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SUBCOMMITTEE HEARING ON SECOND GENERATION BIOFUELS: THE NEW FRONTIER FOR SMALL BUSINESSES

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COMMITTEE ON SMALL BUSINESS
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SUBCOMMITTEE HEARING ON SECOND GENERATION BIOFUELS: THE NEW FRONTIER FOR SMALL BUSINESSES

Wednesday, June 11, 2008

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON SMALL BUSINESS,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:00 a.m., in Room 1539 Longworth House Office Building, Hon. Heath Shuler [chairman of the Subcommittee] presiding.

Present: Representatives Shuler, Ellsworth, and Bartlett.

Also Present: Representatives Fortenberry and Chabot (ex officio).

OPENING STATEMENT OF CHAIRMAN SHULER

Chairman SHULER. I will call the Subcommittee hearing to order. I would like to first welcome all of our folks here today to this very important hearing.

We have a lot to discuss. We will try to keep it from the member standpoint as brief as we possibly can because of our expert witnesses that we have today. And we look forward to your testimony. I again thank you for your travels here today and your safe travel home tomorrow.

We are here to examine the issues of second generation renewable fuels and the opportunities for small businesses. At a time when our country is paying $4 a gallon for gasoline, it is critical that we continue the development of alternative energy supplies to help reduce prices and our independence on foreign oil.

While this may not be the only answer to our challenges, entrepreneurs have been instrumental in developing these new and affordable energies. Renewable energies hold the potential to have an enormous impact on domestic fuel supplies, rural economics, and small businesses.

In an industry driven by small businesses, growth in renewable fuels has been a win-win for the U.S. economy. Today's hearing will focus on the next generation of biofuels.

The advancement of corn-based ethanol is a step in the right direction. But it carries a great consequence, mostly due to its low efficiency. Because of this, we must continue to produce more advanced and sustainable models for biofuels production.

Currently, renewable energy producers are investing in research in new technologies that will enable production of both cellulosic

ethanol as well as biodiesel from alternative sources. This means that ethanol will be produced not only from corn but from wood chips, corn cobs and biomass inputs, like grasses.

Diversifying the sources of production will mean that farmers and small businesses, in areas like Asheville, North Carolina, will play a role in developing these clean energies.

While the growth in these industries has been advanced, challenges remain. Cellulosic ethanol producers face high capital investments with no guarantees of return. By addressing these barriers, small firms will be able to make large-scale productions a reality in the near future.

It is critical that policies encourage the development of these new innovations to expand the sources of energy. This ranges from tax incentives and trade policies to usage requirements and financial assistance. Our energy policy must not only work in the short-term but also the long-term energy security of our nation.

Recognizing obstacles to growth, the House recently passed the Energy and Tax Extending Act of 2008. This step was important because it includes a variety of renewable energy tax provisions and specifically extends the biodiesel tax incentives for one year, through December 31st, 2009. But, perhaps more importantly, it provides a dollar per gallon incentive for all biodiesel.

Though renewable fuels have grown exponentially over the past decade, it still makes up less than one percent of the current U.S. production. This hearing will provide us with a better understanding of the current state of the next generation of the renewable fuels industry and what it needs to grow. In the end, we need to do what it takes to ensure that small businesses will continue to have the resources to enable them to develop new fuels.

I appreciate the witnesses here today to talk about this important issue. And I look forward to today's discussion. At this time, I will yield to my good friend Mr. Fortenberry, the Ranking Member, for his opening statement.

OPENING STATEMENT OF MR. FORTENBERRY

Mr. FORTENBERRY. Thank you, Mr. Chairman, for calling this very timely hearing. And I want to thank our panel as well for joining us today.

This hearing is about the second generation of biofuels and the role of small businesses in renewable energy production. And we are also privileged to have our Ranking Member Chabot join us here today.

We are here to examine possible new technologies that can bridge the transition to a sustainable energy future and how small businesses can participate in these ventures. Geopolitical instability and high energy costs make clear that our nation needs to chart a new path that can lead to lower, more predictable energy costs for communities, small businesses, and families.

The causes of recent high energy prices are numerous, including geopolitical instability, commodity speculation, supply restrictions, boutique fuels, the strategic petroleum reserve, lack of sustainable alternatives, and the oligopolistic leverage of OPEC.

While Congress toils with policy responses, grain ethanol and soy biodiesel are components of a portfolio of renewable energy sources that will help us build a more sustainable future.

There is a long history of grain-based fuels in our country. While ethanol was considered viable by many pioneers of industry, including Henry Ford, it was the rising energy cost of the 1970s that hastened the advent of the current biofuels age. Additional concerns about the safety of the additive MTBE, methyl tertiary butyl ether, in gasoline in recent years led toward a consensus in favor of further development of grain-based ethanol as a safer alternative.

In 2005, Congress passed a new energy bill in order to foster greater energy independence as a result of rising concerns over global tensions and the security of our energy sources. A centerpiece of this legislation was a renewable fuels standard mandating that a minimum level of renewable fuels be produced annually.

Given its relative infancy, questions have arisen about the efficiency of grain-based ethanol and biodiesel. New synergistic developments and rapid improvements in efficiency, however, are continuing to prove the usefulness of these technologies.

One example of this can be found in Jackson, Nebraska, in my district, where an ethanol plant is powered in part by methane gas that is produced by a local landfill greatly increasing energy output efficiencies.

Researchers in small firms must now consider the next step in this evolution, such as the second generation of biofuels, from sources such as switchgrass, corn stover, and biomass.

