn it, we are putting carbon dioxide back in, but it is a canceling effect as opposed to fossil fuels which only put the carbon or CO² out into the atmosphere.

The CHAIRMAN. Very good. Thank you. The gentleman from Minnesota, Mr. Peterson, is recognized.

Mr. PETERSON. Thank you, Mr. Chairman. Following up on your question, when I was in California they were telling me California EPA won't let them sell them in California or something. Is that true, Mr. Walker? The corn stoves are not approved by the California EPA and you can't sell them there? Is that true?

Mr. WALKER. Some of the corn stoves are not approved.

Mr. PETERSON. But yours is?

Mr. WALKER. Ours is approved.

Mr. PETERSON. In California?

Mr. WALKER. Yes.

Mr. PETERSON. Oh, OK. Mr. Gaalswyk, how many of these units are operating and what is the cost of producing a gallon of ethanol with these? FAPRI did a study for me and said it is \$1.09 for the country average ethanol cost production. What is the cost production with your units and how many do you have operating?

Mr. GAALSWYK. We have a couple of test units running currently gearing up for mass production of them, and the cost looks like with the combination of the technologies, we can drive our cost down to 70 cents per gallon.

Mr. PETERSON. That would be after everything is worked out, but do you have any idea what it is now?

Mr. GAALSWYK. I feel like we will get to the 70.

Mr. PETERSON. Well, if you did, you would sell a lot of them, I would think.

Mr. GAALSWYK. I hope so.

Mr. PETERSON. Mr. Hamilton, you guys are doing some kind of big deal down in Oklahoma, right? There are about 1,700 farmers I heard, or—

Mr. HAMILTON. The Noble Foundation has cooperation with about 1,200 surrounding farmers but it is not limited to Oklahoma. We have got fuel trials going in about 12 different States.

Mr. PETERSON. But are these field trials then? You are not getting these farmers into big-scale production or—

Mr. HAMILTON. Not yet.

Mr. PETERSON. So that you are just kind of testing it. The same FAPRI study that I had done, they said that the average yield from an acre of corn is 440 gallons of ethanol per acre. What kind of yield will you get out of switchgrass?

Mr. HAMILTON. Well, again, it depends on the tons per acre and the gallons of ethanol that you can get per ton but let us just assume 80 gallons of ethanol per ton of biomass. Currently we are seeing switchgrass yields—biotype switchgrass will yield about 5 tons an acre. We have taken that already to about 9 and think we can get closer to 15 or 20. So if you get it all the way to 20 tons per acre, that is 1,600 gallons of ethanol per acre. It is significant.

Mr. PETERSON. So even at 5, you are going to be about equivalent with corn. If you can get it to 10, you will be twice what corn is basically.

Mr. HAMILTON. Yes. Again, I am pedantic on this point so I am going to correct you on it. When you say corn, what you mean is corn starch.

Mr. PETERSON. Yes, corn starch. I know you can get it out of the corn stover, yes.

Mr. HAMILTON. Yes, the corn make stovers as well. If you combine the corn stover and the corn starch—

Mr. PETERSON. What I was talking about was what we are doing today.

Mr. HAMILTON. Yes. Let us talk about starch and cellulose, not corn versus something else.

Mr. PETERSON. Right. So you are doing this in 12 different States?

Mr. HAMILTON. Yes, we have 12 locations in eight States, I think it is right now, but we are really expanding that.

Mr. PETERSON. And you are doing some bioengineering that is going to significantly increase this apparently?

Mr. HAMILTON. Yes.

Mr. PETERSON. Mr. Christopherson, kind of following up on that, I was at a briefing that your people did for me like a year ago maybe where they took all these different biomass and so forth and did a study of what they produce in energy. They look at methane digesters and corn stover. Are you familiar with that study that Mike Sparby did?

Mr. CHRISTOPHERSON. Not in great detail. I am aware of the study that you are talking about and—

Mr. PETERSON. Is that available to the public, or not?

Mr. CHRISTOPHERSON. I would guess it would be, yes.

Mr. PETERSON. Could you make that available to the committee? I think that would be something that would be useful for the com-

mittee to see some of the work, because it was useful to me to kind of just sort out what the economics were and one of the things I think we are all trying to do here is get up to speed. We are not chemical engineers but I think we need to be, given the meetings I have been having for the last 2 months, all the technical stuff everybody is throwing at you all the time. But your folks have been doing some good work, and has been said earlier by Mr. Gutknecht, we are proud of Minnesota. We have been doing what a lot of States wish they were doing, and we look forward to continue to work with you, so thank you all very much for your testimony. It was very good.

Mr. GUTKNECHT [presiding]. The gentleman's time has expired. It is my turn, and returning to my theme of shameless self-promotion, I will let everybody know that there is a supply of these DVDs that Bob Walker has provided about Bixby Energy. It is called "Our Story." I haven't seen it yet, but Members will have it, and I think there are some out there to talk a little bit about what his company is doing, so we will continue to promote you, Bob, every chance we get.

Someone raised the point about a market for sawdust. Mr. Walker, would you describe for us potentially what the market is for sawdust just in the State of Minnesota?

Mr. WALKER. We have heard, because I am so closely related to the wood pellet industry, that there is a shortage of approximately 430,000 tons of sawdust in the United States but just 2 days ago I was trekking through the forest in northern Minnesota and because of the technology that we have and how we can utilize it, there is a lot of waste material that is cut off that is left in the forest because when they are doing the clearing, that is immediately available and we can use in that business. Interestingly enough, just in northern Minnesota alone, there is a half a million tons of sawdust available. So we are not utilizing our resources as much we could think, and I think as we advance this alternative technology, we are going to find resources out there that we didn't know was there and it is going to allow us to maximize the potential of this alternative energy that is available everywhere in the United States.

Mr. GUTKNECHT. But now, Mr. Walker, you had to run through your presentation awfully fast. I am wondering, could you tell us a little more about the business model that you envision, especially I am extremely interested in this new combination furnace. Can you talk a little bit about that and maybe share with us a little bit about what you see the future being?

Mr. WALKER. Well, as you know, Congressman Gutknecht, I am an old marketing guy and whenever I put a company together, I look at three things. First of all, who is my customer, why do they buy my product and how do I get it to them, and actually the third is the most important. If I can't figure out how to get it to them, I haven't got a business. So as we created Bixby Energy, our concept was to create a system as well as technologies, and we call it the 3-legged stool approach. In other words, we create a fuel that we can burn or pyrolyze or gasify. We create a furnace that can burn it to its maximum potential or consume the energy to its maximum potential and we develop a delivery channel to get it to our

end consumer, and several years ago we acquired a rather novel little company that had a concept of delivering salt to the consumer for their water conditioning systems.

People don't like to carry 40-pound bags of salt down in the basement and put it in their water softener so they had developed a system that allowed them to by using a plastic pipe that ran from the outside of the house, a rather unobtrusive cap on the outside, ran down to the brine tank. They put a 600-pound tank down there. Our truck would drive up, pull out a 220-foot hose and in a matter of minutes blow 400 pounds of salt into that container. It was unobtrusive into the house. Customers loved it and the business grew rapidly.

Several years ago that CEO of that company came to us and made an investment in our company and then suggested that we acquire the company, and we were quite surprised because here we were, a startup development company bleeding cash. Here was a nice little company delivering salt and making a good business out of it, and so I asked them, why were you interested in being acquired by Bixby and he said when we see what you are doing and you are building a delivery system around the country, when you begin delivering your pelleted fuels or your engineered fuels, you will dwarf what we do in the salt business and then you will begin to notice us and wonder why we are doing what we are doing and you will notice that we buy salt at 2 cents a pound and sell it for 13 cents a pound and you are going to say those are nice margins, let us get into the salt business too and we will be yesterday's newspaper.

So while we had the opportunity, we think we ought to come and talk to you about enhancing your delivery system, moving it forward a lot quicker than you would because frankly if we started out just using a loss leader delivery system, we would deliver with one truck in north Minnesota on Monday, western Minnesota on Tuesday and so on and so forth and lose money for several years until we built up a delivery system that could support that. Today we have a very profitable salt delivery system and are expanding it through the entire State of Minnesota in what we call our Minnesota model, building this microcosm energy and delivery channel throughout the State, and when we begin delivering our engineered fuels, we will already have a profitable business that we are just adding profitability to.

Mr. GUTKNECHT. Well, unfortunately, my time has expired. I did want to get back to Mr. Gaalswyk because I want to reinforce a couple of points that he made, that my colleague from Minnesota, Mr. Peterson, picked up on. But what you are really talking about, Mr. Gaalswyk, is a modular unit. In fact, it looks a little like a space landing craft, will fit inside a shipping container so it can be shipped anywhere in the world and basically you plug it in, you feed it corn and out one side comes feed and the other side comes ethanol, and based on the prototype that you now have built and hope to start delivering commercially later this year, you believe you will be able to make ethanol in this unit for about 70 cents a gallon. Am I exaggerating anything there?

Mr. GAALSWYK. No, that is correct.

Mr. GUTKNECHT. This really is revolutionary, and it is revolutionary for agriculture. It is revolutionary for the United States. It is revolutionary for the world because ultimately what that really means is, we will be able to produce in small batches ethanol here in the United States or anywhere in the world at a cost that will be competitive with sugarcane or anything else in the world, and incidentally, I am told that with \$70-a-barrel oil, it now costs about \$2 a gallon to produce unleaded gasoline. So, I mean, we are starting to see the future and it works, and the technology is coming that really—we are very competitive right now with renewable energy and we are going to becoming increasingly more competitive, so as I say, this is a good story that only gets better. I have more than used up my time. The gentleman from Nebraska is recognized for 5 minutes.

Mr. OSBORNE. OK. Thank you very much. I would like to follow up a little further with Mr. Gaalswyk. You mentioned in your testimony that your units would be practical for large farms or cooperatives, and when we are talking about large farms, about what size farm would be the minimum size, I mean in terms of acres planted in the corn? What would be viable economically?

Mr. GAALSWYK. The technology could be built for any size but the size that we are thinking, a 750,000-gallon-per-year module. At 3, that would be about 250,000 bushels of corn and probably about a 1,000-acre farmer. A farmer with 1,000 acres growing all corn would produce about 750,000 gallons a year of ethanol.

Mr. OSBORNE. Which isn't real big and—

Mr. GAALSWYK. No, it doesn't have to be huge but it is not—I don't want to—we could build them for the hobby farmers but I think that is not our first market. And then the other part of it is, is that I am a big believer in the tying the feed mill in with that because that is where you get part of your gain is improving the process of improving the feed quality and use more of the feed.

Mr. OSBORNE. And you are saying the unit would produce about 750,000 gallons—

Mr. GAALSWYK. Yes, one unit, and you can keep plugging them together and they all work as a big system.

Mr. OSBORNE. If you had a cooperative, you might put six or seven of them together.

Mr. GAALSWYK. Yes, put 20 of them in and—

Mr. OSBORNE. OK. And this may be information you don't want to divulge but do you have a rough target price per unit?

Mr. GAALSWYK. Yes, I think it going to be around \$1 million, and then the issue there, it is a financing issue is part of it, trying to make them easily financed so it is kind of like financing trailer houses where if they don't make their payments, you can just pick it up and bring it to the next farm and plug it back in again.

Mr. OSBORNE. That is interesting. You are like a used car lot or something. Well, thank you. Mr. Walker, you mentioned H.R. 4435. I had not heard about this particular bill. Do you know how much money this authorizes and who the author of the bill is?

Mr. WALKER. I do not. I don't know too much about it. I just learned about it in the last couple days from my lobbyist, but I believe Hillary Clinton is the author of that over in the Senate. But

what I understand is, it is a concept that will allow the Government to basically run a DARPA type of operation.

Mr. OSBORNE. It is a venture capital stimulator?

Mr. WALKER. Yes, that is correct.

Mr. OSBORNE. OK. I would like to move on then with Dr. Hamilton. I know it probably varies area by area geographically but I kind of sense from your testimony that you feel that switchgrass may be in many cases the optimal source of biomass. Is that correct?

Mr. HAMILTON. Switchgrass is one of several what we call perennial grasses, so they are grasses, they form deep root structures and you cut them once and they grow back the following year without having to resow and seed. Another example of a grass that is native to Asia that produces a lot of biomass is something called miscanthus giganteus, which will also put out the equivalent of quite a bit of biomass per acre.

Mr. OSBORNE. And apparently you are working to optimize the tonnage of these types of material?

Mr. HAMILTON. Amongst other characteristics.

Mr. OSBORNE. OK. And I know you have already talked about this but it seems we have got a lot of numbers floating around here. What would you say when you are talking about cellulosic ethanol production using something like switchgrass, what would be sort of a target or an average gallons per acre production that you think you might be able to achieve?

Mr. HAMILTON. Again, depending on the acre you are going to use and I use a target of sort of 15 to 20 tons of biomass per acre, I think on some, if you use very prime agricultural land, you can get more than that, but let us say if you used 20 tons per acre, make the math easy, and then 80 gallons per ton of ethanol, you get 1,600 gallons. Obviously we are not at 20 tons per acre today. We are at about 9 or 10. But we think we can get there.

Mr. OSBORNE. And the last question is, I know that cellulosic ethanol production is sort of an emerging technology. Do you feel that it is right now economically viable or do you feel it is still in an experimental stage or do you feel there are plants that are actually up and running that are going to be able to be profitable?

Mr. HAMILTON. Well, as was pointed out at the beginning, I think there are plants now operating on a pilot scale in Canada and in Spain and we are trying to get the first few cellulosic biorefineries built in the United States and so let us build them and then we will be able to calculate exactly the economics of operating them, but I think a number of people think they are sufficiently close to making economics competitive, that is time to start putting these in the ground.

Mr. OSBORNE. But the technology is there as far as you are concerned?

Mr. HAMILTON. Yes, it is.

Mr. OSBORNE. Thank you. I yield back. Chairman, thank you.

Mr. GUTKNECHT. The gentleman's time has expired. The good doctor from Michigan, Dr. Schwarz.

Mr. SCHWARZ. Dr. Hamilton, will you explain to me, I think I pretty well understand how you get little C_2H_5OH from sucrose and from starch. The process to extract ethanol from plant cellulose

or wood cellulose, I assume it is a thermal process and you just break down the molecular structure of the cellulose and one of the products is ethyl alcohol?

Mr. HAMILTON. Yes, there is a couple different ways to do it. What you just described—

Mr. SCHWARZ. Go ahead, fire away, because this is *terra incognita* to me. I need to know—

Mr. HAMILTON. What you described is a thermal chemical process for breaking down cellulose. I think what folks like my friends at Iogen are talking about is actually a technology where you are going to break down the cellulose using enzymes produced through biotechnology. Sucrose is a disaccharide of fructose and glucose. You know that starch is a polymer of glucose. Cellulose is also a polymer of glucose but the linkages between the glucose molecules are different and so it makes it a little bit more recalcitrant to digest. Now, there are organisms, fungi and microorganisms, for example, found in the guts of termites that can break down cellulose into the component sugars and so companies like Iogen, Novozymes, Genencorp, Diversa have used biotechnology to go in and isolate the genes for those enzymes and then overproduce them in a very inexpensive way so that we now use these enzymes to break down the cellulose to simple sugars that can be fermented into ethanol.

Mr. SCHWARZ. If you find an efficient enzymatic key to breaking down cellulose, that becomes almost a power-free, in other words, you are using natural gas, you are not using electricity, you are not using anything. You are using a natural enzymatic process to break it down which would seem to me to be unbelievably efficient. As far as the process goes, how about volume?

Mr. HAMILTON. In terms of—

Mr. SCHWARZ. You are talking about high density in producing the cellulosic plant, whatever it is, so if you have got your high density, you have got your fields out there growing high-density cellulose, switchgrass and some of the other genuses and species that you just mentioned that I have never heard of before, which is not unusual. There are lot of genuses and species I have never heard of before. And then you break it down to produce ethanol with an enzyme. That seems to be unbelievably efficient, and am I correct in assuming that is precisely where you want to go? You want the most efficient, obviously the cheapest way to do it but the most efficient way to do it and so you are energy plus in producing the ethanol. You are not using a lot of existing energy derived from, for example, natural gas or derived from electricity which probably was produced from natural gas or petroleum or coal.

Mr. HAMILTON. That is absolutely—

Mr. SCHWARZ. Am I on the right track here or am I wandering around somewhere in the woods?

Mr. HAMILTON. No, no, no, no. Pardon the pun, you are not wandering around in the woods, but no, the net energy, or as I prefer to think of it, the net fuel savings around using dedicated energy crops and cellulose conversion technologies are—people talk about corn starch being whatever it is, 1.25 or 1.6. When you start talking about cellulosic conversion technologies and dedicated energy

crops, you are up around 8 times more energy and fuel than you are getting out than what you have to put in.

Mr. SCHWARZ. Thank you. I yield back.

Mr. GUTKNECHT. Wow, that is interesting. Well, we are not going to have a second round of questions, we do have another panel, but I just want to thank all of you. I wish we had more time. You will be available. In fact, I will take the chairman's prerogative here. We will keep the record open for 5 days. If Members have other questions they would like to submit to you, we would ask you to consider responding to those questions in writing. Again, one of the points that came up, and I will mention this, was what we can do both through Rural Development and the Department of Agriculture to fill some of the gaps out there in terms of the basic research and importantly of taking concepts and being able to move to proof of concept, and I think those are two areas right now where we are a bit delinquent and frankly I think those are two areas that whether we can do it yet this year or as we go into the next farm bill, we need to work with the Department of Agriculture and with entrepreneurs and researchers like yourselves to make certain that we fill those holes because the rewards I think not only to agriculture but to the American economy will be enormous with some of these developments we are hearing about today, so thank you very much for coming. We really appreciate your testimony. And with that, I will dismiss this panel and will bring the third panel up.

I would like to thank the third panel for coming today. Let me just briefly introduce them. First of all, Mr. Bob Dinneen, who is the president and CEO of Renewable Fuels Association here in Washington, DC, and a welcome and frequent guest of ours here on this committee; Mr. Jeff Passmore, who is the executive vice president of Iogen Energy. We have read and heard a lot about Iogen and we are very excited to have you here from Ottawa, Canada. Dr. Mary Beth Stanek, who is not new to my subcommittee. We were delighted to have her testify before us when we were in Detroit about a month ago. She is a manager of General Motors Strategic Initiatives Program in Detroit, Michigan. And finally Mr. William Frey, who is the global business director of DuPont Biofuels here in Washington, DC. So we are delighted to have all of you with us. Mr. Dinneen, perhaps you could start. Thank you.

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

Mr. DINNEEN. Thank you, Mr. Chairman, Congressman Peterson. I appreciate the opportunity to be here today.

It is a privilege and a pleasure for me to be amongst friends who have worked so hard and advocated so effectively for ethanol and for value-added agriculture. With your work, you have helped to create the fastest growing renewable energy industry in the world, fuel ethanol. In 2005 alone, the industry produced some 4 billion gallons of ethanol from about 1.7 billion bushels of grain. We produced 9 million metric tons of distilled feed used in cattle and poultry markets across this country. The industry has become a very important and ubiquitous component of the U.S. motor fuel market and it is critically important to our nation's economy. The 4 billion

gallons of ethanol that were produced and sold in 2005 alone created more than \$32 billion in gross output. It created more than \$5.7 billion to household income, created 153,000 jobs across this country. It created about \$1.7 billion in increased Federal tax revenues, another \$1.2 billion in State and local tax revenues. I can tell you, Mr. Chairman, the ethanol industry has become a critically important component of our U.S. motor fuel market and you gentlemen certainly know that from the great State of Minnesota. You know what it has done for your State and it happening increasingly all across the country.

Today there are 101 ethanol biorefineries in operation across 19 different States that have the capacity to produce 4.8 billion gallons of ethanol but we are not done yet. There are 34 plants that are currently under construction, another 7 plants that are expanding their capacity. They will add another 2.2 billion gallons of production capacity, and by this time a year from now, the U.S. ethanol industry will be producing about 7 billion gallons of clean-burning renewable fuel. It is a tremendous achievement for our industry and for this country.

We have had this tremendous growth in large part because of your efforts to pass the Energy Policy Act last year. That bill for the very first time created a requirement for refiners to utilize renewable fuels like ethanol and biodiesel in increasing percentages. The program began this year at 4 billion gallons. We will sell more than 5 billion gallons this year. It ramps up to 7½ billion gallons by 2012 but quite frankly the RFS was intended to be a floor, not a ceiling, and we will meet that standard far earlier than that and it is because of the signal that the RFS sent to the marketplace a year ago. It was a clarion call to our industry to expand production and indeed 24 plants have broken ground since August 8 when President Bush signed that law into effect.

The other reason there is a great deal of growth right now obviously is because refiners have made the decision to get out of MTBE. Our industry has greatly expanded production and the transition from MTBE to ethanol in those areas where MTBE was still being used in the mid-Atlantic and the Northeast and in Texas is now largely complete, and as the transition from MTBE to ethanol in New York and California previously, it was indeed largely successful.

As the industry has grown, it has changed as well. As you gentlemen both know and Congressman Salazar as well, the industry now is largely farmer owned. The single largest ethanol producer in the country today taken as a whole is the farmer-owned ethanol plant. More than 40 percent of our Nation's ethanol today is produced by farmer owners.