Small-scale production utilizing partnerships between government, small business, and communities can be realized as a result of public policy and business opportunity. Whether it is from improvements in cellulosic ethanol technology or utilizing combinations of different renewable resources, new biofuels can alleviate some of the pressures placed on existing energy supplies.

During this hearing, we will hear from a diverse group of witnesses, including an innovative Nebraskan, who is a leader in small-scale progressive renewable energy production.

Mr. Chairman, thank you again for holding this hearing. And I yield back to you.

Chairman SHULER. Thank you, Mr. Fortenberry.

I now yield to the Ranking Member of the Committee, Mr. Chabot, for his opening remarks.

OPENING STATEMENT OF MR. CHABOT

Mr. CHABOT. I thank the Chairman for yielding. And I want to thank you for holding this important hearing and for allowing me just a couple of minutes to speak. I will be brief.

Disturbingly, each time I talk about the energy and gas prices, when we are doing the statement, we have to revise it to reflect another increase. Now, hopefully it is not cause and effect.

I hope the prices aren't going up because I keep giving these speeches, but last weekend we surpassed the unfortunate $4 a gallon milestone. And it seems that every day brings a new record high. And my constituents and I am sure the constituents of all the members who are here today are rightfully outraged and are de-

manding answers. They want to know why, for example, we aren't drilling in the United States, in ANWR, and in the outer continental shelf especially and why we aren't building more refineries—we haven't built one in over 30 years, the last one being 1976, in this country, virtually made it impossible to build another one—and why we aren't doing more to promote alternative energy sources.

In response, this Congress and, unfortunately, gives them legislation that purports to fix our energy problem simply by raising taxes, by billions of dollars on domestic energy companies, and hoping for the best. That is not an energy policy. That is a tax increase.

And it is on every American family because let's face it. When you raise taxes on the energy companies, whether you call it a windfall profits tax, whatever the heck you call it, they pass it on. And people just pay more at the pump. That is what happens.

Critics of domestic drilling point out that even if we drilled in ANWR and in the outer continental shelf, we wouldn't have oil available for that for another five years or another ten years. Well, that is one reason we should have done this five years or ten years ago, but it was blocked by Congress. I know many of us are waiting to hear what Congress is going to do about this.

Over time we have improved the technology mitigating the environmental impact of oil and gas development. For instance, rather than having several stations drilling straight down, horizontal, and directional drilling can reach oil and gas deposits as far as ten miles away. But instead of taking immediate steps to reduce our dependence on oil-rich but unstable foreign governments, members of this Congress have focused on placing our nation's sources of oil off limits, hamstring the construction of new refineries, and requiring the production of boutique fuels that drive up prices on consumers, as the gentleman from Nebraska just mentioned.

Just as the nation has never taxed itself into prosperity, it is simply not plausible to believe that we can tax and regulate our way to energy independence and lower gas prices.

I have and will continue to support efforts to encourage investment in biofuels and other renewable energy technologies. I think that is appropriate. I think we ought to be doing it and doing more of it. I have every hope that we will discover energy alternatives that will change the world.

But I want to thank our witnesses for being here today. And this is part of the overall solution, but it is not the entire solution. There are a number of other things that we could be doing, we should be doing, that we should have done a long time ago. And ANWR and the outer continental shelf are at the top of my list, as are nuclear power plants.

The fact that we haven't built one here in the United States in over 20 years is ridiculous when you consider that France, for example, has 80 percent of their power now produced by nuclear power plants. They are being built in China, being built in Russia, being built in India, all around the world except here. We have over 100 of them, but we haven't built one in 20 years.

And all of these things together, it has to be a comprehensive strategy to deal with our energy problems. And one of them is

clearly biofuels, but part of it is also going after oil that we have control over that is within the United States or in our borders.

And to think that Cuba and China are going to be drilling off the coast of the Florida Keys and going after that energy, both oil and natural gas, trillions of cubic feet of natural gas—they are going to get it, and we have put it off limits to American consumers—just baffles the mind.

And I thank the gentleman for yielding and thank him for holding this hearing and yield back the balance of my time.

Chairman SHULER. Thank you, Ranking Member.

At this time I would like to yield to Dr. Bartlett for his opening statement.

OPENING STATEMENT OF MR. BARTLETT

Mr. BARTLETT. Thank you, very much for yield. And thank you for holding this hearing.

Fifty-one years ago the 14th of this last May, Hyman Rickover, the father of our nuclear submarine, gave what I think was the most insightful speech of the last century to a group of physicians in St. Paul, Minnesota. In that speech, he noted that at that time we were about 100 years into the age of oil, which he noted as the golden age. He said that the age of oil would be but a blip in the 8,000-year history of man.

And he had no idea how long the age of oil would last. Today we know fairly precisely how long the age of oil will last, but 50 years ago, 51 years ago, he didn't know. But he said how long it lasted was important in only one regard, that the longer it lasted, the more time we would have to plan an orderly transition to renewable sources of energy.

Mr. Chairman, Hyman Rickover would tell you that this hearing is 51 years too late. It is at least two decades too late. We have known of an absolute certainty for 28 years to now that this day would come because 28 years ago was 10 years after the United States reached its maximum oil production, which was predicted by M. King Hubbert 14 years earlier, in 1956.

When you look back in 1980, it was really obvious that he was right because we had peaked in 1970. And you pull up the Google for "Hubbert's peak" and pull up that peak and look. We were obviously well down the other side in 1980.

So what have we done for the last 28 years? With no more responsibilities than the kids who found the cookie jar or the hog who found the feed room door open, we just have been pigging out. We have behaved as if oil is absolutely forever, in total denial of the reality that it is a finite resource. And today we now have oil at $130-some a barrel and gasoline at $4 a gallon.

And the President's proposal to do something about this will do nothing, Mr. Chairman, but make the price of oil go up. If you drill, it takes energy to drill. For the moment, that will drive the price of oil up. If you invest in alternatives, that takes energy to invest in alternatives. For the moment, that will drive the price of oil up.

As I said, this hearing would have been very productive 20 years ago. My wife has a great observation on where we are. She used that old country Western it is too late now to do the right thing.

So here we are today. And I am really pleased to be here. We will transition. Geology will mandate that we transition to renewables. It is just incredible the innocence, the ignorance, and the denial of people in both of our parties about this energy situation.

I think that the American people would gladly follow someone who was honest with them. Drilling is not going to bring down the price of oil. Not a drop will flow for five years. So for five years, you will be investing in drilling and driving up the price of oil.

Investing in alternatives will not bring down the price of oil today. There is only one thing, Mr. Chairman, that will bring down the price of oil today. And that is to use less of it.

Two things will accomplish that. One, the price will go so high we are going to have a global economic depression. And that will bring down the price of oil. Tragic if that is what we let happen.

The only other thing that will bring down the price of oil is a conscious, purposeful program of conservation. If we use less, I will guarantee to you that the price of oil will drop.

I think, Matt Simmons thinks that we can buy two decades of time with an aggressive conservation. I am just going to make one little anecdote. I was driving to work the other day. In the two lanes in front of me, in one lane was an SUV with one person in it. In the car beside that was a Prius with two people in it. The people in that Prius were getting six times the miles per gallon per person as compared to the person in the SUV. We have enormous opportunities for conservation. It is the only thing that will momentarily bring down the price of oil so that we can now invest in alternatives.

Hyman Rickover, by the way, would be pleased we have had some of our oil reserves held because now we at least have some energy that we can use to invest in alternatives for the future. Had we been able to drill everywhere, there would be no surplus energy to invest. And so our investment made at least two decades too late will do nothing more for the moment to drive up the price of oil.

I have a lot of people in my district. I have a big, long district. And my people can't afford to live near where they work because it is too darn expensive to live there. They live 50, 60, 70, 80 miles away. They can't even afford to buy a new car. They are driving that old clunker, which is inefficient.

This is really, really tough. And the American people have every right to be furious with their leadership because their leadership in both of our parties have systematically failed us for at least the last three different presidencies in our country.

So thank you very much for holding this very important hearing. I look forward to the testimony and the discussion. Thank you.

Chairman SHULER. Dr. Bartlett, thank you so much. And I couldn't agree with you more. We do have so much work to do.

At this time I would like to introduce our first witness. Dr. Wooley is Director of Engineering with Abengoa Bioenergy New Technology in Lakewood, Colorado. Dr. Wooley, you are recognized for five minutes.

STATEMENT OF MR. ROBERT J. WOOLEY, DIRECTOR, PROCESS ENGINEERING, ABENGOA BIOENERGY NEW TECHNOLOGY

Mr. WOOLEY. Thank you, Mr. Chairman, members of the Subcommittee.

As mentioned, my name is Robert Wooley. I am the Director of Process Engineering at Abengoa Bioenergy. I appreciate the opportunity to participate in today's hearing to discuss second-generation biofuels. After briefly introducing my company, I will focus my remarks on some of the challenges facing second generation or cellulosic ethanol.

First, I would like to say that Abengoa Bioenergy is committed to the renewable fuels industry. Our corporate leadership believes the existing energy model, based on fossil sources, is showing clear signs of exhaustion, as we have heard from the distinguished people already.

Because of that, our company will have invested almost $500 million in research to advance cellulosic ethanol and signed an agreement with the City of Phoenix to provide them with greenhouse gas-free solar power. Extending the 30 percent investment tax credit for solar, as the House has done, is very important to our parent company.

Personally I have spent the last 12 years developing and engineering the cellulose to ethanol process, first as the Biofuels Technology Manager at the National Renewable Energy Lab, then as the biomass technology development leader at Cargill's NatureWorks, and now at Abengoa Bioenergy.

I would like to provide the Subcommittee with some background on Abengoa Bioenergy. We entered the U.S. market when we purchased High Plains Corporation in 2002. Abengoa produces starch-based ethanol in York, Nebraska, where we also have a pilot plant for the development of the cellulosic ethanol technology. We have starch-based ethanol also in Ravenna, Nebraska; Colwich, Kansas; and Portales, New Mexico. And we are in the process of building two new plants: one in Illinois and the second one in Evansville, Indiana, in Mr. Ellsworth's district.

We are designing a hybrid facility to be built in Hugoton, Kansas. This hybrid facility will produce 88 million gallons per year of starch-based ethanol and 12 million gallons a year of cellulosic-based ethanol. The launching of the second generation cellulosic industry is only possible through the use of this first generation technology basis, cash flows from that first generation, the know-how, and the infrastructure.

Our pilot cellulosic plant in York, Nebraska is the proving grounds for the technology that we are incorporating in the Hugoton plant. In fact, cellulosic ethanol can be produced today. However, the main concern is how much it costs to produce that gallon. We are working as quickly as we can to figure out how to produce that lower cost of production.

Fuel production from biomass is currently offering considerable savings in greenhouse gas emissions from transportation fuel and has the potential for more. The current technology has a life cycle reduction in greenhouse gas as compared to fossil fuels, such as gasoline, of about 28 percent.