Change is also occurring in technology. Just recently in Benson, Minnesota, Chippewa Valley Ethanol broke ground on an expansion of their plant but also creating biomass gasification. It is a revolutionary change in the industry that is going to make us more efficient but it is indicative of the spirit in our industry to become more efficient producers of fuel ethanol. We are looking at corn fractionization. We are looking at corn oil extraction. We are looking at an awful lot of things. The fact of the matter is, our industry will be unrecognizable 5 years from now from what it is today and

it is because of the new capital, the new intellectual capital coming into the industry. We will not be a corn-derived ethanol industry forever. Clearly we are going to be looking at cellulosic ethanol technology as the evolution of our industry continues, and I look forward to working with this committee and your continued leadership to make sure that happens. Thank you.

[The prepared statement of Mr. Dinneen appears at the conclusion of the hearing.]

Mr. GUTKNECHT. Bob, you are a pro. You took exactly 5 minutes, so thank you. Mr. Passmore.

**STATEMENT OF JEFF PASSMORE, EXECUTIVE VICE
PRESIDENT, IOGEN ENERGY**

Mr. PASSMORE. Thank you very much, Mr. Chairman, and thank you for the opportunity to appear here today. With all the talk about cellulose ethanol and Iogen, I hope I can live up to the expectations of the committee.

I am here today to talk about Iogen's interest in commercialization of cellulose ethanol. We have been active for the last 30 years and we have spent a lot of money, about \$175 million, on bringing us to the point where we are ready to go and I guess if I have got two messages for you, one of them is, we are ready to go. We are ready to go commercial. We have partners, as you know, like Shell and Goldman Sachs, and have built the only demonstration facility that is operating in the world. We have been operating now for 2 years making ethanol from wheat and barley straw but we can also use corn stover and of course many of the dedicated perennials that you have heard talked about this morning such as switchgrass.

There has been a lot of attention paid to cellulose ethanol over the last little while and most recently of course in today's Wall Street Journal but based on our experience, we are ready to get the shovel in the ground in 2007, in other words, next summer, so we would like to get going and break ground on a plant in Idaho. We have selected southeast Idaho as the location for the first facility because it is one of the best wheat straw and barley straw basins in North America but the fact that we are starting on cereal straws of course doesn't mean that we can't—I mean, as I said, we can use corn stover and other forms of cellulose.

What is the size of the opportunity? There is a lot of that question being asked and you heard Under Secretary Dorr talk about that this morning when he talked about what has euphemistically become known as the billion-ton study. That is talking about 60 billion gallons. I mean, it is remarkable. I was at a conference in Chicago about 2 weeks ago where members of the financial community were saying this time last year the House and the Senate were having a discussion about whether it should be a 5 billion or an 8 billion gallon RFS and it turned out to be 7.5. Well, now everybody is looking at 7½ billion gallons and saying wow, that is just too small and when we are talking about 30, 40, 60 billion gallons.

And the other thing I want to make real to you is, how does that translate in terms of an individual farmer. Well, everybody said to us, are you really sure you are going to be able to sign up the feedstock material. So in Idaho, we have signed up 320 growers for about 356,000 tons of straw. That is in 14 different counties. And

assuming—we have structured the price we will pay, I have kind of been a little creative there and structured it to flow with the world price of oil, and assuming \$50 a barrel of oil and a yield of about 2 tons of straw per acre, a farmer would get \$24 an acre just before they did anything, just for the straw lying in the windrow. If you then say well, I want to get involved in the baling and trucking to the field, about a 700-ton-a-day plant would bring \$9 million a year into the community without looking at the construction of the facility or the jobs created.

This same story can be repeated in rural communities across America. I have attached some maps to my testimony that you can see those are USDA maps that indicate where the corn stover and the barley straw is.

So why don't we just build the plants? Well, basically it is because cellulose ethanol is unproven at commercial scale, and if you imagine a facility being built through a combination of equity and debt, we have the equity players in the Shells of the world and the Goldman Sachs and others who are willing to come to the table and put equity into the facility but you cannot do conventional project financing of new technology that has never been built at that scale before, and this is not unique to cellulose ethanol. It is true of a whole bunch of new technologies. Congress recognized in the Energy Policy Act of 2005 that there was that market failure so they put in place loan guarantee provisions for gold to liquids, new nuclear, integrated gas combined cycle and cellulose ethanol so my second main message is, if my first one was cellulose ethanol is ready to go, my second key message today is, let us just get going on and implement what has already been passed by Congress.

It has been almost a year since the loan guarantee provisions were put in place in the Energy Policy Act and yet it is not possible for Iogen or any other company to apply under any existing framework for a U.S. Government loan guarantee. So the private sector has invested a lot of money. We want to share the risk of commercialization with the Government and we are ready to get going, and I look forward to your questions.

[The prepared statement of Mr. Passmore appears at the conclusion of the hearing.]

Mr. GUTKNECHT. Dr. Stanek, I gave you a little introduction, and some in this committee and others have been a bit critical in the past of our auto manufacturing business being a little slow to respond to the availability of renewable fuels but let me just assure all of them, based on the testimony we heard in Detroit, you are not lagging behind the curve anymore, and we welcome you and we are delighted that you are here, and on behalf of the subcommittee, I want to again thank you for your testimony in Detroit and all you did to make certain that our subcommittee had a great hearing, so welcome.

STATEMENT OF MARY BETH STANEK, GENERAL MOTORS STRATEGIC INITIATIVES

Ms. STANEK. Thank you very much, Mr. Chairman and members of the committee. I want to thank you for the opportunity to speak on behalf of General Motors today.

I am Mary Beth Stanek and I am manager of GM's Strategic Initiatives and I am leading several aspects of General Motors' biofuel campaign, especially in the area of E-85 partnership. I am also very supportive of our national "Live Green, Go Yellow" campaign and we will talk about that in a little bit.

This afternoon I want to cover a couple of aspects of the renewable fuel market including the benefits of E-85, our current model offerings, national and regional marketing efforts, and our infrastructure partnerships today. We live in a period of unprecedented change in the automobile industry. Today we are bringing to market a range of advanced technologies that include hybrids, flex fuel, active fuel management, and they are improving fuel efficiency and also providing great fuel diversity. But we believe it is hydrogen ultimately that will get us off our oil addiction. That will come about in the next decade. Today we can do something about it with biofuels. We believe E-85 is a very important component of that. The main tenets of that are ethanol is a renewable fuel, it helps reduce greenhouse gas emissions, it helps reduce our dependence on foreign oil but more importantly gives us true fuel diversity at the pump. It helps reduce smog-forming emissions and also helps grow the domestic agricultural industry and also new jobs.

Because of the very successful cafe programs, as you know, there are over 5 million flex fuel products on the market and registration. Of those, 2 million are General Motors and 400,000 are produced annually by GM. We have a broad lineup, and I think it is important to know that we have gone from 9 product offerings to this year a total of 17 models. So that is very good growth. That includes the Chevrolet Tahoe, Suburban, Silverado, Avalanche, Impala, Monte Carlo, GMC Yukon, Yukon XL and Sierra. The new additions include our Chevrolet Uplander, our Express, our Pontiac Montana SV-6 for Canada, GMC Savannah, Saturn Relay and Buick Teraza.

In addition, General Motors believes that the flex fuel vehicles, the renewable fuels like ethanol are poised to drive a fundamental shift in the transportation energy sector. That is why we along with Ford and Daimler Chrysler have endorsed the vision of the 25 x '25, and we will increase our total flex fuel offerings on an annualized basis to 2 million but we can't reduce the Nation's dependence on oil simply by having these vehicles on the road. We need the ethanol and fueling network to make it available to consumers. We believe the country should aim to give most Americans reasonable access to E-85. To us, this means having E-85 pumps at at least 20 percent of stations nationwide. We think this could happen within the next few years.

While General Motors is not in the fuel business, we believe that we play a valuable role in developing the E-85 market. One of the ways we are doing this is by supporting the Governors Ethanol Coalition. You may or may not know that General Motors provides vehicles to 26 member States as part of the educational effort on renewable fuels. We have renewed this partnership and are in the process of changing out the vehicles with the governor States.

In addition, General Motors, as you know, launched a major campaign during the Super Bowl hosted in our hometown of Detroit and amplified it during the Winter Olympics. It is known as "Live

Green, Go Yellow.” During this campaign we had millions of viewers come to our Web site to not only learn about our products offerings, to learn about ethanol, renewable fuel and to see if a station was located near them. On average during the Olympics we had 3 million hits a day during that week.

Most importantly, we are changing our products. I brought some exhibits here today. We are now badging our vehicles with a rear badge that says flex fuel E-85 ethanol and we are also putting a very visible yellow cap on all our flex fuel products. This will remind consumers every time they fill up that they have a fuel choice. It is very powerful and a high touch point for consumers. We are also pleased to announce that Chrysler is joining us and will also be using and adapting the yellow cap.

Later in the third quarter of this year we will be notifying our flex fuel owners who have ownership of our products for more than the last year to let them know that they have a flex fuel product. We believe there is a certain percentage of our owners who don't know that they do. We will encourage them to come in, get a yellow cap and exterior badge and also create more of a thrust around E-85 and flex fuel.

In addition, we are working on several regional campaigns that I will talk about in a little bit but it is important to know that we are working on enhanced labeling, dealer and consumer education. We are collaborating with all the State and Federal agencies and we are supporting many industry events. Right now we are currently working with Weekly Reader on a student education program for middle school students that will reach 9,000 schools in our nation. In the area of partnership where I spend most of my day, we are addressing the E-85 refueling shortage. We have been working with special interest groups, producers and E-85 retailers. Our most recent announcements include the State of Michigan and Indiana working with both the States, Myers and Clean Fuel USA to get E-85 in 40 locations in those two States, but prior to that we have announced partnerships in California with Chevron and Pacific Ethanol, in Illinois, with Verisun and Gas City and a soon-to-be pilot with Shell, in Minnesota with Verisun again and Erickson Oil; also in the State of Texas with Kroger and Appengo Bioenergy. In 2005, GM also worked with Verisun in Sioux Falls, South Dakota.

I think it is also important to note today that General Motors will be announcing two additional partnerships in the next 2 weeks in two more States, so that will be a total of 9 States with the addition of probably close to 160 pumps that General Motors has helped to be a catalyst in the process of. This will not only help get E-85 available to our consumers, it will support local economies and increased use of E-85.

Ethanol pricing. There is a great deal of discussion today regarding ethanol and gasoline-blend pricing. We recognize because of the high value of the blending agent to gasoline, the current price of ethanol is at a record high. In many parts of this country this has driven up the price of E-85 to the point where drivers may not have economic incentives to buy it. However, we also believe that this is a very temporary situation created largely by the need to replace MTBE. I think the congressional incentives and market

forces are causing ethanol capacity and supply to increase rapidly which will in turn cause supply and demand to come more into balance. U.S. ethanol plants, as Bob cited earlier, are growing rapidly. According to Jim Jordan Associates, we can easily see over 6 billion by the end of next year and 10 billion by 2010. I have attached an attachment in my testimony for your review from Jim Jordan. Ethanol supply that exceeds demand will help grow the E-85 market and also get it at a price where it is competitive. This is where we need to get so that we have true fuel diversity in our country.

In summary, GM is working to develop a host of advanced vehicle technologies to diversify our energy supply with more alternative fuel choices. GM believes these actions can significantly reduce our dependence on oil and has endorsed the 25 x '25 vision to replace imported oil with homegrown renewable energy. GM is committed to expanding the availability of flex fuel vehicles and is working actively to bring out a wider range of flex fuel vehicle offerings. GM recognizes that it has a role to play in expanding the E-85 infrastructure and is partnering with, as I mentioned, ethanol producers, special interests and retailers all across the country to bring more pumps on line. We recognize the current price of ethanol represents a challenge to the E-85 market but believe fully that in the not too distant future, the market forces will create more demand for E-85 and flex fuels. We think this suggests a healthy future for the ethanol industry and more fuel diversity and choice for our customers.

Thank you very much, Mr. Chairman.

[The prepared statement of Ms. Stanek appears at the conclusion of the hearing.]

Mr. GUTKNECHT. Thank you, Dr. Stanek. Next we have Dr. William Frey. He is the global business director for DuPont Biofuels. Welcome.

**STATEMENT OF WILLIAM A. FREY, GLOBAL BUSINESS
DIRECTOR, E.I. DUPONT DE NEMOURS & COMPANY, INC.**

Mr. FREY. Thank you, Mr. Chairman and members of the committee.

I am particularly happy to be here with you today to share with you some of the work that we are doing to apply DuPont's science to helping grow the biofuels value chain. DuPont starts in the field, as many of you know, where our Pioneer corn and soybean seeds developed specifically for biofuels applications help to maximize the yield of ethanol and biodiesel from those crops. For eight decades Pioneer has been helping its customers succeed in the marketplace where renewable fuels are just one route to that success in today's market. In addition, our environmentally sensitive crop protection chemicals help farmers to ensure high rates of productivity. With 135 seed corn varieties designated as high ethanol hybrids, crop seeds and crop protection products represent the first step in DuPont's biofuels vision of meeting energy needs from the field to the pump.

From this foundation we have been bringing our biotechnology expertise to bear to convert these agricultural crops into high-value products for the marketplace. For example, DuPont was recently awarded the President's Green Chemistry Award for the develop-

ment of our Sorona fiber, whose unique properties include stain protection, brilliant colors and wear resistance. This year we will start up a world-scale fermentation facility in Loudon, Tennessee, producing the raw material for Sorona, propanedio, or PDO, from corn rather than petroleum. So very soon the carpet you walk on and the clothes you wear will come from the farmer's field.

We are also working with the Department of Energy and partners including John Deere and Diversa to develop an integrated corn-based biorefinery that will convert the entire corn plant, both the grain and the corn stalk and leaves, into cost-effective ethanol and bio PDO. We believe this new development will improve earnings for farmers and ethanol producers. It will also open the door to significant expansion of biofuels production from plants, allowing for the expansion of their development without potential pressure on food crops and improving even further the environmental performance of these materials.

I would like to spend the rest of my time focusing on our newest development that we announced just last week. DuPont and BP have formed a partnership to develop and bring to market next generation biofuels that will help to speed the development of this important market in ways that will benefit farmers and biofuel producers including ethanol producers. The first of these new products to market will be biobutanol. Biobutanol will be produced from the same feedstocks from which ethanol is produced today in essentially the same type of production facilities. One of the things that makes biobutanol exciting is its ability as a co-blending agent with ethanol and gasoline to enhance the performance of the fuel blends in way that can speed the growth of the biofuels market and the agricultural markets that support it. Biobutanol packs more energy per gallon than does ethanol, so when biobutanol is added to an ethanol-gasoline blend, the resulting fuel provides greater fuel mileage. In addition, biobutanol is less volatile than ethanol and a co-blend of the two results in reduced vapor emissions, reducing the potential for smog formation. This will expand the geographic areas in which ethanol-blended fuels can be used year round, California being a particular example of where that might apply.

Butanol is not a new thing. What is new is the application of our biotechnology expertise that we have developed through our experience with bio PDO and with our biorefinery efforts to the development of a cost-effective process to produce butanol from agricultural produces. Also new is the partnership between DuPont's biology and production expertise and BP's fuel expertise and market presence. The partnership will begin biofuel or biobutanol production in the U.K. in 2007 in conjunction with British Sugar using existing technology in order to get the product to the market rapidly. We are starting in the U.K. in order to have an early presence in a newly developing biofuels market and will use sugar beets to produce biobutanol.

Here in the U.S. we anticipate biobutanol will be produced from corn with sugar beets or sugarcane also potential feedstocks. In the future, the cellulosic technologies you have heard about today will be a natural fit for biobutanol. Where we do have specific plans at this moment for U.S. production, the U.S. is obviously an impor-

tant market for us and we fully intend for biobutanol production in the U.S. when our next generation technology is available.

One factor that will be important for U.S. market entry is a level playing field and incentives for biofuels, be they in tax policy or elsewhere, and we believe biobutanol should receive the same treatment as other biofuels.

In conclusion, DuPont is excited to partner with BP to bring biobutanol and other advanced biofuels to market. We think these developments will be good for agriculture, good for national security, good for the environment and good for our shareholders. I appreciate the opportunity to share these developments with you and I look forward to your questions.

[The prepared statement of Mr. Frey appears at the conclusion of the hearing.]

Mr. GUTKNECHT. Thank you, Dr. Frey. First I will go to you, Bob. We have heard a lot of really interesting testimony today but I want to come back to the basic point. See, I happen to believe success leaves clues, OK, and I think Minnesota does have a sort of success story in terms of the development of the renewable fuels industry. But my own view, and I want to get your impression of this. My own view is one of the most important things we did was to have this 10 percent requirement. Would you want to respond to that?

Mr. DINNEEN. Well, there is no question that Minnesota has been a leader on ethanol issues for more than a decade and certainly began with the requirement in the State for statewide ethanol use. In 1994 Minnesota had one ethanol plant. It passed the statewide requirement. It created some other incentives for ethanol use. Today there are 15 ethanol plants in operation in the State. Every gallon of gasoline sold in Minnesota is blended with 10 percent ethanol. As you noted earlier, more than half of the Nation's E-85 refueling stations are located in Minnesota and the most active E-85 market is in Minnesota. It has been a tremendous success, one for which you should be very proud and one that should be emulated in other States across the country.

Mr. GUTKNECHT. Well, we actually just want to share the goodness. I mean, we want more States to do that and that is part of the reason that I have been a strong advocate of the concept of 10 x '10, and I believe in 25 x '25 but I think it was the Chinese philosopher, Lao Tzu, said a journey of a thousand leagues begins with a single step, and we have got to keep moving that ball forward. I think we are going to get way ahead of that RFS standard that we passed last year.

Mr. Passmore, I am very intrigued with, and I think everyone here on the committee and everyone here today is very intrigued with your technology. We heard some of the other people talk, because at the end of all of this, it is about cost per gallon or it really is cost per BTU. Can you talk a little more about how cost-effective you believe your plant, the new plant will be in—it is in Idaho, the one that you hope to construct?

Mr. PASSMORE. Yes. The plant is to be built in southeast Idaho for the first plant and our target costs are \$1.30 a gallon. One would have to build a biorefinery that would—that is the USD we model essentially that you are not just producing ethanol, you are

producing a number of associated co-products and taken together as a whole the facility can produce ethanol at \$1.30 a gallon.

Mr. GUTKNECHT. Dr. Stanek, I want to come back to you and again congratulate you and the American auto manufacturing people because you really have moved a long ways in relatively short period of time to encourage people to at least examine the possibility. But I want to reinforce something that we learned while we were in Detroit and perhaps you can want to comment on this. I am a big believer in E-85 vehicles, and I think Mr. Dinneen is correct that half of the E-85 pumps in the United States are in Minnesota today and I think over half of those E-85 pumps that are in Minnesota are in my district, and so we are a strong proponent of E-85 and we have probably a disproportionate percentage of all of the E-85 vehicles that you make are in Minnesota and in my district. But one of the issues that came up was, it is hard to force people to buy E-85 vehicles in areas where they don't have pumps. I wonder if you would talk a little bit about this whole idea of the vehicles you make today, how many of them today can easily burn at least a 10 percent blend. Maybe you can talk about that.

Ms. STANEK. All of our vehicles are E-10 capable so that is true of all the domestic OEMs and also the foreign OEMs so that is OK, an E-10. With E-85, you mentioned something about trying to get folks to buy flex fuel vehicles if the fuel is not near them. We are not seeing that. We are seeing that people are coming in sort of in a readiness purchasing mode—I want a flex fuel vehicle because I know it is coming. So we are seeing through our educational awareness brought about new sales as a result of E-85—we will call it E-85 preparedness planning. In fact, they are up significantly. I think most people really about a year, year and a half ago simply just did not know about the technology or really didn't have a full understanding. So we are seeing more traffic. Our dealers are seeing a lot more discussion and a lot more purchase decision based around flex fuel in hopes that it is coming.

Mr. GUTKNECHT. Well, let me just say on my own behalf, I am actually looking for an E-85 vehicle and so far I haven't found the one that I really like but I am delighted that more and more are coming out that may fit the kind of car that I want to drive, so I want to thank you for that, and I will yield back the balance of my time and I will yield to my colleague from Minnesota, Mr. Peterson.

Mr. PETERSON. Thank you, Mr. Chairman. Following up on that, how big of a problem, Dr. Stanek, is this EPA requirement that you guys have? We were in Brazil, Senator Grassley and myself, they are making all the cars down there, but apparently they can just decide that they are going to do it and they don't have to go through the EPA testing and whatever, but is that a problem that you—I mean, what is it that you have to do to? You have to get engine certified and go through some lengthy process? They are burning 25 percent ethanol down there, blended in Brazil, which I firmly believe we can burn here. Why is the EPA doing this on every engine? I mean, it doesn't seem like a sensible thing. Is there something we can do short-circuit that or get them out of the process, or what?