In some of our plants, we are starting to introduce biomass as the energy source for converting that corn ethanol. That increases the reduction in greenhouse gas to 52 percent. By using cellulose as the feedstock, rather than corn, to make the ethanol, we can reduce the greenhouse gas by 90 percent compared to gasoline.

What are the barriers to the cost of production? First, the rapid increase in the price of feedstocks, has caused banks and Wall Street to be concerned over the profitability of the industry. Financing for new ethanol-based plants is difficult to obtain and nearly impossible for new, unproven technology, such as the cellulose ethanol.

To obtain a financing package, financial institutions will require the cellulosic industry to line up long-term contracts with feedstock suppliers. Feedstock collection, harvesting, storage, and transportation will be significant challenges to the industry we will have to address.

As an example, in this plant in Hugoton, Kansas, we will be requiring 700 to 1,100 tons of biomass daily to operate the cellulosic ethanol and the steam facility to supply steam to both plants. We will also need 90,000 bushels a day of corn to operate the starch facility. To do this, we need 100 trucks per day delivering biomass to the plant, this biomass in the corn of corn stover, sorghum stover, or wheat straw. In addition, another 100 trucks per day will be delivering corn or milo starch to the processing.

Significant resources are needed to be dedicated to this issue over the next year to make the system work. There are still areas of technology development that can help reduce the cost of converting cellulosic material to ethanol, freeing up more of the cost of production to enable the farmer to produce the feed material. These include the cost of enzymes to convert cellulose to sugar.

Currently starch conversion to ethanol spends a few cents per gallon of ethanol, while the initial cellulosic processes will probably spend 50 cents to a dollar per gallon. With further research, we feel that this can be reduced to 10 cents per gallon. It will always be a little bit more expensive than starch because of the complexity of the conversion).

In conclusion, Abengoa is committed to the renewable fuels industry. Unfortunately, a well-coordinated attack from those who defend the status quo is raising doubts on our capability to increase our energy independence. We will have to show that we understand the advantages of renewable energy sources, confident in knowledge of renewable fuels, and continue to devote significant financial resources to research and deploying these new technologies.

Thank you.

[The prepared statement of Mr. Wooley may be found in the Appendix on page 38.]

Chairman SHULER. Thank you, sir.

At this time our next witness is Scott Barnwell. Mr. Barnwell is the General Manager of Blue Ridge Biofuels in Asheville, North Carolina. I don't think there is a company in our region that has had a greater impact on the awareness of this issue and truly making a difference in not only the discussions but actually in proving a point than this company has - Blue Ridge Biofuels.

So, Mr. Barnwell, thank you. And you will be recognized for five minutes.

STATEMENT OF MR. SCOTT BARNWELL, GENERAL MANAGER, BLUE RIDGE BIOFUELS

Mr. BARNWELL. Mr. Chairman, Ranking Member Fortenberry,and members of the Subcommittee, I really appreciate the opportunity to come and talk to you today and testify on this very important topic.

I am General Manager of Blue Ridge Biofuels, located in Asheville, North Carolina. And I am also here speaking on behalf of the National Biodiesel Board, the trade association for the U.S. biodiesel industry.

Just to give you a little bit of background, Blue Ridge Biofuels started in 2004 building our plant in Asheville. Two years later we actually began supplying biodiesel to the first publicly available biodiesel station in that part of the state, actually one of the first in the Southeast, and started continuing construction of the plant beyond that.

A big component of our operation has been education. We have tried to educate the public about the importance of alternative fuels and biodiesel, in particular. And in many ways, Blue Ridge Biofuels I think was ahead of our time because while we are now here today in 2008 talking about second generation biofuels, that really for us was our beginning.

We were somewhat nontraditional in our approach. We really focused on recycled waste vegetable oils as our base feedstock from the very beginning and have been growing that ever since.

And every drop of fuel that we have produced has come from recycled waste vegetable oils, and we are currently involved in research and development to actually expand that feedstock base.

This fuel has been used by countless residents of western North Carolina for personal vehicles, for construction fleets. The Asheville Regional Airport uses our fuel. A number of municipalities, including the City of Asheville, City of Hendersonville, City of Black Mountain, throughout western North Carolina use of fuel.

And we have been expanding, in addition to universities. And also we are one of the pioneers in developing what is called bioheat or home heating oil, that has a biodiesel component, again all with fuel that is made from recycled waste vegetable oils that are one of the most sustainable fuel sources and feedstock sources available.

So in many ways, our business model has been we were founded and based our ideas with a strong environmental ethic, but, quite frankly, the economics is coming full circle now. And that is why we are starting to see many others in the industry looking at these recycled oils as a potential feedstock, taking what was once considered a waste product and actually turning that into a very effective fuel, a very clean-burning, high-quality fuel that meets all ASTM specifications.

I would like to applaud the leadership, both the Chairman and others in the House, for your leadership in expanding the use of domestic renewable fuels. And, in particular, with H.R. 6049, the Renewable Energy and Job Creation Act, that was passed by the

House prior to Memorial Day, has a few critical provisions for our business, in particular, and for the national biodiesel industry.

Most importantly is the extension of the biodiesel tax incentive for another year. That is a critical element as we have to spend a great deal of resources in research and development. That is an element that has actually allowed us to remain viable. And without that, I probably wouldn't be here talking to you today had that tax incentive not been enacted in the first place.

Also, a very important part of that legislation is increasing the tax incentive to make it equal among all feedstocks because, as you know, until now and including now, the fuel that we make, we receive 50 percent of the tax incentive that producers that use virgin feedstocks receive. And when we talk about sustainability and promoting sustainable feedstocks and sustainable fuel and promoting energy security, that is absolutely critical for the long-term growth of the industry.