Ms. STANEK. Well, I don't know that the EPA would like to be cut out of the process but I think there is a number of things that

are occurring. First of all, if you look at our model lineup in Brazil, it is true, 95 percent of our product portfolio in Brazil is flex fuel. But it is also a very simple model lineup. In other words, compared to 78, 80 model offerings here, 9 or 10. So that first of all, simplicity is very important. The other thing is of course, it is not only just in the area of emissions and auto certification and other aspects. As you know, each region of the world has very different requirements so Brazil's requirements are far simpler than they are in the U.S. are in Europe so it is much harder to develop and certify a vehicle in both the EU and the United States but all for good reason, because it affects air quality and safety and all the right things. The other thing that I think we need to factor into this is that no two systems are really alike. If you look at the way a certain engine is configured, if you look at the way a gas tank is configured and everything in between, we have quite a few varieties of systems, so it is not as simple as changing out corrosive parts. We have all sorts of additional parts that may have to come on and then we get into what we call engine calibration. When you put the resources on a new study of a configuration to calibrate for flex fuel, you are increasing engineering workload about 30 percent, OK, so you are taking a very constrained part of the business, and this is true for all the OEMs, and you are asking to get a lot of throughput, so between the variation of the systems, the model complexity, the regulations, it is just a little harder to get at this. I think a lot of folks try to make it as simple as a box of parts, and if it was, we would already be there. What we are trying to do though as we go through what we call our own product life cycle planning which is about 3 to 5 years of a product life, as we begin to start the new product, we will bake in these changes from the start so that what you will see is the evolution of the products being compatible with flex fuel. So we will do it in a way where it makes the most, we will call it affordable engineering sense right from the new life cycle.

Mr. PETERSON. Thank you. Mr. Dinneen, I have two questions. I will put them together, otherwise I will run out of time. First, I think we keep hearing that in the next farm bill we should be doing more research. I assume you agree with that.

Mr. DINNEEN. Absolutely.

Mr. PETERSON. I would like to know where you think that research should be focused, where it is needed, and secondly, can you explain to us in like a minute how the ethanol is marketed in relation to gasoline and why it is doing what it is doing in terms of price? I mean, you can do that in a minute, right?

Mr. DINNEEN. Oh, yes, that is easily done. Thank you, Congressman. All right. I will take the second part first. Ethanol is sold under long-term contracts. About 95 percent or more of the ethanol sold across this country is sold under 6-month or yearlong contracts. Those contracts generally are tied to the price of gasoline or are fixed price but certainly—

Mr. PETERSON. Why are they tied to the price of gasoline? That is the question I keep getting from people that don't know much about this. Is it because they are marketing through the oil company marketing structure, or why is it?

Mr. DINNEEN. Because the value to a refiner is based on its use in gasoline, and ethanol——

Mr. PETERSON. Well, why would it be—if you get less mileage, why would it be higher price than gasoline sometimes?

Mr. DINNEEN. Well, it has higher value. It is not just a question of BTUs. It is a question of octane. It is a question of its clean-burning characteristics. It is a question of volume. Ethanol today is a very valuable blend component with gasoline, and as an octane enhancer. It is marketed against things like toluene or benzene or xylene, and those are components that are far more expensive than ethanol today. The reason you have so much ethanol being used to replace MTBE today when there is no oxygen requirement that would require refiners to do so is because it is the most cost-effective octane replacement for MTBE and so ethanol does have significant value as a blend component and it will continue to grow as a blend component with gasoline. The prices that people are talking about today, the spot prices, I wish our industry was actually able to take advantage of some of those but we have sold all our product. The market is tight and it is tight because some of the imported product that some refiners had contracted for isn't showing up as expected. It is tight because virtually every drop of MTBE has been eliminated from this country. There was some expectation that some would remain; it hasn't. It is all gone. So, I mean, indeed there is no additional ethanol at our plants to satisfy some of that increased demand. We are bringing on plants faster than I can get out there to give the speed to open them up. Congressman Herse the other day was at yet another groundbreaking for another plant. We are doing everything we can to bring more product on and the spot prices that you are seeing today will come down but they really reflect refiner-to-refiner sales, not ethanol producer sales, because our product is already done.

Mr. PETERSON. What about the research, just briefly?

Mr. DINNEEN. I certainly agree we ought to be doing a lot more research. As the industry continues to evolve, you are going to see ethanol being produced from additional feedstocks, cellulose and additional research into those feedstocks, those enzymes, the pretreatment would all be extraordinarily helpful.

Mr. PETERSON. That would be the top priority you think in that cellulosic area?

Mr. DINNEEN. We can get to 14, 15, 16 billion gallons of ethanol from grain today. We can do that. In fact, it is going to happen, but if we are going to be the 30-, 40-, 50-, 60-billion-gallon industry that we want to become and that the Department of Energy has established as a goal and is going to be necessary in order for there to be enough ethanol to satisfy a meaningful E-85 market, you have to have cellulose production. There is not an ethanol company that I represent that doesn't have a really aggressive cellulose-to-ethanol research program underway today but certainly more needs to be done.

Mr. PETERSON. Thank you, Mr. Chairman.

Mr. GUTKNECHT. The gentleman's time has expired. The gentleman from Michigan, Dr. Schwarz.

Mr. SCHWARZ. Dr. Stanek, welcome to a fellow Michigander. You mentioned, and it was the shortest time span that I had heard that

you hope that General Motors will be producing at least partial hydrogen-consuming automobiles in a decade. Did I understand that correctly?

Ms. STANEK. Yes, certainly there will be specialized fleets in the very near future. As far as volume, we will have to see based on the affordability but we are getting close.

Mr. SCHWARZ. As you do your futuring at GM and the auto industry in general does its futuring, what percentage of the fleet would you think in 20 or 25 years or go out 30 years would be at least partial hydrogen-consuming automobiles, maybe 100 percent?

Ms. STANEK. I really don't want to speculate on that. That is just not my area that I am involved in so I would just I guess try to package that by saying the fleet 20 years from now will be very different than the fleet we have now. It will be a little bit of everything. You will have a wide variety of flex fuel, the hybrids and hydrogen all together as equal participants in that fleet.

Mr. SCHWARZ. Is there general agreement in the R & D sectors of the auto industry, whether GM or Ford or Daimler Chrysler or your other non-American competitors, that fuel X is going to be hydrogen, nothing else out there on the horizon that might displace our thinking about hydrogen? Have you heard any of the scientists in R & D in GM say well maybe it is not going to be hydrogen, maybe there is something else out there we really haven't come up with yet.

Ms. STANEK. Everyone is on point for hydrogen.

Mr. SCHWARZ. Everyone is point for hydrogen? Good. Thank you very much. I guess I am not on point for hydrogen quite yet. I don't believe that we are going to be able to produce enough of it in a small enough container safely enough and economically enough to do what we would all like to do with it so I am from Missouri, there is—

Ms. STANEK. So we need to show you then, right?

Mr. SCHWARZ. That is right.

Ms. STANEK. Well, I will make sure you get a call.

Mr. SCHWARZ. All right. You do need to show me. All right. Let me go to Dr. Frey. Tell me about the reason that you are going to the CH90H instead of the CH50H. Why are you going to butanol? Why is butanol a good fuel? What advantage does it have as a gasoline-butanol or gasoline-ethanol-butanol mix? Give me a little bit of the technical reason for that.

Mr. FREY. Sure. Let me put it in the context of the investment we have been making for the last 10 years, if it is OK, to look at how we might move away from petroleum to agricultural products. So when I talked earlier about our Sorona fiber and our plant that is coming up in Loudon, Tennessee, to produce PDO to make carpets and clothing, all of that is part of a decision we made almost 10 years ago to say how are we going to take our science and move to where the future will be, and the future having a lot less in terms of petroleum. We have looked at that in the materials world because in the materials world we were looking for high-value products, no one thinking that some day down the road fuels would be high-value products but of course the situation has changed over the past years. We looked and we have gotten together with many.

We first got together with the Department of Energy and asked questions about where can we take our science to help to improve the future of biofuels and that is when we started out effort with the Department of Energy around cellulosic conversion technologies. We are very excited about where we are and we are excited that Iogen is planning to build its plant. We are looking forward to taking our next steps to do that as well. As we got involved with that, of course, we were looking at fuels at the same time. We started dialogs with different oil companies talking about where there are areas that the science that we can bring might benefit the biofuels industry of the future, and as we had those dialogs we recognized that in different places of the world, Brazil being in the lead, the U.S. probably is second to only Brazil in terms of its commitment to biofuels and ethanol as a biofuel. Other places of the world have yet to make those kinds of decision and those kinds of conversions, the European Union being one of those, and the questions were, are there things that we could do with our science in the biofuel area that would bring value and provide more flexibility and more options. Butanol is clearly one of those molecules. It is an alcohol. It is very similar to ethanol, four carbons, not two carbons. It has lower volatility. It is more dense, has higher energy content.

Mr. SCHWARZ. That would have been my question. Does it have a higher energy content, and the answer apparently is yes.

Mr. FREY. Yes, on a per-gallon basis. Blended with fuels, particularly blended with—one of the surprises as we looked at this is, if you blend butanol with ethanol-gasoline blends, it tends to reduce some of the problems that ethanol blends create, so we have looked at it in markets where there is ethanol. Butanol is another option to help in markets where there is a decision that needs to be made as to what fuel would be the fuel of choice from a biofuel perspective. Butanol is clearly a competitor for that decision.

Mr. SCHWARZ. It would not be unfair then to say we are really—the whole business of biofuels is in its nascence right now and we know about ethanol. We have known about it for a long time. You are working your way up the chain, and it looks like some of the ones up higher on the chain might have equal value as well and you are working with butanol.

Mr. FREY. Yes, because we think we can bring our science to help to make that cost-competitive. As we have all said here, cost-competitiveness is the real key to any of these really having that biofuel be an option of choice and we do not view it as some have said it as if it is competitive with ethanol. These are complementary. They provide very flexibility. We think that to achieve the kinds of percentages of incorporation that people are talking about in fuel blends, you are going to need more than just one biofuel in order to make that successful.

Mr. SCHWARZ. Thank you, sir. Thank you, Mr. Chairman.

Mr. GUTKNECHT. The chair would just state that he is not alone in his skepticism about how long it is going to take us to convert to a hydrogen-powered vehicle fleet here in the United States. I think we are a ways away from that, but that is an editorial point of view. I will now recognize the gentle lady from South Dakota, Ms. Herseth.

Ms. HERSETH. Thank you, Mr. Chairman. I want to thank the ranking member for his leadership on this issue for so many years. I want to thank each of you. Dr. Stanek, nice to see you again, and Mr. Dinneen, and nice to hear from Mr. Frey and Mr. Passmore. Let me start with you, if I might. Mr. Passmore, what cellulosic feedstocks do you think are most promising?

Mr. PASSMORE. Well, we are starting with agricultural residues because that is what is available. I mean, farmers aren't going to go out and start growing dedicated perennial grasses on spec so fundamentally we are starting with wheat and barley straw because baling technology is available to bale that material. We very quickly go into corn stover because there is several hundred thousand tons of corn stover available, and then get into dedicated perennial grasses like switchgrass.

Ms. HERSETH. And what hurdles do you think are remaining? In other words, for example, tell me how important it is to you that the Department of Energy move forward in some of what we passed in the Energy Policy Act of last summer like the loan guarantee program? How important is that to your long-term plans?

Mr. PASSMORE. Well, that is absolutely essential. As I was indicating in my testimony, the problem with the commercialization of emerging technologies, and again, this is not unique to cellulose ethanol, the problem associated with commercialization of emerging technologies is that you can't raise conventional project finance debt unless that debt is guaranteed by a strong credit rating such as the Government. Now, governments obviously want to protect themselves and make sure they are making prudent decisions and so you want to set up a loan guarantee program that is smart and makes sure that taxpayers' money is being well allocated, but a lot of people ask us that question. They say well, you have got Shell as a partner, why don't they just build the plant and Shell has amazing demands on its capital and they need to make the same type of competitive returns on that capital that they can make on any other investment, and so they are prepared to put in the equity and the debt will only come to the table when you can guarantee a strong credit rating. So we need the DOE, we need the legislation that was passed in 2005 to move forward ASAP.

Ms. HERSETH. I agree with you, and not only on that issue in terms of the loan guarantee program but also the question that Mr. Peterson posed to Mr. Dinneen, I don't think we are doing enough yet and I think even this most recent round in the appropriations process. I mean, with a lot of us on this committee on both sides of the aisle supporting the Energy Policy Act because it has the renewable fuels standard which the RFA helped promote for a number of years to finally get it enacted. We also supported making these significant investments in research and yet we are continuing to not fully fund them, and the longer we wait, the more we run the risk that other countries are going to get ahead of us on this technology. So Mr. Dinneen, let me ask you, because of the predominance of corn ethanol in the current renewable fuels supply, do you see a need for separate incentives, say, for biodiesel whether that is reconciling how far out we extend the tax credits or a separate renewable fuels standard for biodiesel, and what are your thoughts on a carve-out for cellulosic ethanol within a more aggres-

sive renewable fuels standard, and do you have any thoughts on biobutanol?

Mr. DINNEEN. OK. There are about four to five questions there. Biodiesel already has a tax incentive and clearly I think extending that incentive and the incentives for renewable fuels generally makes a great deal of sense. Congressman Pomeroy, Congressman Hulshof have introduced legislation to do that and we certainly support that. I think in terms of a separate carve-out for a renewable diesel standard separate and distinct from the renewable fuel standard. If it would be possible to do that, that would certainly simplify the implementation of this program and would make some sense as well and perhaps create an important market opportunity for biodiesel that does not exist today because the RFS is being not just met but exceeded with ethanol alone, so I think that would indeed be extraordinarily important also.

Your comments about appropriations are absolutely true. We need to be doing more in terms of appropriating money for research. I would note that the House appropriation for EPA also eliminated funding for EPA's implementation of the RFS, presumably because they didn't think the agency needed money for that but the agency believes that it does and I think that was a mistake. I believe the Senate is trying to restore some of that funding and I hope in conference that occurs because implementation of the renewable fuel standard is going to be extraordinarily important to the future growth of the industry.

Ms. HERSETH. Thank you. My time is almost up. Let me just post a quick question to Dr. Stanek. There were a few questions here about hydrogen technology but has GM considered—what other steps are you taking in the direction of more efficiencies either through manufacturing a flex fuel hybrid or a flex fuel plug-in hybrid? Is that also on the radar screen of our manufacturers?

Ms. STANEK. Because of the size of the company, obviously we look into everything so everything is being evaluated. In particular, we are very focused right now on expanding flex fuel technologies. We have a lot of focus on improving internal combustion engines. With our new Tahoe, we have a 20 percent savings in fuel economy, and in fact, of all the auto makers, we have more models that get over 30 miles per gallon than anyone else. So we have a lot of—we will call it a lot of muscle and emphasis behind trying to get our internal combustion engines improved. We have active fuel management. It is going on several of our vehicles right now, and to just not to get into too much technical conversation but essentially when you are driving down the highway on eight cylinders, it will go down to four. So we have a lot of things covering the whole landscape that we are looking into. In particular with flex fuel, right now you can purchase an Impala that has both active fuel management and flex fuel, so we are looking at interesting combinations. Without giving you the specifics of what we are working on, but right now you can get them right now and you will see more in the future.

Ms. HERSETH. A final comment. I just signed a lease for an E-85 Impala.

Ms. STANEK. Thank you very much. Congratulations on your Impala.

Ms. HERSETH. Thank you.

The CHAIRMAN [presiding]. I thank the gentlewoman. The gentleman from California is recognized for 5 minutes.

Mr. BACA. Thank you very much, Mr. Chairman. The question is for Dr. Stanek. What are some of the challenges since we just talked about the E-85, what are some of the challenges you see for the E-85 in California, which is question No. 1. And then you can follow up, are there a lot of conflicting reports there about whether or not you can use E-85 in warmer climate like California, and what is your understanding of this issue if there is a challenge or a problem there?

Ms. STANEK. Well, first of all, I want to say that we are in California quite a bit and your agencies have very good leadership. We work with all the folks at CARB and all the other agencies and they have been working very hard to get E-85 to California. There are some specific challenges that we are working on, not only with your EPA in California but also at the Federal level with stage 2 recovery and dispensing. As you know, most of the auto makers have had onboard vapor recovery for a long time now and that means that you are not having problems with some of the gaseous fuel, and what is happening now is in the retail market in California, there is a rule that you have to have stage 2, and that requires kind of breaking it down at the bottom line for retailer, a pretty significant investment because it is sort of testing and certification and it can run into the hundreds of thousands of dollars.

Mr. BACA. But that is where the opposition then would come then from retailers because of the high cost for them?

Ms. STANEK. Well, one of the opposition areas. In mean, in particular if it is going to cost that much, that requires someone to help fund it because if they are small, they are just not going to take that on with what they believe is a fuel that has to be proven, OK, just—

Mr. BACA. And yet produces clean air though, right?

Ms. STANEK. Oh, the emissions and even the VAP tailpipe, they are fantastic on—

Mr. BACA. Because we have the highest form of smog in our area in the Inland Empire because we get it all from the L.A. area. It is the mountains and basins in the Inland Empire, both San Bernardino and Riverside counties.

Ms. STANEK. The environmental improvements are really why we need to keep pursuing this but I just want you to know, Dean Simeroth and others were all active on this and we are trying to make this happen. We have an enormous amount of California registrations of flex fuel owners. It is a very important market to us. We are not letting up, so we will be there. We will work with everyone, both private investors, the agencies, both State and Federal, and we have our dealers ready on point to get engaged in this so we are going to hope to see E-85 retailed by the end of the year in California.

Mr. BACA. What incentives can be created to help in this endeavor?

Ms. STANEK. I think the incentives are very similar to some of the things we have seen in other States. I don't know how it is done because California funding is a little bit different than others

but we have seen in States where there is anywhere from \$300,000 to \$500,000 set aside for infrastructure by the State that we can begin to move things pretty quickly. We also have to make sure that permitting can be done in a reasonable time frame and that—

Mr. BACA. So that means the State then has to approve it in their budget?

Ms. STANEK. Right.

Mr. BACA. They just voted for the budget yesterday or the day before. We should have had that in there.

Ms. STANEK. Yes, I know, because then you lose another cycle. And then there is also the permitting process must be expedient in all States. We have to be able to move fuel by rail, by barge, by truck without having ethanol producers and we will call it the folks involved in all the movement of the goods kind of burdened with that, and it must be affordable. Certification is a very expensive process and often a distraction, so we also need to make sure that automakers like ourselves once the fuel is in will market to those stations so the station provider feels that they will get enough volume, and so that is what we are committing ourselves to do is assuming it goes in, whether through private or governmental funding, or through sort of a consortia approach which we are trying to work on, that we will make sure that all these registrants in your State will go to those stations.

Mr. BACA. Thank you. Mr. Dinneen, can you tell us why E-85 is selling at a price below the regular gasoline in some markets and well above in others?

Mr. DINNEEN. It depends on what marketing agreements they have. In many areas again if the E-85 marketer has secured a contract with an ethanol producer on a long-term basis, he likely has a very competitive price and is able to price the fuel accordingly. If for whatever reason the gasoline marketer did not secure a long-term contract and has to go to the spot market, there is just not that much out there and he is going to be paying a much higher price. There are also situations today where ethanol marketers, ethanol producers are marketing E-85 directly. That is as a result of tax changes that occurred in late 2004 that made the ethanol tax incentive program far more flexible, and in those cases, you have got a number of ethanol producers that have committed to selling ethanol as E-85 in markets at a significant discount to gasoline. That occurs throughout the State of Minnesota where there is a great deal of competition and interest in E-85 and you have producers that are aggressively pursuing that market for its future opportunity. In South Dakota there is a real leader in the industry, Verisun, who has been marketing VE-85 as a branded product and they are also committed to developing that market and are pricing it accordingly, but if you are a gasoline marketer in an area where there is not a great deal of E-85 sold, in this marketplace, for example, I have got my GM Avalanche, a terrific vehicle, E-85 fueled. I drove here to this hearing today in it, but when I have got to go to the only E-85 station in this metropolitan area, the Citgo station right by the Pentagon where there is no competition, where the marketer hasn't engaged in a long-term contract, the E-85 is priced typically more than gasoline and it is usually priced 40 or

50 cents below gasoline, so it is a personal frustration but it doesn't reflect the way most E-85 is sold across the country.

Mr. BACA. Thank you. I know that my time has run out. If I may ask one final question. How much is ethanol selling for at a wholesale level and what is the average cost of producing ethanol?

Mr. DINNEEN. Well, Tom Dorr indicated earlier that the average price of ethanol is probably about \$1.09 in terms of production costs, and then there is shipping costs on top of that. At the wholesale price again, ethanol is sold under long-term contracts typically in relation to gasoline but usually far below that of gasoline. There are spot market prices out there today that suggest a price of \$4 or \$5 in the New York Harbor but those typically reflect refiner-to-refiner sales of product because one refiner may not have secured all the ethanol he needs, another refiner may have more, and those are the type of sales that are going on. Sometimes they are done on exchange. But by and large, most ethanol today is being sold far below the price of gasoline and is providing a significant savings for gasoline marketers and consumers.

Mr. BACA. How much would the consumer then actually pay because I know that in California, they are really outraged in terms of our gas prices, and we are higher than almost every other State in terms of our costs. What would be the average cost?

Mr. DINNEEN. Well, there are all kinds of reasons why California's gasoline prices are typically much higher than the rest of the country but generally ethanol-blended gasolines will be lower in price. The Consumer Federation of America—

Mr. BACA. How much? Can you give an estimate, because the consumer always wants to know how much.