I would also like to express our pleasure with the expanded renewable fuel standards that was included in the Renewable Energy and Job Creation Act enacted last December. That is going to create a much broader base of production for biodiesel and help make this a more important component of our expanded renewable energy development here in the U.S.

Increased biodiesel production is very important for the environment. It is good for consumers, and it is good for our country as a whole.

We are working in partnership right now with the University of North Carolina to develop actually new innovative approaches to be able to expand these recycled feedstocks to use very low-quality oils that have historically not been used in biodiesel production. And that type of research and development is going to be actually promoted and enhanced by the renewable fuel standard that was enacted.

So, again, I would like to thank you for this opportunity to come here and speak to you. Research into these new feedstocks into these second generation biofuels over the next four to five years will be critical for the long-term success of the biodiesel industry in this country. And we look forward to working with you. And thank you, Mr. Chairman, for the opportunity to come speak to you.

[The prepared statement of Mr. Barnwell may be found in the Appendix on page 43.]

Chairman SHULER. Thank you, Mr. Barnwell.

Our next witness is Tom Todaro, the CEO of Targeted Growth and Sustainable Oils in Seattle, Washington. You will be recognized for five minutes.

STATEMENT OF MR. TOM TODARO, CEO, TARGETED GROWTH AND SUSTAINABLE OILS

Mr. TODARO. Thank you.

Good morning. As the Congressman said, my name is Tom Todaro. I run an agricultural biotechnology company based in Seattle, Washington but with field stations in many of our districts, actually, all of the Midwest.

The company is almost ten years old, making us sort of the old man of the industry we are talking about today. These problems take a long time in terms of the biology necessary to create plant life that can provide a remarkably different energy source than the ones you are seeing today. So while the other members around the table use machines to produce it, we use plants to produce what they need to put into their machines.

So I will talk briefly about us and then we basically serve as a footprint for what the industry will likely look like over the next couple of years.

So the company works both on biodiesel and on ethanol, both in next generation or generation and a half. So the biodiesel crop we use is a crop similar to canola. It is called camelina. It is a mustard seed.

We chose it because it has very, very good energy qualities. It is not a great food oil, but it grows in marginal lands, so in eastern Washington, Oregon, Montana, the Dakotas. The work we have done on it non-transgenically has allowed really substantial yield increases through some very clever technologies that we have developed using marker-assisted breeding and some science words I won't bore you with today.

But the net result is we think we are achieving a cost per gallon savings of about 50 percent over soybeans. It rides up and down. Soybean oil today is trading at about six cents a pound.

And that pricing, both on soybean oil and on corn, is what is creating all of these problems with financing being available for the physical plants that are in the Midwest.

So generally the goal is to do 100 million gallons. By the end of 2010, 2011 probably, we will be the largest dedicated second generation feedstock in the country.

On the ethanol side, we looked back in time, rather than forward in time. A thousand years ago, 3,000 years ago, the Mayans were using sugar to create alcohols. Alcohol is all ethanol is.

We started looking at ways to convert traditional corn into a sugar-based product. Rather than going through the starch process, we basically are able to turn corn into sugar cane. So this corn has no cob. It has no ear. It has no kernels. What it has is an awful lot of sugar in its stalk.

And if our last year's tests prove out this year, we will be getting 1,000 gallons an acre on corn that we can grow in the Midwest, in the Farm Belt. And if this proves out to be true, it helps relieve the food versus fuel debate in a counterintuitive way, which is let's take a small area around the ethanol facility, grow very high energy corn stovers there, and allow that to be the product that feeds the ethanol industry for a certain period of the year. Well, you can't do it all year for some reasons, but it will work three, four, five, six months of the year depending on growing seasons.

The third and I think the most esoteric but the one that requires the long-term investment that Dr. Bartlett was talking about, is prokaryotic algae. All the oil you are getting today out of the ground, almost all of it, comes from algae. Some of it is from old trees, but it is all biomass that has had a long time to digest.

We believe that Targeted Growth is able to take that second generation, this algae, use a whole bunch of photosynthesis, the energy

from the sun, and create something that grows at five to ten thousand gallons an acre, so many fold over what we think we can do in corn.

That will take us several more years to develop. And I am unable to say what Congress can do to help because I don't understand the legislative process, but I can tell you what we can do and what others like us should be able to do.

And to the extent you can help companies like Targeted Growth and the others of this panel, I am pretty confident that sort of help is on the way and well within the time before oil depletes and we are back to alternative sources that would be more problematic to use. Biofuels really can make a significant impact in the amount of fossil fuels that are consumed today.

Thank you.

[The prepared statement of Mr. Todaro may be found in the Appendix on page 47.]

Chairman SHULER. Thank you, sir.

Our next witness is Jeffrey Trucksess, the Executive Vice President of Green Earth Fuels LLC, which is based in Houston, Texas. Mr. Trucksess, you will have five minutes for your testimony.

STATEMENT OF MR. JEFFREY TRUCKSESS, EXECUTIVE VICE PRESIDENT, GREEN EARTH FUELS, LLC

Mr. TRUCKSESS. Mr. Chairman, Committee members, thank you for this opportunity to speak with you today. I am the Executive Vice President of Green Earth Fuels and one of the founders.

We are one of the largest biodiesel producers in the country. I guess that is an honor to be here as one of the largest. Three years ago we called ourselves five guys and a fax machine. So small businesses can transcend. And I think this country is going to need that sort of innovation because we have got some challenges ahead, as you all have pointed out.