The CHAIRMAN. And you need to bring it to a close.

Mr. BACA. Yes. Thank you very much, Mr. Chairman.

Mr. DINNEEN. The Consumer Federation of America did a study a year ago suggesting that consumers would save about 8 cents a gallon on gasoline if it was blended with ethanol. Now, that was a year ago. It was a picture in time. It is a little bit hard to transfer that in today's marketplace but generally ethanol blended gasolines are always going to be less expensive than non-blended gasolines.

Mr. BACA. But we don't know the price other than 8 cents less?

Mr. DINNEEN. It depends on the market.

Mr. BACA. OK. Thank you.

The CHAIRMAN. I thank the gentleman. Let me follow up on that line of questioning that Mr. Baca has pursued. Unlike Congresswoman Herseth, who has been able to lease an E-85 vehicle, I looked into this. The first question I had was, are they sold in the area of southwest Virginia, not very much, No. 1. Number 2, the reason of course is, as Bob Dinneen has pointed out, I went online to see what kind of stations were providing E-85 gasoline in my area. There is not a single one in a 100-mile radius of Roanoke, Virginia, and if you do a 200-mile radius, which encompasses this area, then you are going to find in the entire region, the mid-Atlantic region of the country, maybe 20 stations, so it seems to me that this is very much tied to the production and the distribution, and I guess my question for you, Bob, is, do you believe that there is the ability to be cost-effective and ship these great distances when

you are competing with people who are shipping oil through pipelines? Roanoke is near a major storage and storage distribution facility. We enjoy very low comparatively gasoline prices but I just wonder whether you can compete with that at great distances or do we have to see a lot of regionalized, localized production of ethanol and other alternative fuels to be competitive in an area like mine?

Mr. DINNEEN. Well, Mr. Chairman, I do think that you are going to see more localized production of ethanol as the industry continues to grow but let me bifurcate your question. Ethanol today is a blend component in gasoline. As such, it is blended virtually coast to coast and border to border. Forty percent of the Nation's fuel today is blended with ethanol. There is indeed ethanol in Roanoke, in Norfolk, in Washington, in Baltimore and in the Northeast and it is shipped via what I have referred to as a virtual pipeline through rail and barge, some truck, but we are able to get ethanol from the Midwest where it is produced to any market in the country very effectively, very economically via the rail lines and we are doing it today. Now, ethanol ultimately will become a fuel as E-85. That infrastructure will develop. It will develop as there are more vehicles on the road. It will develop as there is more ethanol available, and the infrastructure will continue to grow as well. We don't have E-85 available in Roanoke today but there is ethanol there now and the fact that there is ethanol there now, there may be a gasoline marketer that will see the opportunity with the tremendous commitment that GM and the other automakers have made to those flexible fueled vehicles and I think the infrastructure will follow the market.

The CHAIRMAN. Very good. Let me ask Dr. Stanek a related question. One of the issues that we deal with, with trying to compare E-85 vehicles with gasoline-powered vehicles is that the mileage tends to be better with the gasoline-powered vehicles but I am told that isn't necessarily something that is a given, that research could be done and new engines developed that burn the E-85 ethanol product more efficiently, and I wonder if you might comment on that. Is such research going on, and is there the possibility of improving the mileage for E-85 vehicles?

Ms. STANEK. Well, first I want to answer a couple questions. I think you need to know, we are in talks with the great State of Virginia with regard to E-85 partnerships so Roanoke may not be such a desert of E-85, OK?

The CHAIRMAN. Bring them on.

Ms. STANEK. So just so you know, we have a good group, the Governor's staff we are working with. With regard to engine and engine development, Saab biopower of course has received a lot of rave reviews around the world because it is flex fuel and it does not lose as much energy as some of the other flex fuel products. It is because it is turbo charged. Turbo charging does kind of give you back a little bit more energy because it boosts it. There is still a reduction there. Now, the question becomes, is there technology where you can wipe this issue out and it becomes zero sum. That is very much down the road. It would not be truthful to say that this is something that is imminent. However, these types of technologies where we can boost the fuel, reduce the range loss are

definitely being studied and explored. Turbo charging is one method. There is other ways that can be achieved. It will require university work. It will require important labs to get on it, not just the automakers. So it is going to require again a consortia approach for that improvement.

The CHAIRMAN. Mr. Passmore, what has been the learning curve on your operation of your demonstration plant? How much maintenance is involved with that plant? How replicable do you think it is? Will we see a lot of them in the near future?

Mr. PASSMORE. Well, there is a number of steps we have gone through over the course of the last 25 years. I mean, we started off with fundamental research in test tubes and then went to applied research, bench testing and beakers, and then we did two \$7 million pilots, one in the 1980s and one in the 1990s, kind of in 500-liter tanks, batch process, and what we have now and what you see pictures of in my testimony is kind of step 4, which we consider to be the last step before going full scale commercial and that is the demonstration plant, so instead of 500-gallon tanks batch process, you are looking at 50,000-gallon tanks and it is a continuous process, and the purpose of a demonstration plant is to do exactly what the nature of your question is, which is to teach us what works and what doesn't and what is scalable and what isn't. We have learned a lot as a result of the demonstration plant and we have had to make some changes in it as a result of saying well, this is great for a million-gallon-a-year plant but we want to build something a lot larger than that so we have to make some adjustments. We are at the stage now where we have made those adjustments, and when we build the plant in Idaho, the idea is, it will be a modular plant and it would have replicability across America, absolutely, probably in larger plants the one we would build in southeast Idaho is a size that is responding to a DOE solicitation right now of about 22 million gallons a year but that would then be able to be replicated, two times, four times, six times.

The CHAIRMAN. Very good. Well, as you hear all these buzzers going off, that is an indication that we have some votes on the floor and I think all the members of the committee who have desired to do asked questions. Let me end by apologizing for missing your testimony but I can tell you that just hearing a part of the questions asked, this has been a great panel, and I really appreciate your participation here today. We are going to pursue this issue very aggressively as we move towards writing the next farm bill. There are a lot of issues related to that including jurisdictional issues with other committees and so on but we think this is a great future in American agriculture and we will be staying in touch with you. Please stay in touch with us as well and we will look forward to hearing of greater progress as we move forward.

Without objection, the record of today's hearing will remain open for 10 days to receive additional material and supplementary written responses from witnesses to any question posed by a member of the panel. The hearing of the House committee on Agriculture is adjourned.

[Whereupon, at 2:10 p.m., the committee was adjourned.]

[Material submitted for inclusion in the record follows:]



Renewable Fuels Association

**Committee on Agriculture
U.S. House of Representatives**

Hearing on

Review of the Renewable Fuels Market

Testimony of

**Bob Dinneen
President
Renewable Fuels Association**

June 29, 2006

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

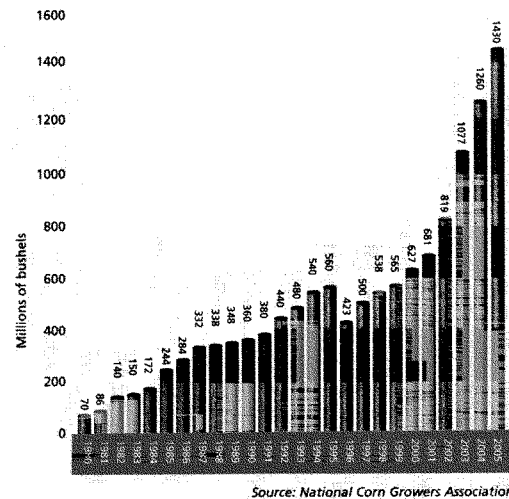
This is an important and timely hearing, and I am pleased to be here to discuss the unprecedented growth in the domestic ethanol industry, and the attendant economic, energy and environmental benefits resulting from that growth. Ethanol today is the single most important value-added market for farmers. The rapidly increased demand for grain used in ethanol processing has increased farm income, created jobs in the agricultural sector, and revitalized numerous rural communities where ethanol biorefineries have been located.

Background

Today's ethanol industry consists of 101 biorefineries located in 19 different states with the capacity to process more than 1.7 billion bushels of grain into nearly 4.8 billion gallons of high octane, clean burning motor fuel and 9 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 a ubiquitous component of the U.S. motor fuel market. Today, ethanol is blended in more than 40% of the nation's fuel, and is sold virtually from coast to coast and border to border.

Corn Utilized in Ethanol Production



Source: National Corn Growers Association

In 2005, the U.S. ethanol industry consumed more than 1.4 billion bushels of corn in the production of 4 billion gallons of ethanol. That represents approximately 12% of last year's 11 billion bushel crop. The industry also used 55 million bushels of sorghum, or about 14% of that crop. Finally, ethanol is produced from a variety of agricultural waste products, including cheese whey, beer and beverage waste.

The 4 billion gallons of ethanol produced and sold in the U.S. last year contributed significantly to the nation's economic, environmental and energy security. According to an analysis completed for the RFA¹, the 4 billion gallons of ethanol produced in 2005 resulted in the following impacts:

- Added \$32 Billion to gross output;
- Created 153,725 jobs in all sectors of the economy;
- Increased economic activity and new jobs from ethanol increased household income by \$5.7 Billion, money that flows directly into consumers' pockets;
- Contributed \$1.9 Billion of tax revenue for the Federal government and \$1.6 Billion for State and Local governments; and,
- Reduced oil imports by 170 million barrels of oil, valued at \$8.7 Billion.

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

In addition, because the crops used in the production of ethanol absorb carbon dioxide, the 4 billion gallons of ethanol produced in 2005 reduced greenhouse gas emissions by nearly 8 million tons.² That's the equivalent of taking well over a million vehicles off the road.

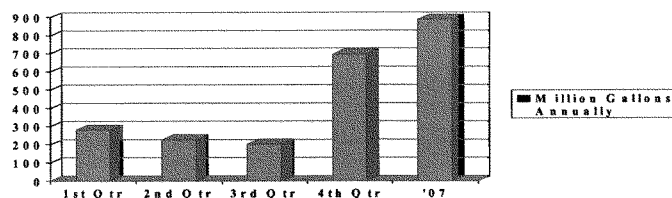
As the industry has grown, it has also changed. Today, the single largest ethanol producer, taken as a whole, is the farmer-owned ethanol plant.

Energy Policy Act Has Stimulated Significant New Ethanol Production

Mr. Chairman, in large part because of the Energy Policy Act of 2005 (EPAct), the U.S. ethanol industry is today the fastest growing energy resource in the world. As you know, EPAct included an historic new direction for U.S. energy policy, requiring refiners to utilize an increasing percentage of renewable fuels. The Renewable Fuels Standard (RFS) began in January and requires refiners to utilize at least 4 billion gallons of ethanol and/or biodiesel this year. The RFS gradually increases to at least 7.5 billion gallons of renewable fuels by 2012. The RFS has been a clarion call to the ethanol industry and the financial community that demand for ethanol and biodiesel was no longer uncertain, allowing the renewable fuels industry to grow with confidence.

Indeed, there are currently 41 plants under construction or expansion. Twenty-seven of those have broken ground just since last August when President Bush signed EPAct into law. The industry expects more than 2.2 billion gallons of new production capacity to be in operation within the next 12 to 18 months. The following is our best estimate of when this new production will come on stream.

Projected Ethanol Production Capacity



This preceding chart reflects the plants and expansions brought on line so far this year, representing more than 500 million gallons of production capacity; and another 16 plants and 2 expansions that will be completed before the end of the year, adding about 900 million gallons more. This new 1.4 billion gallons of new capacity represents a 32% increase in production, a phenomenal rate of growth, particularly when viewed in light of the 20-plus percent growth the industry has already achieved in each of the past several years.

² Argonne National Laboratory, U.S. Department of Energy, GREET Model, February, 2006.

Rapidly Increasing Demand

While ethanol supply is growing exponentially, ethanol demand is increasing as well. Indeed, ethanol demand in 2006 is significantly higher than that required by EPA³. The reason for that is refiners chose to eliminate the use of MTBE in many of the reformulated gasoline areas where it had not already been removed.³ Those areas include the Mid-Atlantic, New England and Texas. The Energy Information Administration estimated about 130,000 barrels per day of ethanol was needed to replace MTBE in those areas.

The transition from MTBE to ethanol in these areas is now largely complete. Increased demand for ethanol was met by building stocks, increasing production capacity and incremental imports. The transition clearly presented logistical challenges, but the marketplace responded and assured success. The ethanol industry, refiners and gasoline marketers worked collaboratively to meet the challenge of MTBE replacement.

The fuel distribution network also played a role in the successful transition. 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.

New Technologies

The only thing more astonishing than the growth in the ethanol industry is the technological revolution happening at every biorefinery and every ethanol construction site across the country. Plants today are using such innovations as no-heat fermentation, corn fractionization and corn oil extraction. With today's natural gas prices, plants are also looking toward new energy sources, including methane digesters and biomass gasification. In short, the ethanol industry is unrecognizable from what it was just five years ago, and it will be unrecognizable again five years from now.

To continue this technological revolution, however, continued government support will be critically important. DOE's biomass and biorefinery systems research and development program has been essential to developing new technologies. Competitively awarded grants provided by this program have played a very important role in developing new technology.

Recently, DOE informed the renewable fuels industry that it was canceling research contracts. Many of the grants provide technologically promising projects that would help move the industry forward. The RFA encourages Congress to continue to provide additional funds for competitive solicitations.

³ It is important to note that no provision of the Energy Policy Act or the Clean Air Act requires refiners to eliminate MTBE, nor are they required to use ethanol. This is a decision refiners are making because replacing MTBE with ethanol is the most cost-effective means of meeting Clean Air Act standards while maintaining the octane and performance consumers expect.

New Feedstocks

To date, the ethanol industry has grown almost exclusively from grain processing. In the future, ethanol will be produced from other feedstocks, such as cellulose. Cellulose is the main component of plant cell walls and is the most common organic compound on earth. However, it is more difficult to break down cellulose and convert it into usable sugars for ethanol. Yet, making ethanol from cellulose dramatically expands the types and amount of available material for ethanol production. This includes many materials now regarded as wastes requiring disposal, as well as corn stalks, rice straw and wood chips or "energy crops" of fast-growing trees and grasses. Cellulosic ethanol production will augment, not replace, grain-based ethanol, but ultimately exponentially expand potential 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 they all have cellulose already coming into the plant. If they can process that material into ethanol, they will have a significant marketplace advantage.

Many companies are working to commercialize cellulosic ethanol. Iogen, Inc., a Canadian enzyme company, has been producing cellulosic ethanol from wheat straw since 2004 at a one million gallon plant in Ontario. The company is planning to begin construction of a commercial facility in the U.S. during the summer of 2007. Abengoa Bioenergy Corp., which operates four biorefineries in the U.S. today, has begun construction of a grain and cellulose ethanol plant in Spain. The company plans to bring that technology to the U.S. as soon as the technology is proven successful. Numerous other companies are moving toward commercialization and I am confident cellulosic ethanol will be a reality quite soon.

New Markets

Ethanol today is largely a blend component with gasoline, adding octane, displacing toxics and helping refiners to 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 such as E-85 and ethanol fuel cells.

Today there are approximately 5 million flexible fuel vehicles (FFVs) on the road capable of using E-85, a mix of 85% ethanol and 15% gasoline. There are about 600 E-85 refueling stations across the country. Frankly, we can and must do better.

Five million FFVs represent less than 2% of the total U.S. motor vehicle fleet. This year, the U.S. will purchase about 17 million vehicles. Approximately 800,000, or roughly 3% of those, will be FFVs. In contrast, more than 60% of the vehicles produced and sold in Brazil this year will be FFVs.

Clearly, U.S. auto manufacturers have made a significant commitment to FFV technology, and their commitment is increasing. Ford, General Motors and DaimlerChrysler have made significant strides in producing and promoting FFVs. But we can do better.

As FFV vehicles are commercialized, it is important to encourage the most efficient technologies. Some FFVs today experience a reduction in mileage when ethanol is used because of the difference in BTU content compared to gasoline. But that debit can be addressed. General Motors has introduced a turbo-charged SAAB that experiences NO reduction in fuel efficiency when ethanol is used. That's the kind of innovation the government should be rewarding in any program designed to encourage E-85 use.

Of course, FFVs will be wasted without a commensurate increase in E-85 fuel availability. Reforms of the ethanol tax incentive have made it much easier for ethanol producers to work with gasoline marketers directly to promote E-85. Ethanol producers such as Chippewa Valley Ethanol Company (CVEC) and VeraSun have moved aggressively to market E-85. As a result, there was more E-85 sold last year than ever,⁴ and sales continue to grow.

Still, convincing gasoline marketers to sell E-85 under their canopies remains a challenge. Today, only about 600 of the 170,000 gasoline stations nationwide sell E-85. That's not enough. Incentives to encourage gasoline marketers to invest in the necessary infrastructure may be necessary move this market forward.

In the final analysis, many things have to happen for E-85 to become a more consequential component of the U.S. motor fuel marketplace. There must be more vehicles. There must be more refueling pumps. And there must be more ethanol to supply this market, which likely means cellulosic ethanol capacity. But the need to develop meaningful alternatives to gasoline has never been more apparent. And we must invest now, or that future will never materialize.

Conclusion

In his State of the Union Address, President Bush acknowledged the nation "is addicted to oil" and pledged to greatly reduce our oil imports by increasing the production and use of domestic renewable fuels such as ethanol and biodiesel. The Energy Policy Act of 2005 clearly put this nation on a new path toward greater energy diversity and national security through the RFS. Additional and more focused research, targeted incentives for E-85 vehicles and refueling infrastructure, and the continued commitment of this Committee will make the President's vision of a more energy secure America a reality.

Thank you.

⁴ In Minnesota alone, the only state for which there is reliable data, approximately 8 million gallons of E-85 were sold in 2005. About 200 E-85 stations are located in Minnesota.



Testimony of Jeff Passmore, Executive Vice President
Iogen Corporation

before the
United States House of Representatives
Full Committee on Agriculture

Public Hearing
“Review of Agriculture’s Role in the Renewable Fuels Market”
Thursday, June 29, 2006
1300 Longworth House Office Building
Washington, DC

Good morning Mr. Chairman and Members of the Committee. Thank you for giving me the opportunity to appear before you on this important issue. My name is Jeff Passmore. I am Iogen’s Executive Vice President.

Iogen is the world leader in making ethanol from cellulose. Iogen also operates a commercial business in the manufacture of enzymes for use in the textile, pulp and paper, and livestock feed industries. We have 190 employees.

Today we are here to talk about Iogen’s interest in the commercialization of cellulose ethanol. Iogen has been active in this field since the late 1970’s and since that time, has committed more than \$175 million in technology and commercial development. Our partners include Shell and Goldman Sachs.

Iogen designed, built and operates the world’s only cellulose ethanol demonstration plant at a cost of \$40 million. This facility has been producing cellulose ethanol since April 2004. To ensure there is no confusion, all ethanol is essentially the same – no matter what the feedstock. What is unique about cellulose ethanol is that it is derived from the non-food residue portion of the crop. For example, in the case of cereal grains such as wheat, barley and rice, it is not the grain, but rather the straw, that is the feedstock for our process. The same is true for corn, where our process uses the cobs, stalks and leaves, commonly referred to as “corn stover.”

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There has been a lot of attention paid to cellulose ethanol over the past few months, not the least of which was the President's mention of new sources of ethanol in his most recent State of the Union address. My message for you today is this: Cellulose ethanol is ready to go.

Based on Iogen's experience with its demonstration facility, we are ready to break ground on a commercial-scale biorefinery in the summer of 2007, and plan to be supplying ethanol to commercial markets by 2009. After the first plant is built, we anticipate the development of a multi-plant, multi-billion-gallon industry.

So what is the size of this opportunity, and what will it mean for American Agriculture? Allow me to quote from an April 2005 DOE / USDA report – commonly referred to as the “billion ton study.”

“The purpose of this report is to determine whether the land resources of the United States are capable of producing a sustainable supply of biomass sufficient to displace 30% of the country's present petroleum consumption. (i.e. 60 billion gallons per year)... 1 billion dry tons of biomass feedstock per year. The short answer to the question ... is yes.” [U.S. Department of Agriculture and U.S. Department of Energy, “Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply” (2005): executive summary]

Let's translate that statement into terms that might mean more to an individual farmer. Iogen has identified Southeast Idaho as a prime candidate location for its first commercial plant. In this area we have signed contracts for the annual supply of 356,000 tons of barley and wheat straw from 320 growers in 14 counties. These contracts, which will pay an average delivered price of \$45 per ton, are structured to float with the world price of oil. Assuming \$50 per barrel oil, and a yield of 2 tons of straw per acre, a farmer will receive \$24 per acre for straw lying in the field. Some growers have chosen to generate additional income by being involved in the baling and trucking of the straw to the plant gate. The straw collection activity alone will plow millions of dollars into the community - not counting the revenue generated through permanent job creation and during the plant construction period.

This same story can be repeated in rural communities all across America (see maps). As the attached maps indicate, there is sufficient agricultural residue in rural America to support dozens of plants similar to or larger than the one we propose to build in Idaho.

So why don't we just build the plant? Fundamentally, it is because cellulose ethanol facilities have never been built at commercial scale before, and lenders do not provide project debt financing to technologies that are unproven at commercial scale unless that debt is guaranteed by a strong credit rating such as a government's.

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The U.S. Congress recognized this market failure in the Energy Policy Act of 2005 and put in place loan guarantee provisions for emerging technologies such as cellulose ethanol.

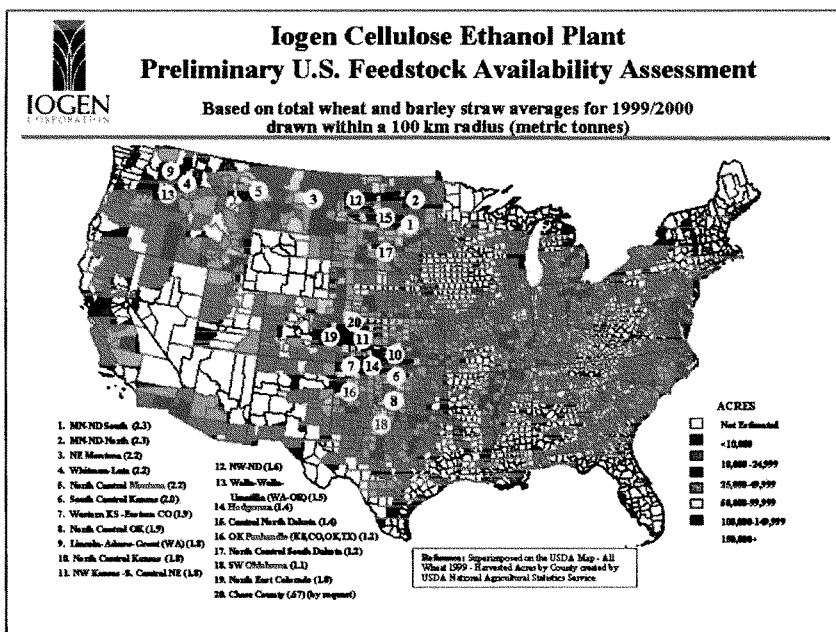
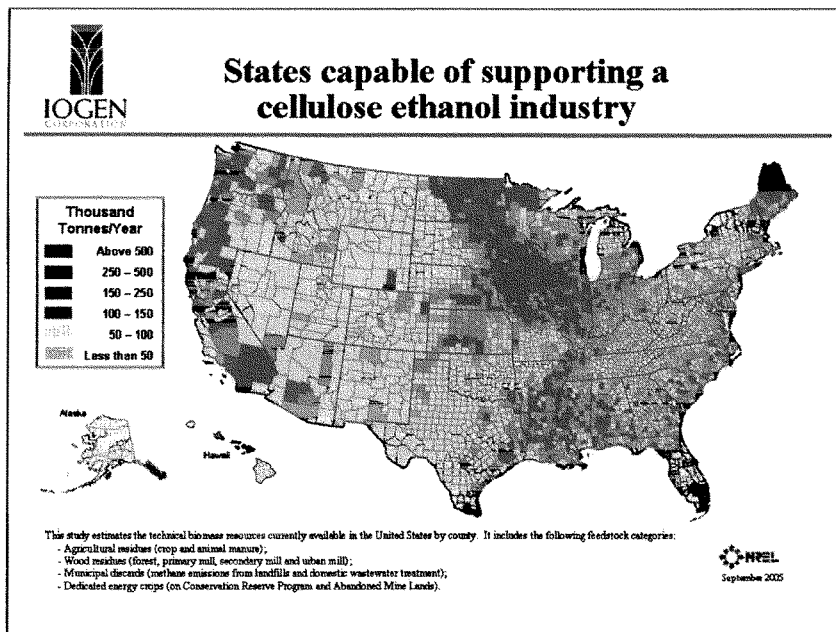
It is important that the Administration continue to push for implementation of this loan guarantee initiative as soon as possible because, as a domestically derived renewable biofuel, cellulose ethanol can help meet a number of important government policy objectives. These include:

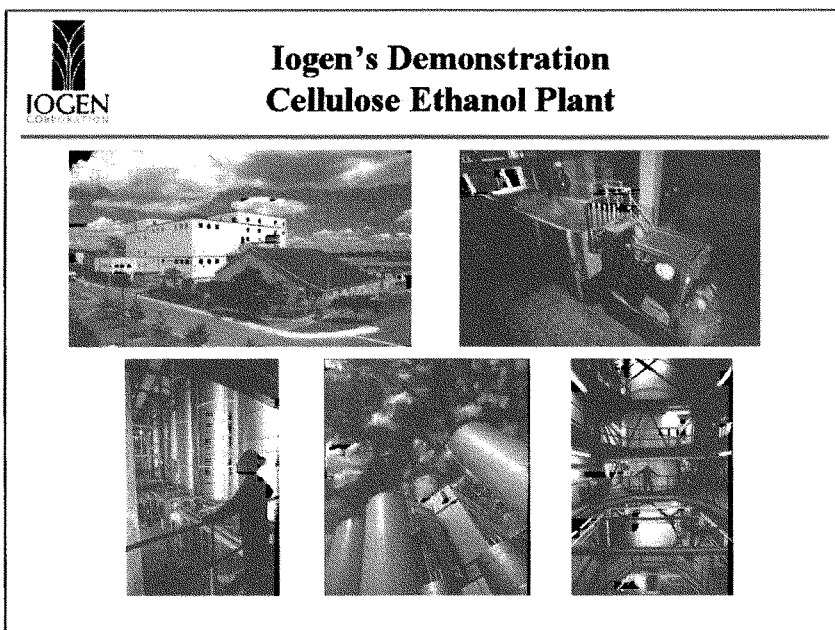
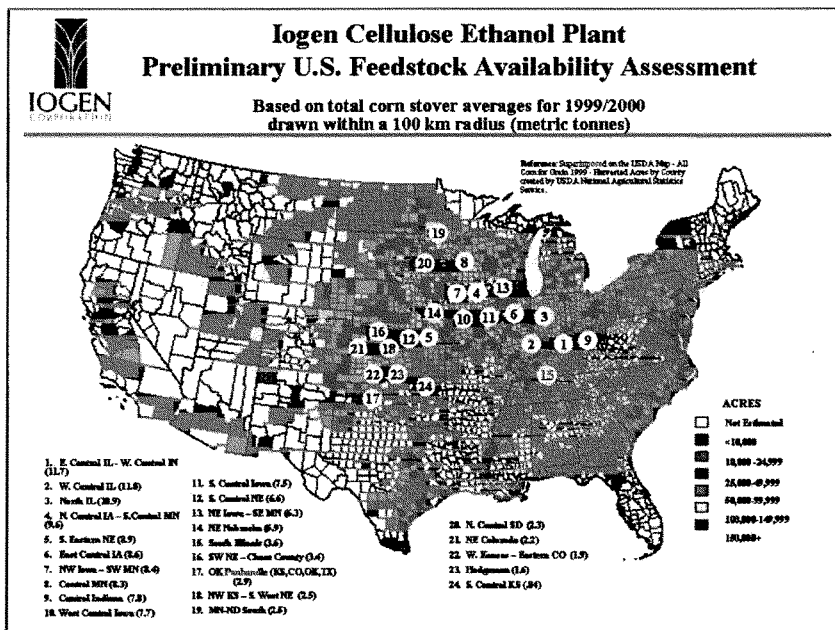
- reduced oil imports leading to improved energy and economic security
- new income and jobs for rural communities
- improved environmental protection and reduced greenhouse gas emissions.

The private sector has invested a considerable amount of money getting cellulose ethanol to the point of being "ready to go." That same private sector is now ready to invest significant equity into the commercialization of this exciting new form of ethanol. But because of the public policy goals cellulose ethanol commercialization helps achieve, the private sector wants to share the risk of technology commercialization with government.

Together, industry, government, and the American farmer, can get the job done. We can create new sources of income for agriculture, make America less dependant on imported fossil fuel from the Middle East, and help protect the environment.

Thank you. I look forward to your questions.





Dr. Mary Beth Stanek
Manager, General Motors Strategic Initiatives

Testimony before the U.S. House Agriculture Committee
Hearing on the Renewable Fuel Market
June 29, 2006

Mr. Chairman and Members of the committee, thank you for the opportunity to testify today on behalf of General Motors. I am Mary Beth Stanek, Manager of General Motors Strategic Initiatives, and I am leading several aspects of General Motors efforts to support renewable fuels through partnerships with groups around the country. I am also supporting our national Live Green Go Yellow marketing campaign for "Flex Fuel" vehicles capable of running on E85 ethanol.

This morning, I would like to cover several aspects of the renewable fuel market including the benefits of E85, our current model offerings, national and regional marketing efforts and our infrastructure partnership activities to-date.

We live in a period of unprecedented change in the automobile marketplace. Today, we are bringing to the marketplace a range of advanced vehicle technologies, like hybrids and active fuel management, that are increasing fuel efficiency, and diversifying our vehicle fuels away from petroleum. While we believe it is hydrogen fuel cell technology that will ultimately end our addiction to oil, that is a solution that will emerge in the next decade. Today, one of the best opportunities to significantly reduce the demand for oil in the transportation sector is to displace petroleum-based fuels with biofuels, particularly E85 ethanol.

We believe there are many benefits of using E85 including

- Ethanol being a renewable fuel
- Using E85 helps reduce greenhouse gas emissions
- Using E85 helps to reduce dependence on petroleum and helps to create greater diversity in our nation's energy supplies and sources
- Using E85 helps to reduce smog forming emissions
- Using E85 can help to support the domestic agriculture industry in the U.S. and support new job growth

Flex Fuel Vehicles

Because of the very successful CAFE credit program, there are currently over 5 million E85 flex fuel vehicles on the road. GM currently has over 2 million flex fuel vehicles registered in the United States. This year, we will sell over 400,000 flex fuel vehicles. If all of these vehicles were running on E85, we would offset the need for 3.6 billion gallons of gasoline per year.

General Motors produces a broad lineup of flex fuel offerings including the Chevrolet Tahoe, Suburban, Silverado, Avalanche, Impala, Monte Carlo and GMC Yukon, Yukon

XL and Sierra. General Motors recently announced the addition of several new models and products including: Chevrolet Uplander, Express, Pontiac Montanan SV6 for Canada, GMC Savana, Saturn Relay and Buick Terrazza increasing our model count from nine to seventeen.

25 x '25

General Motors believes that flex fuel vehicles and renewable fuels like ethanol are poised to drive a fundamental shift in the transportation energy sector. That's why we – along with Ford and DaimlerChrysler - have endorsed the vision of the "25 x'25" campaign. Particularly in the transportation sector we believe it is entirely possible to replace 25% of our oil consumption with renewable fuels by 2025. We are fully committed to playing our roll in making this happen with increase offerings of flex fuel vehicles.

But we can't reduce the nation's dependence on oil simply by having these vehicles on the road. We need the ethanol and the fueling network to make it available to consumers. We believe the country should aim to give most Americans reasonable access to E85. To us, this means having E85 pumps as at least 20% of stations nationwide. We think this could happen within the next few years.

Governors Ethanol Coalition

While General Motors is not in the fuel business, we believe we have a valuable role to play in developing E85 infrastructure by partnering with other stakeholders. For example, GM has partnered with the Governors' Ethanol Coalition to educate the public and promote the benefits of using ethanol. As part of this collaboration, GM has loaned E85 flex fuel vehicles to 28 states and organizations so that they may use them in their promotional activities. This partnership has been extended for 2006 and the loan of GM's 2007 E85 flex fuel vehicles is underway.

The member states include: Alabama, Arizona, Arkansas, Colorado, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Washington, Wisconsin and Wyoming. Puerto Rico is also a member.

Live Green, Go Yellow

In addition, General Motors launched the national "Live Green Go Yellow" advertising campaign at the 2006 Super Bowl XL. After the Super Bowl, the campaign continued during the 2006 Winter Olympics, and the campaign continues today. The unmatched visibility and viewership of these events offered a great opportunity for us to launch a major marketing and advertising campaign to promote ethanol and flex fuel vehicle technology that put a focus on key energy diversification issues, and helped us illustrate a core element to GM's overall vehicle strategy. Web traffic to our

Livegreengoyellow.com website has run in the millions as consumers investigate E85, GM flex fuel vehicles, and look for E85 stations in their area.

Yellow Caps and Badging

As a further part of our E85 outreach, we are equipping E85 capable Chevrolet and GMC cars and trucks with yellow fuel caps and exterior flex fuel badging. The yellow cap is a regular reminder that consumers have a fuel choice each time they fill up their tank. We think the yellow gas cap should become the industry standard, and have offered it at no charge to other auto makers. We are very pleased that Daimler Chrysler as announced it intends to join us in using the yellow gas cap as a symbol of flex fuel capability. And for our customers who already own a flex fuel vehicle, we will be implementing a program later this year to offer yellow gas caps and flex fuel badging for many of our older flex fuel models.

GM is also working on several regional and local marketing efforts in conjunction with the Live Green Go Yellow campaign. We have intensified efforts to help the public understand the benefits of E85, including enhanced labeling, dealer and consumer education, collaboration with state and federal ethanol initiatives, and continued support of industry events. We are currently working with Weekly Reader on a student education effort that will reach 9000 schools.

Partnerships

General Motors is also doing its part to address the shortage of E85 refueling infrastructure by partnering with ethanol producers and E85 marketers to increase the number of available refueling stations. Most recently, we announced that General Motors is partnering with Meijer, CleanFuelUSA, the State of Michigan and the State of Indiana to work towards approximately forty new retail outlets. We have previously announced similar partnerships in California with Chevron, Pacific Ethanol and the State of California; in Illinois with VeraSun, Gas City and an upcoming pilot with Shell; in Minnesota with VeraSun and Erickson Oil; and in the State of Texas with Kroger and Abengoa Bioenergy in 2006. In 2005, GM co-marketed fuel coupons and owner awareness in Sioux Falls, South Dakota. General Motors will be announcing two additional partnerships in July with more to come.

The key to our partnerships has been support from state governments, favorable pricing by ethanol suppliers and retailers and the development of continuous consumer marketing. GM supports these partnerships by promoting awareness among flex fuel owners, company drivers and prospective buyers – we know our customers with flex fuel vehicles and can help drive them to new E85 stations. As an example, in the North Central region GM is offering a \$1,000 fuel coupon with each new flex fuel purchase—supporting our flex fuel marketing effort and our E85 retail partners. This collaborative effort is important to help grow the E85 refueling infrastructure and to increase the availability of the fuel to more E85 flex fuel drivers

Ethanol Pricing

There is a great deal of discussion today regarding ethanol and gasoline blend pricing. We recognize that because of its value as a blending agent in gasoline, the current price of ethanol is at a record high. In many parts of the country, this has driven up the price of E85 to the point where drivers may not have an economic incentive to buy E85. However, we believe this is a temporary situation, created in large part by the rapid exit from the market of the gasoline additive MTBE.

Congressional incentives and market forces are causing ethanol capacity and supply to increase rapidly, which will in turn cause supply and demand to come more into balance. As shown in Attachment A, U.S. ethanol plants currently under construction will bring production to over 6 billion gallons next year. In addition, announced facilities not yet under construction are likely to increase that to over 10 billion gallons by 2010. When ethanol supplies exceed the demand from refiners for ethanol as a blending agent, we expect ethanol prices to fall and the availability of reasonably priced E85 to expand rapidly, with E85 sold at prices that make it equivalent or cheaper than gasoline on a cents-per-mile basis. This will spur the continued expansion of the market with more demand for E85, and more demand for flex fuel vehicles, more fuel diversity and consumer choice, and in the end, more displacement of petroleum.

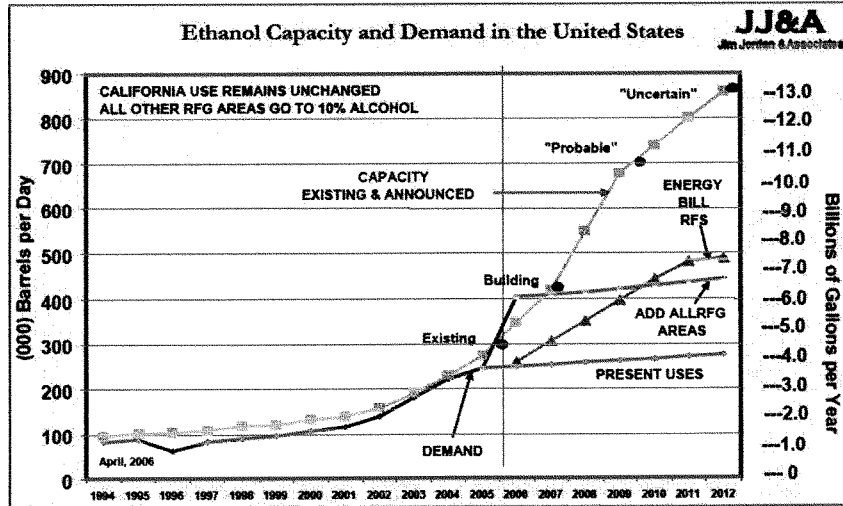
Conclusion

In summary, GM is working with to develop a host of advanced vehicle technologies and to diversify our energy supply with more alternative fuel choices. GM believes these actions can significantly reduce our dependence on oil, and has endorsed the 25 x'25 vision to replace imported oil with home grown renewable energy. GM is committed to expanding the availability of flex fuel vehicles and is working actively to bringing out a wider range of flex fuel vehicle choices.

GM recognizes that it has a role to play in expanding the E85 infrastructure and is partnering with ethanol producers and retailers across the country to bring more pumps on line. GM recognizes that the current price of ethanol represents a challenge to the growth of the E85 market, but believes that in the not too distant future, market forces will create more of a demand for E85 and flex fuel vehicles. We think this suggests a healthy future for the ethanol industry and more fuel diversity and choice for our customers.

Thank you.

Attachment A





The Fertilizer Institute

Nourish, Replenish, Grow

Written Testimony of

The Fertilizer Institute

Submitted to the

U.S. House Committee on Agriculture

Regarding

Review of Agriculture's Role in the Renewable Fuels Market

DESCRIPTION OF TESTIMONY

A description of the critical role played by the U.S. fertilizer industry in providing the nation's growing renewable fuels industry with an abundant corn crop for food and renewable fuels while protecting the environment from nutrient losses.

June 29, 2006

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Washington, DC 20002

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The following written testimony is being provided by The Fertilizer Institute, or TFI. TFI is the leading voice of the nation's fertilizer industry, representing the public policy, communication and statistical needs of producers, importers, wholesalers and retailers of fertilizer.

Fertilizers Role in Food and Fuel Production

Fertilizer – nitrogen, phosphate and potash - is essential to food and renewable fuels production. Without fertilizers' contribution to crop production, roughly one-third of the world's population would be without food. Because crop production depletes soil nutrient supplies annually, farmers rely on fertilizers to replenish the soil. With the help of commercial fertilizers, North American farmers are able to produce the most abundant and affordable food supply in the world and provide a necessary input for the manufacture of ethanol, the fastest growing renewable energy source in the world.

In the United States last year, nearly 13 percent of the corn crop was used for ethanol production, representing the third largest market for U.S. corn behind livestock feed and exports. Depending on the type of cropping system used, it typically takes 1.5 to 2 pounds of fertilizer nutrients to produce a bushel of corn. Last year, there were 11.1 billion bushels of corn produced. Of the estimated 9.5 million nutrient tons of fertilizer used to produce the 2005 corn crop, nearly 1.25 million nutrient tons were used to produce the corn used in ethanol production.

Ethanol and Farm Profitability

The Renewable Fuel Program of the Energy Policy Act of 2005 (EPACT) mandates renewable fuel use in gasoline to reach 7.5 billion gallons by calendar year 2012, nearly double the 2005 level. The Renewable Fuels Standard, as contained in EPACT, is set to have a significant impact on the U.S. economy by 2012 including \$70 billion in spending on goods and services required to produce 8 billion gallons of ethanol and biodiesel by 2012. Projected purchases of corn, grain sorghum, soybeans, corn stover, and wheat straw alone will total \$43 billion.

This program already is having a significant impact on domestic ethanol production, which is currently produced from corn. High energy prices also contribute to favorable returns for ethanol production, providing additional economic incentives for expansion of domestic ethanol production capacity. In the U.S. Department of Agriculture's (USDA) "Agricultural Baseline Projections to 2015," corn acreage rises significantly in the initial years of the projections reaching 85 million acres by 2011, as large domestic ethanol production from corn increases demand, potentially raising corn prices and net returns. In the longer run, increasing exports also underlie higher corn acreage.

According to USDA, ethanol production increases the price a farmer receives for corn by 25 to 50 cents per bushel, or as much as \$5.5 billion over the entire U.S. corn crop. Additionally, USDA estimates that ethanol production reduced farm program costs by \$3.2 billion in 2004 by increasing the demand and price of corn.

Fertilizer, Food, Feed and Renewable Fuels: The Path to Sustainability:

Soil, water, air and nutrients are essential for growing crops for food, livestock feed and fuel and the North American fertilizer industry has a strong history and long commitment of partnering with its farmer customers to ensure maximum crop yields while minimizing the impact fertilizer nutrients have on the environment. A report released recently by TFI demonstrates that U.S. farmers are using fertilizer nutrients with the greatest efficiency in history. The information shows that since 1980, U.S. corn production has increased 57.8 percent while farmers' use of nitrogen on corn is down 2 percent and use of phosphate and potash are down 24 percent and 26.8 percent, respectively.