One of the differences about our biodiesel company is we are making significant investments in second generation or generation and a half feedstocks. We actually have a joint venture with Targeted Growth to commercialize this crop, camelina. We are investing enough capital to do about a million acres, hopefully by 2011.

We are also building a model palm plantation in Guatemala. I call it a model palm plantation because we are preserving all the primary rainforests, providing about 4,000 jobs to the region, developing an independent growers' program. So it brings jobs to the region, and it is a highly productive crop. And it can be done environmentally sensitively.

The most interesting thing, thanks to Congress, we have gone as an industry from about 25 million gallons a year in 2004. You guys have passed a renewable fuel standard tax package. We are up to about 500 million gallons a year now. And the renewable fuel standard will take us to a billion.

I think that is just a start, but it creates the marketplace that drives the investment. To get to some of these next generation crops, I appreciate your support. And I think we have a lot to do.

And one of the most important pieces here is stability of policy. And that is something that is in grave question right now, tax

credits expiring, fuel standard being questioned. And I can tell you from sort of the financial community and the business community it is devastating.

And so we certainly look to you to provide the sort of leadership that is going to be long-term and appreciate what the House has done on the proposed extension, but we will get to that in a bit.

A little bit about camelina. Tom has given you a brief overview. One of the interesting things is it is a non-food crop, in part because it doesn't taste very good, but it grows best in marginal areas or as a rotation crop for wheat. So typically every third year you would leave your acre of wheat fallow to let the soil regenerate.

This fits in well nicely, kind of like the corn-soybean rotation that has worked over time. So it fits in well. You are not competing for the wheat acres because it is not that profitable, but instead of leaving it fallow, you are using it or it is very low-input, low water, low fertilizer needs. So you can put marginal acres into use.

There is another crop: jatropha. We are planning about 50 trial acres of that. We did a study in Texas to see how would this work in Texas, how could you do it, you know, again, utilizing marginal acres that we are not taking advantage of.

Ironically, we found about a million acres of triangles on center pivots of land currently in production, where the center pivot doesn't actually reach the corners. There are a million acres of that, camelina or jatrophic, that grow great in an area like that. Again, you are not competing with food crops. It is a low-input crop, doesn't need the water, huge potential there.

Texas looked at, you know, if we could do 500 million gallons in Texas, it would be about a $22 billion industry and create 100,000 jobs in the state. So it is huge jobs. It is going to farmers. It is going to small businesses, small crushers because biodiesel and a lot of these other technologies are great regional businesses. You have Blue Ridge here. You see them pop up everywhere.

We just recently spoke at a conference in Albuquerque, New and had the national labs there, a lot of leading experts in agriculture. Kind of the consensus of the day was there is a significant opportunity to do sustainable biofuels. Is it the complete answer? No, it is not he complete answer, but it certainly offers potential five percent, ten percent. Algae comes along, maybe greater than that. So the leading experts think we can do it. And we just need sort of the commitment from our nation so we can continue to make these sorts of investments.

And I guess I have referred to it a lot, but it is critical: stability of policy. It really is what drives investments. The renewable fuel standard I know has been questioned recently. I urge you. The linkage you question that. You question the marketplace. You scare investors. They pull out. They pull back their money. And it stops investments for ten years.

So when I started this business, we went to the investment community. And they are like, oh, we have been burned on ethanol before. We don't even want to look at it. It was a huge hurdle to get over because policies had changed over time.

So, even though there are questions, I think Congress has done a great job in setting the policies. Stick with them because it is what really drives the next generator.

Tax incentive package. Again I applaud the House action on this. We are working with the Senate as hard as we can to try and get them to pass it, but already banks started pulling money out of my business because they are concerned it won't get extended.

A retroactive fix doesn't work for the fuels industry. It has worked for wind. It won't work for us. So banks get scared. They pull their money back, which means I can't invest in camelina. I can't invest in Tom's science.

So it is critical that we get these things done and move early—you know, even if it doesn't expire until December, we have problems now—and invest in the research and development.

I appreciate the time and look forward to your questions.

[The prepared statement of Mr. Trucksess may be found in the Appendix on page 51.]

Chairman SHULER. Thank you, Mr. Trucksess.

At this time I yield to the Ranking Member, Mr. Fortenberry, for introduction of our next witness.

Mr. FORTENBERRY. Thank you, Mr. Chairman.

I would like to introduce Mr. Robert Byrnes from Oakland, Nebraska. Mr. Byrnes is a producer of beef and pork and worked for many years as a chemical engineer. He runs Nebraska Renewable Energy Systems and is President of the Nebraska Renewable Energy Association. At his business, he works with a wide variety of renewable energy sources and runs an off-the-grid farm as a demonstration of what renewable fuels can achieve.

Mr. Byrnes came all the way from Nebraska to Washington in a vehicle powered entirely by biodiesel. And we appreciate your willingness to come out and look forward to your testimony.

STATEMENT OF MR. ROBERT BYRNES, NEBRASKA RENEWABLE ENERGY SYSTEMS

Mr. BYRNES. Thank you, Congressman Fortenberry and Chairman Shuler for the opportunity to visit with you. I hope my testimony will be of some value to the Committee in their considerations.

As the first registered producer of biodiesel in Nebraska, I have been involved with developments in my state from the ground floor and just recently commissioned the largest operating biodiesel facility in the state. The Energy Farm in northeast Nebraska that I own is energy self-sufficient and is currently in use as an energy training facility.

I co-founded the Nebraska Renewable Energy Association in 2006 and am currently focused on the needed processing of the materials that will supply these second generation oils to the market.

Travel to and from this hearing will be petroleum-free, using 100 percent Nebraska-made biodiesel.