Growing a more bountiful crop for food, feed and fuel use and protecting the environment go hand-in-hand. Our approach to managing nutrients is site-specific, providing farmers with a variety of science-based best management practices (BMPs) which stress the use of the right fertilizer product, applied at the right rate, at the right time and in the right place. Through the use of these BMPs, farmers are minimizing nutrient losses to the environment while maximizing crop production.

The proper management of nutrients is best accomplished with advice from a trained specialist. A strong network of 13,500 certified crop advisers, or CCA's, is working nationwide to help U.S. farmers develop customized nutrient management plans by assessing soils and environmental conditions on individual farms. CCA's are trusted professionals and a valued tool in assuring farm profitability and environmental sustainability. To achieve the CCA designation, individuals must pass two rigorous exams, submit credentials detailing their education, subscribe to a code of ethics and earn 40 hours of continuing education credit every two years.

Conclusion

U.S. agriculture is being called upon to produce food, feed and fuel. Meeting new demand for any one of these products need not impact farmers' ability to provide the others. As our nation moves toward energy independence through the production and use of renewable fuels, the fertilizer industry is committed to partnering with its farmer customers to meet ever growing demand for agricultural products, while minimizing nutrient losses to the environment.

Pomeroy

ethanol

YOUR OPINION

6-28-06 Forum A13

Corn producers left out of ethanol investments

This past year has been exciting for the North Dakota ethanol industry. New production capacity now stands at 300 million gallons, bringing total capacity to 335 million gallons per year, requiring 120 million bushels of corn. The new corn demand will change North Dakota from a corn-exporting state to a corn-importing state.

Many expect that North Dakota corn producers must be ecstatic about this development, but closer examination shows North Dakota corn farmers – the providers of the raw commodity – are far down the profit chain and have been virtually locked out of plant investment. Ethanol plant investors are the primary beneficiaries from new plants. Commodity producers, on the other hand, benefit the least.

Nationwide, an ethanol plant is expected to raise corn prices from 5 cents to 30 cents a bushel on the average. South Dakota's experience shows the recent explosion of growth in the South Dakota ethanol industry did benefit the South Dakota corn farmer, but not through increased prices. In 2004, South Dakota produced 400 million gallons of ethanol and grew 639 million bushels of corn. By 2006, South Dakota ethanol production grew to 600 million gallons and corn production fell

to 470 million bushels. In spite of the increased demand and reduced production, prices actually decreased.

South Dakota's saving grace is that 8,000 producers were able to invest in ethanol plants, and they realized the benefits of this investment. South Dakota's corn situation is similar to that of North Dakota.

A January study shows the ethanol industry in South Dakota adds \$1 billion per year in economic impact to the state. The biggest benefit to South Dakota corn growers comes from their investments – not from corn sales. According to a 2002 study, a farmer who invests \$20,000 in a 40-million-gallon-a-year ethanol plant can expect an average annual return on investment of 13.3 percent over a 10-year period. This rate of return was calculated on \$2.40 corn and \$1.16 ethanol.

Currently, corn in central North Dakota is \$1.85 and ethanol is \$3.50. The ethanol industry is doing extremely well, but the corn farmer will not enjoy those benefits unless they also own stock in the plant.

On a national basis, 39 percent of all ethanol produced is farmer-owned. In Minnesota, farmers own 66 percent of ethanol production and in South Dakota, 52 percent. In North Dakota, with only a few producer-investors in the plants at Richardson and

Hankinson, the percentage is near zero.

North Dakota Corn Growers have promoted ethanol legislation for ethanol production incentives and for E85 tax breaks, and investment incentives at the state level. We have advocated for similar incentives at the federal level. This was all done with the expectation that corn farmers would benefit from the value added to their raw commodity and that the industry would strengthen rural America.

Now that Wall Street and venture capitalists have discovered ethanol, there is some comfort in knowing more energy income is being earned in the United States rather than going to the Organization of Petroleum Exporting Countries. However, the best scenario for strengthening rural North Dakota – the original intent of policy makers – is slipping away.

The ethanol industry needs to change its present practice and allow corn producers to invest in these plants and sit on their boards of directors. It is in the best interest of the ethanol industry to develop a positive working relationship with the people who produce their input product and to help those producers remain economically viable.

Wesley Luthers, N.D., is president of the North Dakota Corn Growers Association.

Good morning Mr. Chairman and Members of the Committee. Thank you for inviting me to appear before you. My name is Richard Hamilton and I am here representing my company, Ceres, as well as the Biotechnology Industry Organization where I am a member of the Board of Directors. The Biotechnology Industry Organization, (BIO), believes in the future of biofuels from all sources. Our nation's cornfields, soybean fields, forest lands and future fields of switch grass and other crops will all combine to help make America less dependent on foreign sources of oil. America's farmers have long been masters of feeding our great nation, and for the past quarter century helped build the ethanol and soydiesel industries that have assisted the United States in reducing its need for foreign oil. But, as agriculture has always answered the call to feed a growing population, BIO believes agriculture is also the key to further reducing our foreign petroleum needs by utilizing and expanding current and future sources of renewable energy. Ceres is a plant genomics company which has taken the high-throughput technologies developed as part of the Human Genome Project and applied them to plants. We have several commercial interests, one of which is the development of dedicated energy crops such as switchgrass and Miscanthus to serve as cellulosic feedstocks that can be digested and fermented into biofuels such as ethanol and butanol.

As many of you already know most of the ethanol produced in the world today is produced from either sucrose or starch. However, most of the carbohydrate in a plant is in the form of cellulose and hemicellulose, which is found primarily in the leaves, stems, and stalks of plants. Because plants can generate much more cellulose per acre than starch or sucrose, cellulosic feedstocks have a much greater potential to make a significant contribution to our overall fuel supply. In fact if we could plant high yielding energy crops (15 ton/acre) on 34M acres of land (roughly the size of Oklahoma) we could generate the biofuel equivalent of 2.6 million barrels of oil per year, which in my example would make Oklahoma the third largest member of OPEC.

Turning Oklahoma into...			...a member of OPEC?!	
	Today	Tomorrow	Thousand barrels/day	
Farm acres	34 Million	34 Million	Saudi Arabia	9,400
Tons/acre	5	15	Iran	3,900
Gallons/ton	60	80		
Thousand barrels/day	656		Kuwait	2,600
			Venezuela	2,500
			UAE	2,500
			Nigeria	2,200
			Iraq	1,700
			Libya	1,650
			Algeria	1,380
			Indonesia	925
			Qatar	800

I am not seriously suggesting that we convert all 34M acres of Oklahoma cropland to energy crop production nor that Oklahoma become a member of OPEC; I simply use it as

an example to show that cellulosic biofuels can make a very sizable contribution to our fuel supply.

One barrier to this future has been the historical difficulty to break down or digest cellulose in an economically attractive way. Enzymes, or cellulases, which catalyze the breakdown of cellulose, have been isolated from several different organisms, including fungi. Historically, the purification of enzyme from these sources has been prohibitively expensive, on the order of \$5.50 per gallon of ethanol produced. Through research funded by the Department of Energy, genetic engineering or biotechnology has already played a key enabling role in the development of cellulosic biomass conversion technologies by dramatically reducing the cost of cellulase production from about \$5.50 per gallon of ethanol to \$0.10-15 per gallon of ethanol. Future biotechnology-based developments in cellulose processing technology will likely include:

- Improved cellulase and hemicellulase production economics via microbe or plant-based production systems
- Improved fermentation strains that efficiently utilize both hemicellulose (C5) and cellulosic (C6) sugars
- Consolidated bioprocessing microbes which combine the ability to break down cellulosic materials with the ability to efficiently ferment various sugars to ethanol and other biofuels.

To achieve the full potential of cellulosic biorefining technologies, improved feedstocks should be developed to maximize the amount of fuel that can be generated from each acre of land. While many people have suggested that agricultural residues and forest thinnings will be used to supply cellulosic biorefineries, I would like to suggest that high yield density energy crops, will in many geographies be a superior choice of feedstock.

What is Ceres doing to develop dedicated energy crops? We are taking technologies such as high-throughput DNA sequencing and microarray technologies that were developed for deciphering the human genome and applying them to plants. During the past eight years we have discovered and characterized more plant genes (over 70,000) than in the whole of human history. We are using this proprietary knowledge to develop energy crops in several ways:

- Marker-assisted breeding – the use of genomics to generate DNA markers associated with specific plant phenotypes;
- Precision-breeding – the use of recombinant DNA technology to reintroduce plant genes into a plant under different regulation;
- Transgenesis – the ability to transfer genes between plant species.

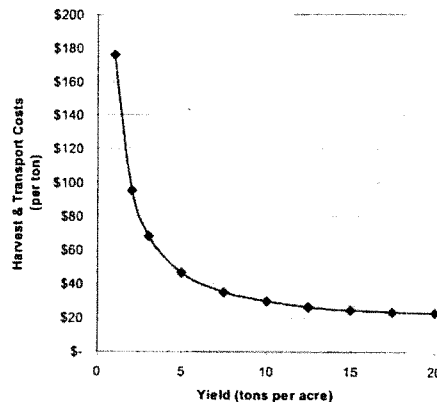
Recently, we entered into a long-term collaboration with the Noble Foundation of Ardmore, Oklahoma, the world's premier research institute for perennial grasses such as switchgrass. By combining our leading genomics capabilities with the Noble Foundation's breeding and agronomic expertise, we will significantly accelerate the development of high yielding, low input, optimized energy crops. Working together we

are currently field testing varieties of switchgrass in 12 different locations in 8 states. We are scaling up the production of some of our leading varieties and anticipate having our initial varieties ready for commercialization in the next few years as commercial scale cellulosic biorefineries become operational. We also have collaborations with the USDA for sequencing switchgrass genes and with the National Renewable Energy Labs for the compositional analysis of energy crops.

What kinds of traits are we developing to improve the characteristics of energy crops such as switchgrass? There are several important characteristics that will improve the economic competitiveness of energy crops as a feedstock for biofuel. However, if there is one thought I would like to communicate to you today it is the importance of yield density.

Yield Density

High biomass yield density (tons per acre) is the single most important characteristic a biofuel feedstock can have. Feedstock cost (at the refinery gate) is the single largest cost element in biofuel production and harvesting and transportation costs are the single largest component of feedstock cost. Imagine a 10,000 ton per day biorefinery using a 2 ton per acre agricultural residue as a feedstock. It would require a 5,000 acre per day "footprint" which would expand every day. The cost of transporting low density biomass to the biorefinery quickly becomes prohibitively expensive.



At Ceres we are using genomics to impact yield density by altering plant physiology, plant architecture, and photosynthetic efficiency. Preliminary results indicate that we can achieve biomass yield increases of >300 percent in some grass species, making the goal of a 15-20 ton per acre feedstock (compared to 4-7 tons currently) well within the realm of feasibility. This means that the radius of cropland needed to supply a cellulosic biofuel refinery could be reduced by as much as 90%.

Expanding Usable Acreage

Another important energy crop characteristic is its ability to grow on a wide variety of geographies. Expanding the amount of usable acreage by being able to grow energy crops on land that is too dry, or with poor soil characteristics, can increase the scale of biofuels production without competing for food production acres. At Ceres we are using genomics to develop drought, heat, cold and salt tolerant plants, as well as plants that can thrive on a variety of different soil conditions.



Drought tolerance



Heat tolerance

Low Agronomic Inputs

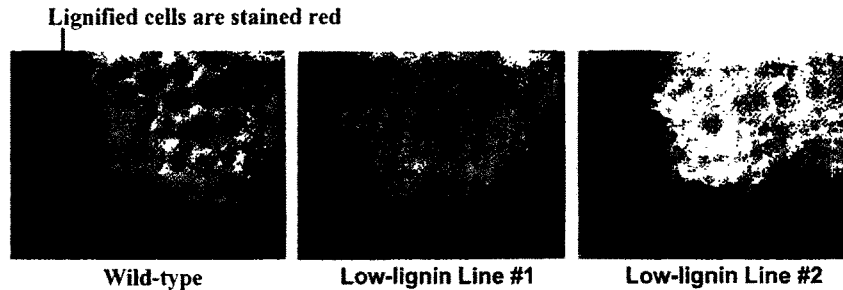
A third characteristic energy crops must have is low agronomic inputs. In order to increase the net energy per acre created, one must limit the energy inputs that go into growing a biomass crop. At Ceres we are developing traits which enable crops to take up and utilize nutrients more efficiently, thus enabling them to be grown with less fertilizer.

Improved Energy Content

Different plants vary in their relative content of cellulose and hemi-cellulose material. For the purpose of a biomass feedstock plant, a higher level of cellulose and hemi-cellulose content would give a greater fermentation yield or more gallons of biofuel per ton of biomass. Ceres is pursuing a variety of approaches to increase the carbohydrate content of various energy crop species.

Improved Processing Characteristics

The recalcitrance of cellulosic biomass to digestion and fermentation remains a significant obstacle to the large scale adoption of cellulosic biorefineries. Designing a feedstock plant with improved processing characteristics such as decreased lignin levels would result in an improvement in the overall economics for cellulosic biorefining. At Ceres we have already isolated every gene in the lignin biosynthesis pathway and are manipulating them to generate optimal processing characteristics.



How might public policy support the development of a domestic cellulosic biofuel industry?

I have a few suggestions:

1. Support programs for the construction of commercial cellulosic biorefineries. It is imperative that we get the first few commercial biorefineries built as quickly as possible so that we can begin riding the learning curve associated with operating them.
2. Establish pilot programs to encourage farmers to plant small acreages of energy crops so that the yield potential for various geographies can be established and biorefineries attracted to those geographies.
3. Consider extending programs like crop insurance and other farmer protection programs to dedicated energy crops.
4. Support programs at the USDA to establish agronomic best practices for the planting, harvesting and storage of dedicated energy crops.

In summary, high yielding energy crops have the potential to provide a significant fraction of our domestic transportation fuel supply while reducing carbon dioxide emissions, increasing farm income and stimulating rural economies. How quickly this future is realized will depend on federal policy that can either slow down or speed up our transition to a more secure energy future. This concludes my remarks, thank you for your time and attention.

Thank you for this opportunity to testify in connection with the role of America's forest resources in providing renewable fuels and energy.

Mr. Chairman and other members of the House Committee on Agriculture, my name is John Burke. My wife and I live on our tree farm in Caroline County, Virginia and I practice law at McGuireWoods in Richmond, Virginia.

My professional life is focused on technology, intellectual property and business law. In particular, I assist companies in putting cutting edge technology to work. In my private life, I manage over 2,000 acres of forest in Caroline County, Virginia, through two family limited partnerships. I am also active in many forestry-related organizations and currently have the privilege of serving as President of the Virginia Forestry Association.

The wise management of forest resources is critically important to the health of the forest and to many benefits that the public enjoys, including habitat for various wildlife species, protection of water quality through management of critical watersheds, the enhancement of air quality and green space around our cities and urban areas. This stewardship and management, for future sustainability, however, cannot occur in a vacuum. It must occur in the context of real world markets and the challenges and risks facing forest landowners.

Now that you know my interests and biases, I would like to share some thoughts in connection with the role of our forest resources in providing renewable fuels and energy.

As is evidenced by the Energy Policy Act of 2005, renewable energy is a concept whose time has come. We are all told by our financial planners that we should balance our portfolios. It is time for this nation to balance its energy portfolio by including in that portfolio more energy from bio-based, renewable sources.

The solutions to the renewable energy puzzle are factually and geographically complex, and the solutions must be analyzed and addressed on a customized basis, tailored to each locality and to each specific situation.

As this Committee is aware, biomass has a role in the renewable energy solution and the products from our nation's forest have a key place in that solution. Concurrently, the use of our forest resources to meet that renewable energy need must be sensitive to sound forest management and to a protection of our environment.

I will utilize a three part framework to analyze of the role of America's forest resources in providing more renewable fuels and energy.

The following three components will be discussed:

1. feedstocks;
2. the processes; and
3. commercial scale and profitability.

Feedstock, under my definition, is a bio-based product of one of two types – either a newly grown crop, or a residual or waste product of some manufacturing process or other activity. To succeed in a renewable energy project, the feedstock must be

available in sufficient quantities and on a consistent basis (seven days a week, 52 weeks a year, rain or shine). The feedstock must be available without excessive transportation costs and it must be relatively easy to store. Further, a successful feedstock must be available over a long period of time and on a sustainable basis and without damage to our environment.

Feedstock solutions will come in many forms and will be specific to each locality. In particular, some solutions may involve a predominance of one type of feedstock. Other solutions will involve a mixture of different feedstocks, both newly grown and residual.

Now, let's focus on the forest resource and its role in this feedstock supply. Forest based, cellulosic feedstock as an energy crop will typically take the form of smallwood. Smallwood is a good feedstock for two reasons: one, the thinning or the removal of smallwood is important to the management of forest stands, whether hardwood or pine, because it removes the smaller, less competitive trees, allowing the crop trees to mature for higher value uses. The second reason touches on a point I made earlier about the need for readily available feedstock in a successful renewable energy project: smallwood is not a food.

In addition, our forest resources can play a role in providing a hedge in connection with other types of feedstock. For example, certain annual energy crops, like corn, wheat straw, and switchgrass, can be subject to seasonal droughts. A forest based feedstock typically will develop over a 7-18 year period and harvesting or thinning of these stands will provide a balance in the feedstock supply. Further, these new markets for forest products will play an important role in keeping our forest lands profitable, a necessary

element to their continued viability and to the continued social benefits that we derive from forest land. One should note, however, that proper commercial forest management involves thinning and harvesting and, if done properly, this thinning and cutting of trees will lead to healthy forests and the regeneration of our forest resources, a key aspect to the sustainability of using forest based bio-mass.

In addition, trees can be selected and improved to produce biomass in a very efficient fashion. Hybrid poplars, for example, can be planted and grown in a dedicated tree farm format similar to the growing of corn or switchgrass, where the rotations are longer, thus providing the balance needed for a consistent mix of feedstocks. In Virginia, for example, much of our former tobacco land is under utilized and could be planted in a combination of switchgrass and hybrid poplars, to provide the necessary feedstock for cellulosic ethanol production.

Moreover, this country's pulp and paper industry has one of the world's best fiber procurement systems. Further, the pulp and paper industry and the forest products industry do a good job of recycling and reclaiming fiber. A renewable energy economy balanced to include more biomass would provide additional markets and additional uses for available wood fiber and bio-based waste materials from the manufacture of forest related products.

Part two of the role of America's Forest Resources in Providing Renewable Fuels and Energy involves processes and technology.

The ingenuity of scientists at our colleges and universities, within our companies, and at governmental agencies should not be underestimated. Many technologies and

processes will be needed to convert the numerous biomass feedstocks to renewable fuels, energy, and carbohydrate based products.

These technologies and processes will be staged in various levels, one after the other, to maximize the yield of energy and products from biomass. A survey of the Patent Office and related literature in the area of converting cellulosic material to bio-based fuels, energy, and other products reveals many issued patents and much related technology. A survey of our colleges and universities reveals more than 24 institutions of higher learning with ongoing research and technology in the area of processes for converting biomass to renewable fuels, energy, and carbohydrate based products. Recently I visited leading scientists at Virginia Tech, in Blacksburg, Virginia, to get an overview of cutting edge technology in the areas of forestry, biological systems engineering, and horticulture. Much activity is underway at this institution.

A review of the National Renewable Energy Laboratory's web site and related articles shows much innovation and technological development. Moreover, many companies are developing technology and other proprietary rights in connection with the processes for converting biomass to renewable energy and carbohydrate based products. Iogen is one of the leaders in the area of cellulosic ethanol production. Other companies working in the area of developing enzymes to convert cellulosic biomass to fuel and other products include Dyadic International (www.dyadic-group.com), Genencor International (www.genencor.com) and Novozymes A/S (www.novozymes.com). In addition, the pulp and paper industry has much research and development devoted to breaking down, manipulating and processing wood fiber. Significant activity devoted to

processes critical to the production of cellulosic ethanol, other renewable fuels, and carbohydrate based products is under way, and we must continue to encourage it.

As we step back and look at the renewable energy initiative, the conversion of biomass from our forests, will be a key component to the renewable energy solution.

Interconnected processes and technology must be identified, licensed and fit together in a cohesive fashion to meet this need, on a customized basis, in different geographical areas, thus allowing for the conversion of various bio-based feedstocks to renewable fuels, energy, and other bio-based products.

America's forest resources can be wisely managed and produce a significant portion of this cellulosic material.

The third component of the role of America's Forest Resources in Providing Renewable Fuels and Energy is commercial scale and profitability.

The various bio-based feedstocks must be available consistently and sustainably to facilitate the production of biofuels and bioproducts at commercially profitable levels. A combination of processes and technologies must dovetail with these feedstocks and all of this must occur on a case by case basis, sensitive to the biomass resources available in each locality. In some cases, there will be the need for a new, large scale production facility. Many companies today are exploring investment potentials and the necessary technology to develop these large scale, bio-based production facilities. In addition, there will be the need for small scale bio-based fuel and energy production capability. For example, small scale biomass energy units could provide the energy needs of greenhouses and other small scale farming operations. There are many different

embodiments for a renewable fuel initiative. The full spectrum should be explored and encouraged.