When we started building the biodiesel facility two years ago, soybean oil was 23 cents a pound, which reflected the 10-year average. Soybean oil now is trading at 67 cents a pound, reflecting its historically strong correlation with petroleum crude oil.

Biodiesel production cost is heavily dependent on feedstock price. An additional dollar a gallon is required to convert this oil to meet ASTM requirements for biodiesel.

As a result of this surge in costs, almost half of the biodiesel production capacity built in the last three years is currently offline. Similar price surges have also been seen in animal fats and used vegetable oil markets. It is clear that the first generation of feedstocks available for biodiesel have run their course.

To meet these short-term needs, industry has turned to waste and low-value streams to substitute for first use oils. Removal of the oil-rich fraction of corn prior to ethanol production is an excellent opportunity since the oil actually inhibits ethanol fermentation.

This oil is also a limiting factor of the DDG, the dried distiller's grain, that comes out of the process as animal feed. The average 40 million-gallon ethanol plant can realistically supply 2 to 3 million gallons of high value corn oil.

In terms of regulatory requirements, biodiesel facilities are characterized as chemical processing facilities. While environmental and personal safety must always be ensured, current regulatory requirements are a tremendous cost for the renewable small business owner.

Nationally an exponential expansion of the feedstock pool is required to make a significant impact on petroleum diesel consumption levels. If all of the fats and oils currently grown in the U.S., over 950 million acres of agriculture, were used, all of them, we would supplant 10 to 12 percent of our petroleum diesel consumption across our country. And that is not possible to do.

I will only mention two of the most promising examples of future feedstocks that offer this exponential increase of the available pool; first, biomass and waste-fed gasification. This can be used to create the building block of organic chemistry known as syngas.

This syngas can then be reformed to a liquid using 100-year-old German chemistry techniques back to a liquid, which is how they were able to make liquid fuel from coal for two world wars. With this technology, waste and low-grade materials can be recovered into renewable diesel or renewable ethanol. The efficiencies of small business research efforts are needed here.

Second, algae production is a tremendous growth area with small businesses leading the way in innovative applications. Algae has been shown to provide over 50 times the productivity per acre as soybean and will actually expand the available food stream by adding a completely new and protein-rich food and feed supplement.

Nebraska has had its first algae project announced this week in a rural area owned by small business. This project is being developed by a renewable energy firm that grew out of my original work within the broad spectrum of available technologies.

This algae project will recycle process waste heat from an oil seed-crushing facility and biomass combustion emissions to boost photosynthetic production of these oils and process them in-house to close the loop.

Decentralized growth of algae and production of oil could be done most quickly through municipal waste facilities where treatment, capacity and food are currently available. Large facilities and processing infrastructure will take time to construct. Small business innovation is once again in the best position to develop this technology in the short term.

A tremendous boost for decentralized utilization and small business production of alternative biofuels would be to exempt all biofuel producers from state and federal road taxes up to 5,000 gallons per year. These producers would need to show verification of biofuel gallons used and not necessarily ASTM certification of fuel quality.

Significant expansion of the successful grant programs currently in place are essential in supporting small business in meeting the challenges of supplying these second generation feedstocks.

Biodiesel itself is a trademark term and is defined by the industry ASTM standards. Non-ASTM renewable diesel or stray vegetable oils can also run diesel motors. But to gain access to the dollar gallon tax credit, ASTM standards must be met. And these oftentimes represent a significant burden to the small producer.

While any fuel in general distribution must meet strict criteria, small businesses that produce and use these materials for themselves or convert the motors to allow their use cannot gain access to this tax credit, even though the use directly replaces petroleum diesel consumption.

The original diesel engine designed by Rudolf Diesel 100 years ago was designed to run on these straight oils. I provided power to my Energy Farm for years using a renewable diesel from animal fats, waste, and alternative seed oils that could not technically be called biodiesel although, it replaces petroleum diesel.

Future feedstocks will also challenge the strict soy-driven ASTM standard requirements. The tax credit of a dollar a gallon should be extended to any renewable biodiesel or biofuel that is used to directly displace the consumption of petroleum-based diesel or gasoline.

In closing, small business will remain a leading and cost-effective innovator in this critical area. The decentralized energy production systems being developed in many cases could be of significant value to U.S. military, Homeland Security, or FEMA. These agencies could greatly benefit from the creation of a streamlined process to partner with small businesses that can support the goals of these agencies for continued operations without requiring vulnerable energy logistical support.

I thank you for your invitation to address this body and your interest in this area. And I would be glad to provide any answers to questions.

[The prepared statement of Mr. Byrnes may be found in the Appendix on page 54.]

Chairman SHULER. Thank you.

Mr. Todaro, I guess explain to us more. I mean, I was very interested when you said that it was from almost 5 to 20 thousand gallons per acre on this algae production. Explain a little bit more to me, if you can, the process, how that works. And probably the most important thing, how do we get there quickly?

Mr. TODARO. The easiest way to think about algae or any single cell organism is it can only do one thing at a time. So algae just divides. Its sole focus is to keep dividing to maintain life. It is not wasting any energy making roots or leaves or growing vertical, cre-

ating high-density cellulose, which the cellulosic people need to remove. So all it does is grow.

It can take a much, much higher percentage of the photons, the energy from the sun, than any traditional land-based crop. And so all earlier calculations, done by NREL and by others, show that there is a solid theoretical basis that says if you just take sunlight, you shoot it onto things and all they do is divide, you will get so much biomass with so much lipids.

The problem has been traditionally that because they can only do one thing, they either divide and you get lots of green stuff or they make oil and they don't divide very well.