In addition to green field activities, our pulp and paper industry has existing facilities, labor, and infrastructure that could be expanded and refocused to produce, in addition to paper and other consumer products, biofuels, bioenergy and other carbohydrate based products. The paper mill of the future may well be a fully integrated, side by side operation, including pulp procurement, paper production and a biorefinery, producing renewable fuels, energy, and other bio-based products.

These new capabilities will require financial investments, the development and sharing of technology, facility construction, and other infrastructure coordination. I will end where I started. Renewable energy is a concept whose time has come. Biomass is a key element to that renewable energy initiative and America's forest resources can and should play a major role in the supply of that biomass. It is my request that this Committee and Congress continue to encourage and incentivize the production of renewable fuels and bio-based products from our forests.

STATEMENT OF THOMAS C. DORR

Mr. Chairman, it is a distinct pleasure for me to appear before you today to discuss USDA's role in our nation's energy strategy.

That role is significant. Agriculture has long been a major consumer of energy. It has more recently become a major producer as well. With oil at \$70 a barrel and expected to remain high, emerging technologies in both energy conservation and renewable energy production offer significant opportunities for higher profits, investment, jobs, and wealth creation in rural America. As the agency with lead responsibility for rural development issues, USDA has a major role to play in bringing these new technologies to market.

USDA's activities are, however, part of a much broader effort. The President's Advanced Energy Initiative (AEI) sets clear goals: developing better ways to fuel our cars and power our homes and businesses and reducing our dependence on imported oil. This effort is the responsibility of the Department of Energy. While not a direct recipient of the increased DOE research funding proposed by the AEI, USDA nonetheless supports these objectives in many ways.

USDA's role in national energy policy is in fact longstanding and varied.

- USDA has been in the electricity business since the 1930's. Today, USDA Rural Development's electric borrowers deliver 10 percent of the nation's kilowatt hours and serve 75 percent of the nation's landmass. We anticipate significant demand growth and are working with rural utilities to expand generation and transmission capabilities. We also work with rural utilities to apply the highest environmental and safety standards to this effort, and we look forward to the advances projected under the AEI in clean coal, nuclear, and renewable energy technologies for electrical generation.

- As a major provider of rural housing, USDA is committed to residential energy efficiency. Our new housing standards conform to HUD's high standards and our energy efficiency requirements for existing homes exceed market standards. On June 6, 2006, we announced the Home Energy Advantage program to provide certain low and moderate income families, who might not otherwise qualify for homeownership, additional incentive to purchase an energy efficient home. We also provide assistance to low- and very-low income rural homeowners for critical home improvements including weatherization, insulation, and new heating systems.

- USDA has supported ethanol for many years; as a t-shirt slogan might put it, we were ethanol before ethanol was cool. This commitment has contributed to the significant increases in production efficiencies achieved by the ethanol industry. It has also helped create the preexisting customer base and production and marketing infrastructure on which the current growth of the industry is based. USDA clearly has been instrumental in nurturing the industry to its present point of liftoff.

- More recently, the Farm Security and Rural Investment Act of 2002 created the Federal Biobased Products Preferred Procurement System, which USDA is implementing now. Up to 4,000 products have been identified for possible inclusion in this system and will be the subject of rulemakings over the next two years. Many of these biobased products can be used instead of petroleum-based products. The long-term potential for feedstock substitution is significant.

- The Farm Security and Rural Investment Act of 2002 also gave USDA Rural Development broad new authorities in the areas of biomass research, the commercialization of renewable energy technologies, and energy efficiency. From Fiscal Years 2001 through 2005 (including energy-related investments made through pre-2002 programs), USDA Rural Development invested more than \$356 million in 650 renewable energy and energy efficiency projects. Renewable energy technologies funded include biofuels, methane gas recovery, biomass, wind, solar, and geothermal. The direct USDA investment in these projects leveraged more than \$1.26 billion in additional private funds.

Biofuels are leading this effort. From Fiscal Years 2001 through 2005, USDA Rural Development invested approximately \$107 million (leveraging an additional \$624 million in private funding) in 147 ethanol and biodiesel projects. This remains a high priority in the years ahead. Just last week, in fact, Secretary Johanns announced a grant and loan guarantee combination totaling \$3.75 million for a 10 million gallon per year biodiesel plant in Iowa—a 10 percent increase in the nation's biodiesel production base in just one plant. At the same time, Secretary Johanns and Secretary Bodman announced a joint USDA-Department of Energy renewable energy conference, which will be held October 10–12, 2006, in St. Louis, to create partnerships and strategies to accelerate the commercialization of renewable energy sources across the board.

The biofuels growth potential is high. U.S. consumption of ethanol last year reached nearly 4 billion gallons, more than doubling the level of 2000. The Energy

Policy Act of 2005 established a Renewable Fuels Standard of 7.5 billion gallons per year by 2012, a goal which now seems likely to be reached well ahead of schedule. The President and Congress have also extended the ethanol tax incentive, doubled the size limitation for the small producer tax credit, and provided a tax credit of up to \$30,000 for the installation of clean fuel infrastructure, such as storage tanks and pumps.

Looking a bit further down the road, President Bush has proposed an accelerated program of research to make cellulosic ethanol cost competitive by 2012. When this is achieved, the production base for ethanol production will be multiplied many times over and will include feedstocks drawn from every region of the country. This is one of the most promising mid-term possibilities for displacing a large fraction of our imported oil, and it is therefore a research agenda to which the Administration is fully committed. While the Department of Energy has the lead R&D role, USDA also supports research on cellulosic ethanol through our biomass R&D program, and we coordinate closely with the Department of Energy to ensure that our activities are complementary.

The “other biofuel”—biodiesel—is in fact an old idea just now coming into its own. At the turn of the last century, Rudolph Diesel himself originally used peanut oil to power his engines—while Henry Ford powered his first car with ethanol—but cheap oil shelved that idea until now. Today, however, high cost oil has changed the equation. From two million gallons in 2000, biodiesel usage in the United States soared to 28 million gallons in 2004 and 91 million gallons in 2005 and is on track to double again in 2006.

Like ethanol, biodiesel is a domestic, value-added agricultural product offering exciting opportunities for investment and wealth creation in rural America. The Energy Policy Act of 2005 provided Federal tax credits for biodiesel production. As we have done for many years with ethanol, USDA Rural Development supports the development of biodiesel production facilities through our Business and Cooperative programs.

Ethanol and biodiesel are simply two of many technologies in play for reducing oil use. Their impact, however, may be very substantial. One Department of Energy/USDA study suggests that biofuels could displace as much as 30 percent of current U.S. gasoline consumption, or up to 60 billion gallons a year, while still meeting our food and export goals. This would be a very significant contribution towards meeting the President’s targets on transportation fuels.

Changing the ways we power our homes and businesses is another priority. Through our partnership with rural electric cooperatives and our support for renewable energy sources through our renewable energy program, USDA has an important role to play in commercializing new opportunities in this area as well.

- Since 2001, through our Rural Utilities programs, Value-Added Producer Grants, and Section 9006 programs, we have helped fund 130 wind, 22 solar, 4 geothermal, 2 hydrogen, and 11 hybrid projects.

- We have funded 92 anaerobic digesters and 7 landfill gas recovery systems, through five different Rural Development programs.

- We recognize that a kilowatt saved is as important as a kilowatt produced. From 2001 through 2005, we funded 168 energy efficiency projects through our High Energy Cost Grant and Section 9006 programs.

To sum up, rising oil and natural gas prices—painful as they are for American consumers—are opening the door to a wide range of alternative energy. It is clear that a new energy economy is being born. It is also clear that renewable fuels, many of them rural or agricultural based, will play a key role in this evolution.

Let me conclude, then, with three brief observations about the broader implications of these developments for rural America.

First, the changes we are facing are driven by fundamentals. Oil prices are high, not only in the United States but around the world. Sources of oil are becoming ever-more concentrated in unstable regions. At the same time, since the fall of the Berlin Wall in 1989, between two and three billion people have joined the world market system. China and India are achieving strong growth rates and have emerged as major oil importers. The world is a much more productive, prosperous, and competitive place than it was 20 or even 10 years ago.

The rising price of oil reflects these new realities. Oil will continue to fluctuate in the short term in response to market and political factors, but very few analysts expect a return to the very low prices to which we have been historically accustomed.

Second, it is useful to remember that since the beginning of the industrial age, America’s energy economy has not been static. From the mid-19th through the late 20th century, for example, earlier generations of Americans transitioned from animal, wind, wood, and water power to coal, oil, natural gas, and nuclear. The chal-

lenges we are facing today are neither unique—the rest of the world faces them as well—nor unprecedented. We have managed such transitions before, and we will do so again.

Finally, from the vantage point of USDA Rural Development, the emergence of a viable market for renewable energy represents an historic opportunity for job and wealth creation in rural America. Ethanol, biodiesel, wind, and solar are distributed resources. Small and mid-sized producers are able to compete. We are acutely interested, therefore, in focusing our resources on products that encourage a high degree of local ownership and control.

The scale of this opportunity is enormous. Displacing a billion barrels of imported oil at a current world oil price ranging around \$70 a barrel represents a savings to America's balance of payments of approximately \$70 billion dollars. That is an amount roughly equivalent to net farm income in the United States in the all-time record years of 2004–05—and it significantly exceeds the long-term averages.

This is a remarkable opportunity for rural America and for our nation as a whole. The development of safe, domestically produced renewable energy is good for our national security. It is good for our economic competitiveness and balance of trade. It is good for the environment. And it is an unprecedented opportunity for creating ownership, wealth, and economic opportunity in rural America.

The President's energy policy supports all of these objectives. It is indeed a privilege for us at USDA Rural Development to support the President's vision. As the President has emphasized, America has a costly addiction to imported oil. But we can kick that addiction if we make up our minds to do so. The American free market system has an unmatched capacity to innovate, to create new technologies and markets, and to turn challenges into opportunities. That is what we are doing today. The United States will, in the long run, deal from strength, not weakness. This has been since 2001, and is still today, a core commitment of this administration.

Thank you. That concludes my prepared statement. I will be happy to address any questions you may have.

STATEMENT OF J. READ SMITH

Mr. Chairman and members of the committee:

All it takes is one stop at the fuel pump to realize that Americans are confronting one of their biggest challenges in decades. Soaring energy prices are impacting all sectors of our economy, whether you are, like me, a farmer trying to fuel up to plant or harvest a crop, a truck driver hauling goods across the country or an office worker who commutes to work every day.

Almost two years ago, a group of agricultural leaders joined forces to discuss how they could proactively address this growing energy challenge. This Work Group spent about six months exploring questions like:

- What role can the farm sector play in producing renewable energy?
- How large of a contribution can the sector make?
- What will it take for agriculture and forestry to become major producers of energy?
- How could a broad-based alliance be established to support a common renewable energy goal for the country?

As you might imagine, we came away from this discussion with probably more questions than answers. But we also believed that, in the great tradition of American ingenuity and entrepreneurship, we could find solutions to our energy problems. Throughout our nation's history, America's farmers have proudly enhanced our national security by providing a safe, abundant food and fiber supply. In the future, we believe agriculture will be repositioned in the eyes of the American public—providing multitudes of food, feed, fiber and fuel.

We felt that the time has come for the agriculture and forestry communities to come together to define “our” vision for the role we can play in this area and then work collectively to bring this vision to life. After extensive dialogue with a wide range of stakeholders and energy advocates, this working group became convinced that agriculture and forestry can play a key role in helping the Nation move toward energy independence.

We looked at the energy potential from a wide range of sources: wind, solar, methane, ethanol, biodiesel. We became convinced that America's farms, ranches and forests can become suppliers for a new generation of clean, alternative fuels and energy feedstocks. At the same time, we'll contribute to a cleaner environment and enhanced rural economic development. As a result, we adopted a simple, but bold goal: 25 percent of the nation's energy supplies from renewable sources by 2025.

How do we reach this ambitious outcome? Let's keep in mind that the technologies that could turn this vision to reality are rapidly emerging and providing new solutions that we might not have even dreamed of five years ago. In the past decade, there have been great strides in ethanol technology, substantially improving the efficiency of this fuel source. Seed companies are producing hybrids specifically bred for their enhanced ability to produce ethanol and yields are steadily improving. Similar advancements have been made with soy diesel, wind turbines, and methane digesters.

Just imagine the economic impact if every farm, ranch and forestry operation in our vast nation were contributing energy in one form or another. Landowners who produce grain, wood or livestock would have a second crop to sell—energy. Jobs would be created in rural America through the processing of agricultural products and the maintenance of equipment for producing electric power. These increased domestic energy supplies would help reduce the price Americans pay to drive their cars and cool their homes.

The 25 x '25 Work Group has dramatically expanded in scope and size since its inception and has attracted the endorsements from over 160 organizations, 11 Governors and four state legislatures. We were pleased to recently join Chairman Goodlatte and Ranking Member Collin Peterson in the House Agriculture Committee hearing room, along with other members of the House and Senate to unveil concurrent congressional resolutions establishing 25 x '25 as a vision for the nation. We look forward to seeing this resolution passed by both the House and Senate.

To further advance the 25 x '25 vision, we have asked all of our endorsing organizations to come together next month and help us start drafting an implementation plan. We don't anticipate that this will be an easy process, but we know it's the right goal at the right time. We look forward to discussing this implementation plan with you and working to turn this vision into a reality.

Thank you for the opportunity to submit this testimony.

STATEMENT OF ROBERT WALKER

Chairman Goodlatte, Congressman Peterson, and Committee Members, my name is Robert Walker. I am the founder, Chairman, and CEO of Bixby Energy Systems, a Minnesota-based alternative energy company.

Bixby Energy is in the business of making energy using the waste products of the world. In other words, we have figured out how to make engineered fuels from agricultural materials also known as Biomass, municipal solid waste, sewage, wood waste, and even rubber tires. But making these fuels is only the beginning of what we do. We have also developed furnaces and energy systems designed to extract the maximum amount of energy obtainable from these fuels. Last, and equally important, we are building a delivery system nationwide with which to provide our fuels economically and dependably to our customers.

That is a quick overview of what our company does and I realize that this committee's interest is with agriculture's role in the renewable fuels market. So, let me focus for a moment on that part of our business. Biomass, of course, is the generic name for anything that grows and there are more than 10,000 different kinds of biomass materials in the U.S. alone. Everything from grape waste, rice stocks, and olive pits in California, sugar beet waste, turkey litter, and cranberry waste in the Midwest, and peanut shells, tobacco waste, and cotton gin trash in the south.

And talk about fast renewables, most grow in less than six months, and some like grass grow in as little as a week. Compare that to fossil fuels that take 70 million years to develop and you begin to appreciate the alternative energy opportunity that exists with these materials. When you add the wood waste, municipal solid waste, sewage, and rubber tires, we have an enormous materials base from which to create our fuel products.

To convert these fuels to heat energy, we have developed the MaxFire burn system, a state-of-the-art multi-fuel stove which has an incredible 99.7 percent combustion efficiency. However, because dry shelled corn has maintained a large surplus for the last 8 to 10 years and it is inexpensive and available everywhere, we have been using it as our primary bio-fuel. Last winter, using corn with about 7,000 Btu's of heat value per pound, thousands of our customers were able to heat their homes very economically. Our stoves are sold in more than 21 states but let me use one example. Customers in our state of Minnesota where winters can be very cold were heating homes 2500 sq. ft. in size for about \$1.50 a day. That's a savings of about 70 percent over fuel oil or propane.

Alternative energy from agricultural materials is a real business opportunity that can provide jobs in rural America in addition to energy independence. In case you

should think that these are the notions of a well meaning but novice entrepreneur, I should tell you that several years ago I invented a product and founded a company to market it. Today, it is a billion dollar plus market cap, Nasdaq traded company. I know opportunity when I see it and the ability to develop alternative energy in this country is one of the most compelling business opportunities of the future.

Is the American consumer interested in energy saving alternative energy products? I can only tell you from my own experience. We introduced the MaxFire stove just 2 years ago to modest sales. Our goal the next year was to do \$3 million in sales. Our fiscal year ended May 31 and we actually posted sales of \$8.3 million. Our goal this coming year which started June 1st is to do an ambitious \$40 million in sales. With only a month into the new season I am pleased to tell you that we already have orders for \$23 million. People are looking for good solutions to their high energy costs!

In two years, we will be offering the Omni System to American consumers. It is designed to be a furnace to heat your home, your hot water heater, your air conditioner, and it will also generate your electricity. All from biomass or other non-fossil fuel sources. It will provide these energy services at 50 percent less than what consumers are currently paying for them.

Working with the University of Minnesota, Bixby Energy is also commercializing a revolutionary pyrolysis technology developed there that solves a big problem inherent with some agricultural waste. Wheat straw for example, has high energy value of about 9,000 Btu's per pound but is so light that shipping it to a processing facility is akin to shipping smoke. The freight costs to deliver this material to one of our facilities would eliminate any potential energy savings. Now, we will be able to install these systems in a farmer's barn. He can put his cattle manure, his corn stalks, grass clippings, and that wheat straw into this bin. It will be simple to operate. He simply adds water and flicks a switch. In two hours, using heat derived from the units low energy consuming microwave system, it will turn that 40' trailer of wheat straw into approximately 3½ barrels of bio-crude. It can now be shipped economically in its liquid state for refinement. This is an already proven technology we are commercializing and expect to have in market within 4 years. Imagine the possibilities! This would literally turn every farmer's barn into a miniature oil well!

Now as much as I would like you to believe that Bixby Energy has all the answers to America's energy problems, that simply is not true. Bixby has been able to advance its technology development because it was able to raise more than \$22 million from the private investment community. What I can tell you is that there are literally hundreds, maybe thousands of people and companies in America with great ideas that can be turned into great products with great potential, but they either don't have capital or the other resources necessary to bring them to commercialization. What is critically needed is a system for locating, qualifying, and funding those technological gems that exist out there and are waiting to be discovered.

Great ideas know no political boundaries. They are neither republican nor democrat. President Clinton said, "America needs to do much more to develop energy conservation, alternative energy technologies and we'd eventually create jobs, have more wealth and save the planet, and we'd make ourselves more independent of foreign oil."

President Bush has said, "This congress must act to encourage conservation, promote technology, build infrastructure and it must act to increase energy production at home so America is less dependant on foreign oil." The President has turned talk into action by establishing the Advanced Energy Initiative.

America's energy situation is not a partisan issue. We are all in this together. I can tell you from experience that the biggest impediment to an entrepreneur's success is undercapitalization. Even at Bixby where we have successfully raised funds, we now need additional investment to support our rapid growth and finish the commercialization of our technologies.

Congress has pending before it H.R. 4435 and S. 2196, a bill that would create an innovative energy research, technology development and deployment program. It's called ARPA and represents a venture capitalist like approach to research and technology transfer. It has the capacity to find and fund those great technologies out there in America that could help secure our energy independence. Its focus is on "out of the box" private energy research that currently isn't supported by other Federal programs. It assists those small companies where great ideas are born, but too often falter because of lack of capital. The beauty of this legislation is that it creates a nimble tool within the Department of Energy without the bureaucratic barriers that can be an obstacle to success.

Congress has witnessed the success of this type of model at In-Q-Tel, DARPA, and HSARPA. These agencies constantly meet the challenge of high risk and high pay-

off technologies that have not only transformed our military but, improved homeland security and central intelligence.

I urge the support of this legislation and in doing so allow the ARPA staff to act like venture capitalists by going out into the private sector to find the individuals, the struggling start-up businesses, the researchers in universities and if they prove to have compelling, potential solutions to our energy problem, fund them to support their development. Give them the assistance they need that will allow them to provide us with domestically based solutions to insure this country's energy independence.

The President and this congress won't find solutions to the problems that the Advanced Energy Initiative seeks to resolve by sticking to the tired government approaches in place today. Our energy needs and independence goals are bold and require a bold approach. The high risk, high pay-off approach of In-Q-Tel, DARPA, and HSPARA have produced results and yes, there have been failures too, but the highway to success has never been a straight line.

In the meantime there are other steps that can be implemented to stimulate the bio-fuel markets with tax incentives. Today ethanol producers receive a \$.51 Federal tax exemption for every gallon of production. Why just ethanol producers? Why not extend that same \$.51 benefit to other liquid bio-fuels or on a per ton basis for pelletized fuels for non-agricultural based fuels produced from trash, recycled oils or grease? Ethanol and alcohol fuels currently receive this exemption through 2010.

Biodiesel fuels today receive a \$1.00 tax credit through 2008. Why not extend this same income and excise tax credit to agricultural based fuels such as those made from Corn Stover, switch grass or other food stocks or wastes?

In conclusion, Mr. Chairman, I hope that I have imparted to you and your committee members the challenges faced by the entrepreneurial world in bringing innovative technologies to commercialization. I hope that you, this committee and the other members of congress will continue to explore and seek ways in which those of us in the private sector can form partnerships with the Federal Government to advance our nation's goal of complete energy independence.

Thank you all for your attention.

STATEMENT OF WILLIAM A FREY

Good morning Chairman Goodlatte, ranking member Peterson and members of the committee. Thank you for the opportunity to testify before the committee today. My name is Bill Frey. I am the global business director for DuPont's biofuels business, and I am pleased to be able to tell you about our efforts to bring DuPont science to bear to add value throughout the biofuels value chain.

We start in the field, where our Pioneer corn and soybean seeds, developed specifically for biofuels applications, help to maximize the yield of ethanol and biodiesel from those crops. For eight decades Pioneer has been helping its customers succeed in the marketplace. With 135 seed corn varieties designated as high ethanol hybrids, renewable fuels are just one route to that success in today's market. Crop seeds represent the first step in DuPont's biofuels vision of meeting energy needs from the field to the pump.

Our highly environmentally sensitive crop protection chemicals help farmers to ensure high rates of productivity from these crops. And we have been bringing our biotechnology expertise to bear to convert those agricultural products to high value products for the marketplace. After two hundred years of using chemistry and materials science to produce products ranging from the invention of Nylon and Kevlar to high quality automotive paints, we are increasingly using biology as the tool to create similarly high value products from agricultural materials.

DuPont was recently awarded the President's Green Chemistry Award for the development of our Sorona fiber, whose unique properties include natural stain protection, brilliant colors and high wear resistance. This year we will start up a world scale fermentation facility in Loudon, TN producing the raw material for Sorona, propane diol or PDO, from corn. In developing our bio-PDO process we used biology to improve the yield of PDO by a factor of 500 fold, resulting in a cost competitive polymer raw material from corn, rather than petroleum. So very soon the carpet you walk on and the clothes you wear will come from the farmer's field.

We are also working with the Department of Energy and partners including John Deere and Diversa to develop an integrated corn-based biorefinery that will convert the entire corn plant, both the grain and the corn stalk and leaves, into cost effective ethanol and bio-PDO. We are nearing the stage where we will demonstrate this new technology on the way to full-scale commercial status. We believe this new development will help improve earnings for farmers and ethanol producers. It will also

open the door to significant expansion of biofuels production from plants, allowing for the expansion of their development without potential pressure on food crops, and improving even further the environmental performance of these materials.

I'd like to spend the rest of my time focusing on our newest development that we just announced last week. DuPont and BP have formed a partnership to develop and bring to market next generation biofuels that will help to speed the development of this important market in ways that will benefit farmers and biofuels producers, including ethanol producers.

The first of these new products to market will be biobutanol. Biobutanol will be produced from the same feedstocks from which ethanol is produced, in essentially the same type of production facilities. One of the things that make biobutanol exciting is its ability, as a co-blending agent with ethanol and gasoline, to enhance the performance of the fuel blend in ways that speeds the growth of the overall biofuels market and the agricultural markets that support it.

Biobutanol packs more energy per gallon than does ethanol, so when biobutanol is added to an ethanol-gasoline blend the resulting fuel provides greater fuel mileage. In addition, biobutanol is much less volatile than ethanol, and a co-blend of the two results in reduced volatile vapor emissions versus ethanol-gasoline blends, reducing the potential for smog formation. This will expand the geographic areas in which ethanol blended fuels can be used year round.

Butanol is not a new thing, but the ability to produce it cost effectively is. That is the power of DuPont's biology expertise brought to bear. Butanol's performance as a transportation fuel has long been recognized. It was, for example, used to fuel vehicles during World War II. However, until now butanol produced from petroleum or by known fermentation technologies has not been cost competitive with other transportation fuels. What is new is the application of the biology expertise we have developed through our experience with bio-PDO and the biorefinery efforts to the development of a cost effective process to produce butanol from agricultural products.

Also new is the partnership between DuPont's biology and production expertise and BP's fuel expertise and market presence. The partnership will begin biobutanol production in the UK in 2007 in conjunction with British Sugar, using existing technology, in order to get product to market rapidly. We are starting in the UK in order to have an early presence in a newly developing biofuels market, and will use sugar beets to produce biobutanol. By 2010 we expect to be producing with our new generation technology, including at a new UK plant based on wheat. This feedstock flexibility is one of the beauties of biobutanol. Here in the US we anticipate biobutanol will be produced from corn, with sugar beets or cane also potential feedstocks. In the future the cellulosic technology we are developing in the biorefinery project will be a natural fit with bio-butanol.

While we don't yet have specific plans for US production, the US is obviously an important market and we fully intend for biobutanol production in the US when our next generation technology is ready. One factor that will be important for US market entry is a level playing field in incentives for biofuels, be they in tax policy or elsewhere. Biobutanol will be good for farmers, good for ethanol producers, and good for the environment, and should receive the same treatment as other biofuels.

DuPont is excited to partner with BP to bring biobutanol and other advanced biofuels to market. We think these developments will be good for agriculture, good for national security, good for the environment, and good for our shareholders. I appreciate the opportunity to share these developments with you, and look forward to your questions.

STATEMENT OF AL CHRISTOPHERSON

Good afternoon. My name is Al Christopherson. I am chairman of the board for the Agricultural Utilization Research Institute (AURI), a Minnesota nonprofit corporation that works to improve the economy of our state through the development of new and value-added uses for agricultural commodities.

I appreciate the opportunity to appear before you today because I believe we are at a moment in time when tremendous strides can be made to change the way we produce and consume energy in this country.

As outlined by the President's Advanced Energy Initiative, there are numerous opportunities for those advancements to be made. AURI is convinced there are areas where agriculture can play a leading role in the development of new sources for transportation fuel, home heating and power generation. In addition, a national focus and policy supporting the development of renewable energy is needed to develop clear goals consolidated by implementation.

Policy development is often a necessary precursor to change. The President's Initiative provides the vision, what is needed now is implementation.

For nearly 20 years, AURI has provided scientific technical assistance to projects that utilize agricultural commodities in innovative ways. AURI's mission supports the President's Initiative in a number of areas.

AURI facilitates the development of new renewable energy enterprises, increasing the overall capacity for renewable energy production. This includes significant work in ethanol, biodiesel development and biomass energy advancement. AURI has also expanded well beyond those areas to include biogas production from anaerobic digesters, gasification of agricultural biomass, turbine fuel assessment, and wind and biodiesel hybrid applications to name a few.

In addition to energy development, AURI fosters the development of new products that displace petroleum-based materials. We have successfully assisted in the development of ag-based polymers, functional foods, fertilizers, lubricants and dozens of other food and industrial products.

Renewable energy from agricultural sources has generated significant interest in recent years as opportunities arise and technology advances. Implementing an advanced energy plan to support further development will help to sustain that surge both on a consumer and industrial level. We know this because it is happening right now.

Minnesota has been a proactive leader in the advancement of renewable energy. Much of this activity began long before high crude oil prices caught the nation's collective attention and renewed calls for alternative energy development. Rather, growers, ranchers and AURI recognized the opportunity bio-based businesses presented for adding value, sustaining strong rural economies and promoting energy independence.

Minnesota entered the ethanol industry in 1983 with the opening of a farmer-owned ethanol plant in Marshall. In 1997, Minnesota became the first state to have 10 percent ethanol added to gasoline sold year round throughout the state. As a result of legislation and growing market opportunities, the state now has 16 operating ethanol plants with several more in various stages of development. These plants are currently producing more than 550 million gallons of ethanol annually. Further, Minnesota has over 220 operating E-85 fuel pumps. Ethanol is not only being produced here, it is also being used here. The distribution network, utilization and interest in ethanol grows stronger every day.

In 2005, Minnesota also became the first state to mandate 2 percent biodiesel to be added to every gallon of diesel fuel sold. There are now four biodiesel refineries operating in the state, producing over 60 million gallons each year.

Recognizing the opportunity created by our state's forward thinking policies on renewable energy, AURI created the Minnesota Center for Producer-Owned Energy. This Center was established through USDA's Agricultural Innovation Center Demonstration Program. The Center serves as a working, ready for implementation model for spurring ag-based renewable energy production in the U.S. and provides a road map for supporting the President's Initiative.

The Center facilitates the development of farmer-owned enterprises that utilize agricultural commodities, biomass and coproducts for the production of energy.

The Center established partnerships with commodity groups, public and private organizations, universities and other agencies. These partnerships result in maximized impact, access to resources and expertise from outside AURI. They also produce broad-based support for the development of renewable energy projects in Minnesota and encourage the leveraging of additional funds.

The policy that created the Center for Producer-Owned Energy originated in the 2002 Farm Bill. The key to success is AURI's development of a solid implementation plan to carry out the policy. In concert with the scientific technical resources of AURI, the Center has successfully implemented 17 projects impacting more than 9,000 producers in the past 2 years. Activities include the formation of several corn-based ethanol plants in underserved areas, the development of what could become the nation's first commercial cellulose-based ethanol plant and the gasification of agricultural biomass for electrical power. Additional projects range from testing a biodiesel-powered ATV to examining the feasibility of using biodiesel in working riverboats.

These renewable energy enterprises are all in rural areas utilizing locally-produced commodities. They are adding jobs to the region and are reducing consumption of petroleum. Many of these facilities are producer-owned, assuring that accumulated wealth stays in the rural environment.

In addition to strong commodity and grower group support, the Minnesota Center for Producer-Owned Energy has established a strong relationship with the Bio-Business Alliance of Minnesota, linking agriculture with organizations such as 3M, the

Mayo Clinic and Medtronic. These relationships will help to move agricultural commodities into new, non-traditional markets. In some cases, they could supplant petrochemicals as source ingredients.

Associations with Bemidji State University and Southwest Minnesota State University will result in the nation's first advanced degree in renewable energy management, promoting best practices and quality in energy production.

While the Center for Producer-Owned Energy and AURI are Minnesota based, the framework could be replicated elsewhere. It has been our experience that providing feasibility analysis and scientific technical experience coupled with a sound implementation plan during the developmental stage is vital to realizing a successful enterprise.

Merging technology with markets, best manufacturing and quality practices with a trained, renewable energy workforce, creates a strong foundation for energy development and business success.

This country was formed as an agrarian society and later moved to an industrial focus. We are now in an era where ideas and innovation are driving our economy. We have seen how this innovation is linking the past with the future. Innovative technology is providing opportunity for strong agricultural activities, which are leading to industrial development. Nowhere is this cycle more evident than in the promise of renewable energy.

STATEMENT OF AMERICAN SPORTFISHING ASSOCIATION, ASSOCIATION OF FISH & WILDLIFE AGENCIES, BASS/ESPN OUTDOORS, BEAR TRUST, BERKLEY CONSERVATION INSTITUTE, CAMPFIRE CLUB OF AMERICA, DUCKS UNLIMITED, IZAAK WALTON LEAGUE OF AMERICA, NATIONAL WILD TURKEY FEDERATION, NATIONAL WILDLIFE FEDERATION, THE NATURE CONSERVANCY, NORTH AMERICAN BEAR FOUNDATION, NORTH AMERICAN GROUSE PARTNERSHIP, PHEASANTS FOREVER, QUALITY DEER MANAGEMENT ASSOCIATION, QUAIL FOREVER, ROCKY MOUNTAIN ELK FOUNDATION, SAFARI CLUB INTERNATIONAL, TEXAS WILDLIFE ASSOCIATION, THEODORE ROOSEVELT CONSERVATION PARTNERSHIP, TROUT UNLIMITED, WILDLIFE MANAGEMENT INSTITUTE, THE WILDLIFE SOCIETY

As organizations representing wildlife and conservation interests in all 50 states, we are writing to express our concern about proposals that have surfaced recently which call for using lands enrolled in USDA conservation programs, especially the Conservation Reserve Program (CRP), for the production of biofuels. Our organizations represent millions of hunters, anglers and other conservationists who care deeply about our Nation's energy supplies and our fish and wildlife resources. We share your concerns and those of nearly every American that the thirst for the world's shrinking supply of fossil fuels is pushing the United States dangerously close to economic harm and dependency on often volatile foreign sources of energy.

The organizations listed above believe in and support the use of biofuels in diminishing the Nation's dependency on fossil fuels. America has nearly 400 million acres of cropland and some of the world's most productive farms. Furthermore, we are confident America's farmers are ready and willing to produce biofuels crops to meet the needs of this emerging market. But, we are concerned that in the rush to produce biofuels crops, we may inadvertently sacrifice many of the natural resource conservation victories achieved over the past two decades.

The certainty of rapidly expanding biofuels development and increased biofuels crop production means that potentially millions of acres of privately owned land may be utilized for biomass production. Options for biomass production are as diverse as the American landscape, ranging from native grasses, corn stover, wheat straw, forestry products, and other materials. Careful selection of appropriate lands for biomass production is critical if you are to craft a successful alternative energy policy that ensures we sustain our current economical food supply, positive balance of agricultural trade, gains in quality habitat and wildlife numbers, and improving water and soil quality. Accordingly, as you seek ways to promote biofuels and biofuels production, we urge you to carefully consider the impacts of increased stubble removal and diminished vegetative cover as they relate to wildlife, soil, water, and air quality; and investigate all proposals and facts regarding the use of land enrolled in conservation programs as a source of crops grown for biofuels production. We look forward to being included as a part of the "energy solution" and respectfully

request that you utilize our wildlife-, habitat-, and conservation-based technical expertise and research-based data; and consult with us in future biofuels discussions and policy decisions.

Of significant concern to us is the future of the highly successful 20-year-old CRP because of the numerous proposals that are surfacing that suggest CRP-enrolled land be used for biofuels production.

The purpose of the CRP is clearly specified by Congress in the 2002 Farm Bill, (P.L. 107-424) according to Sec. 1231 (a) which provides:

“The Secretary shall formulate and carry out a conservation reserve program under which land is enrolled through the use of contracts to assist owners and operators of land specified. to conserve and improve the soil, water, and wildlife resources of such land.”

CRP is the most successful conservation program in history; and is credited with conserving more of our nation’s soil, water, and wildlife than any other program. Since its inception in 1986, CRP has helped reduce soil erosion by more than 40 percent and restored 1.8 million acres of critical wetlands. Since enactment of the 2002 Farm Bill, CRP has increased enrollment by 2.6 million acres, conserving a total of more than 36 million acres of environmentally sensitive land for wildlife habitat, riparian buffers, and soil protection. Altering the existing CRP priorities on millions of acres of enrolled land could dramatically reverse many of the gains realized to date in protecting our environment, improving water quality, and enhancing wildlife. Most at risk, are the wildlife benefits of CRP, which to a great extent, are simply not compatible with frequent harvesting. Risking wildlife benefits also jeopardizes the 67.5 billion dollars and 575,000 jobs that hunting and related activities annually add to the U.S. economy. Furthermore, the amount of water required for biofuels production should be carefully considered to ensure that our citizens, agricultural industry, fish, and wildlife have the aquatic resources necessary in perpetuity.

Although we believe that biofuels production will provide a viable alternative income source and an additional revenue stream for American agriculture, accurate research-based determinations of where and how the most beneficial and cost-effective methods of biofuels production can be achieved are not complete. Accordingly, we concur that it is premature at this point in the biofuels discussion to conclude that land enrolled in CRP should be considered as a source of land for biofuels production.

We look forward to engaging in a joint effort with production agriculture interests, especially as we develop policy for the 2007 Farm Bill, to constructively craft a balanced and effective “agricultural energy policy” that lessens U.S. dependence on foreign oil, enhances rural economies, and provides sound environmental and wildlife benefits.

In summary, the organizations listed above strongly support the position that utilization of CRP enrolled land for the purpose of biofuels production is premature at this stage of the alternative energy/biofuels debate—simply because adequate research does not exist that proves utilization of CRP for biofuels production is the best available option. We also believe that altering the CRP without careful study would unravel the documented benefits CRP currently provides.

Thank you for your consideration.

STATEMENT OF NATIONAL ASSOCIATION OF CONSERVATION DISTRICTS

On behalf of the nation’s 3,000 conservation districts, the National Association of Conservation Districts (NACD) is pleased to provide comments to the Committee on Agriculture’s role in the renewable fuels market. Established under state law, conservation districts are local units of government charged with carrying out programs for the protection and management of natural resources at the local level.

NACD supports the development and use of renewable fuels from agriculture and forestry products to help stretch our nation’s energy supplies and reduce the amount of imported oil by millions of barrels each day. Our members help landowners implement conservation practices such as no-till that can save farmers over 200 million gallons of fuel and up to \$480 million per year. We are also interested in the use of crop acreage in conservation programs for the production of biofuels—corn ethanol, biodiesel and biomass ethanol. In looking toward the future many conservation programs can serve several purposes of soil and water quality benefits, habitat improvement, reduced energy inputs and contribute to biofuel production through

crop and grass production, however we must ensure that these lands continue to be managed to protect natural resource conservation benefits.

One example of the Conservation District's commitment to biofuels is the Spokane County Conservation District's "BioBug". This Clean Green Bio Machine, a 2003 Volkswagen Beetle is fueled with 100 percent biodiesel. The BioBug is part of the District's educational efforts to increase awareness of biodiesel and its positive impacts on our environment and our economy. The District is coordinating the efforts of several public agencies, private industry and agricultural producers to develop the biodiesel industry in Eastern Washington. These efforts include the production of agricultural feedstocks, building oilseed processing facilities, developing biodiesel processing plants, and increasing demand for the fuel.

With energy prices at all-time highs and little expectation of change in the near future, there is a great opportunity for the development and use of renewable fuels and alternative energy sources made from biomass. Many conservation practices actually save energy while also benefiting the environment. Farmers can help solve America's energy problems by producing clean, renewable energy sources.

NACD encourages support for policies and programs that provide incentives for the development and use of renewable fuels and biomass including conservation practices that reduce energy use and the USDA Bioenergy Program. We look forward to continuing to work with the Committee on these programs and working at the state and local level to increase the awareness and use of renewable fuels.

STATEMENT OF MARK GAALSWYK

EASY AUTOMATION, INC.—BACKGROUND

- Easy Automation, Inc. (EAI) is an industry leader in innovative agriculture technologies.
- EAI is the largest provider of Feed Software and Automation in North America.
- EAI has over 3,000 customers.

ETHANOL

- For the past few years EAI has been quietly developing a new innovative process for making ethanol.
- EAI's patent pending process enables factory built, pre-wired, pre-plumbed ethanol plant modules to be built in a size that will fit in a shipping container.
- These shipping container sized ethanol modular plants can be pre-built in a factory and shipped all over the world.
- All one needs to do is set them on floor plug them in and begin making ethanol.
- Each unit will produce approximately 750,000 gallons of ethanol per year.
- To make a larger plant, simply plug more of these units together. All of the individual units will then function together as one complete larger plant.
- The units can all be connected to the Internet and monitored and serviced by EAI's staff in Welcome, Minnesota.
- EAI has built a couple of test units and is now gearing up for mass scale production of these systems.
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ADVANTAGES

- EAI believes that its factory built modular ethanol plants will change the renewable fuels industry the way that Henry Ford's factory built automobiles led to rapid expansion of the auto industry.
- Because they can be assembled to make any size plant from 750,000 gallons up to a 200 million gallon plant, EAI believes many of the units will be installed by larger farmers and existing rural ag cooperatives.
- Some of the advantages of the ethanol plants being owned by large farmers and rural ag cooperatives is that the "value added" benefit will be more closely tied to the producers themselves. The approach will also provide for a greater utilization of existing infrastructure of grain elevators and feed mills. This in turn will lead to a more rapid deployment of renewable fuels systems throughout the country.
- Simply put, EAI's goal is to place an add-on ethanol plant module at each of its 3,000 existing customer sites represented on the customer map.
- EAI expects this "Decentralized" approach to ethanol production to be fought by many of the large Ag conglomerates who favor a more "Centralized" business model and thus a larger barrier to entry.

TECHNOLOGY

- In addition to its innovative modular technologies, EAI is also testing and improving the process of making ethanol.
- This process includes a method of making ethanol that replaces the cook process with a different means of exciting the molecular activity and thus improving the conversion process. These processes can greatly reduce the use of other forms of energy and also reduce pollution related emissions.
- In addition to a better conversion process, this process improves the nutritional content of the feed by-product.
- Initial research on the patent pending process has indicated that the combination of EAI's technologies can create ethanol without burning any natural gas, with no emissions, and a conversion efficiency of 3.2 gallons per bushel of corn. The industry standard is 2.8 gallons of ethanol per bushel of corn. The end result will be the production of ethanol at a cost of production approaching 70 cents per gallon as compared to the current industry standard of approximately \$1 per gallon.

ENVIRONMENTAL BENEFITS

- The decentralized model better distributes any negative environmental impact that may be present.
- With the ethanol plants located closer to the place of production, the costs and environmental aspects of transportation are reduced. Corn can be grown, ethanol produced and the feed by-product consumed—all without ever leaving the farm.
- Because the systems do not need to use steam for the cook process, the usage of water is reduced and large steam stacks can be eliminated.
- Because the systems will often be tied directly to a Feed Mill, the feed by-product can be mixed in with the animal feed and consumed immediately. This eliminates much of the drying process that is often associated with traditional ethanol plants that dry the by-product to create dried distillers grain (DDG). This drying process improves shelf life as the material is transported back as animal feed. It is this drying process that creates many of the air emissions problems the industry traditionally faces.

CONCLUSION

- The ethanol industry is going through a rapid improvement in technologies.
- EAI asks for your continued support as we and other companies continue to improve technologies and build the Nation's production of renewable fuels.