And so companies like Targeted Growth, us, and others have said, well, how do we crack this fundamental problem? And the way you do that is you put in what are called inducible promoters. You tell the thing, "Okay. In the beginning of your life, just divide. And then when you have a high enough density, in an outdoor probably facility, please change. And then spend the rest of your life just making oil. And then we can process you."

The problem is this is pretty complicated. This is a multi-gene system. You know, I have got a dozen molecular biologists who do nothing but try to figure this out. And my big fear is that because there is one thing I can guarantee, which is that 15 years from now, it will be an algae that is the biofuel that everybody is using, its inherent advantages are just too great, the problem is there is no guarantee that is going to be a U.S.-based solution.

There is a lot of good work going on in Asia, some pretty good work going on in Europe. And this can be a game change. Whether it is us or somebody else or a combination of companies, one of my big fears is the investments made abroad are so much greater than the investments made here that if somebody really cracks the nut, they are going to have extraordinary, extraordinarily valuable technology for generation. It becomes an operating system. It becomes the next Microsoft. Because once you have figured out how to do it, it is deployable everywhere.

Chairman SHULER. How far away are we? Do you think it will take 15 years?

Mr. TODARO. Yes. Well, it depends on what you mean by "how far away." We can do it in a really cool-looking flask right now. Come out. You are welcome to visit our labs.

Nobody else has been able to do it in a cool-looking flask. So that is exciting. There are certainly companies that are trying to produce algae right now. And with some limited success, I think the first generation algae fuels are almost ready, but the game changer is being able to do what I am suggesting.

We have a letter of intent from a major utility. We will like try to do a 20 or 25-acre trial with them over the next year to 18 months. There are others that are trying things of about that scale. But this involves biotechnology. So this is genetically engineered. And there is no point in avoiding the question because these pathways are so complicated we need to put them in.

And so depending on legislative issues, Food and Drug Administration, government oversight, we will have a marketable useful product in five, six years realistically. And then if it works, the expansion rates are exponential, just like algae itself.

Chairman SHULER. So the long term is that it is almost like I guess growing up in the mountains of North Carolina when the first cars were produced and the first person to have a car, fuel was pretty easy because they had moonshine. I mean, they actually produced ethanol.

Mr. TODARO. Absolutely.

Chairman SHULER. And that was part of the old process, that you could actually produce it at home. So could a mini farm produce enough with this algae production to be able to almost have a stand-alone fuel station, if you will, if this becomes process?

Mr. TODARO. You certainly could. I mean, I think there will be huge rural implications. Like all things, there is efficiency with scale.

So I think realistically the first generation of these is likely to be collocated with utilities or CO2 sources so that you can do them on tens of thousands of acres.

But even second generation algae, which is actually much easier to do because we can produce a new strain of algae in four and a half hours, it is quite realistic to see a solution where the alkanes, the actual molecule, almost to ASTM spec, you can simply create right there in a pond.

So is it unrealistic to assume that ten years from now a farmer could take an acre of their land, grow material like ours, have it excrete number two diesel, and use that farmer to power vehicles? I think that is quite likely. I think that it is probabilistically where this thing ends up, yes.

Chairman SHULER. Mr. Byrnes, you are off the grid or do you sell back to the utility company?

Mr. BYRNES. The Energy Farm is an off-grid facility focused on bringing out the technology and practicality of the energy loop that exists on the farm, as you had alluded to. I think there is a lot of synergy in bringing the technologies together. And smaller, diversified farms, as farms have classically been, have a lot more potential to utilize that energy loop than specialized larger facilities.

But the farm I have is off grid over four years. The power lines run by—we have wind and solar, biodiesel, crushing, and renewable energy in terms of working on our digester this summer.

Chairman SHULER. What do you feel like your savings have been over that four years?

Mr. BYRNES. Self-reliance is my savings. I have never quantified it. But the fact that we can do it and show other people how it may or may not fit for them or one aspect of it, the satisfaction that it brings I think in showing people that it can be done as a demonstration project is the value.

Chairman SHULER. Mr. Barnwell, tell me and other members of the Committee about the education process that you have gone through, whether it be in the schools or just educating the public or even from the bumper stickers.

Mr. BARNWELL. Right. Well, a big challenge for us is getting people to understand that these fuels that we are talking about don't require any special equipment. People assume that when you start talking biofuels or biodiesel that they need to go out and buy some new equipment, some kind of new engine, they have to have their car modified or truck modified or so on.

So a big part of it is just getting the word out there through—we do a lot of talks at conferences and festivals and so on in the western North Carolina region, in particular, and in the schools, the universities, going in and just talking about both the value of biodiesel in terms of the net energy output that comes from it. And it is very high. It is about 3.5 units of energy for every energy unit input but also the fact that you can simply put this straight into your existing diesel vehicles.

So whether they are truck drivers or folks with a Mercedes or Volkswagen diesel car—like I said, we have fire trucks and landscaping equipment at the actual airport running our fuel—but just educating these folks and these fleet managers so that they understand not only can they just run this fuel in their existing equipment, but it is actually better for their equipment. It is a higher-quality fuel in terms of its lubricity and other properties.

So the bottom line comes down to price almost always. And if we can provide a product comparable to petroleum diesel, which we have been able to do over the long haul, in some cases we are actually slightly under petroleum prices in western North Carolina, some of the lowest-priced biodiesel in the country. People are very willing to accept that and adopt that.

We find that people do it for a number of reasons. Some it is purely environmental. They want to have cleaner emissions and cleaner air in the mountains. Other people it is more a question of national security and patriotism. They would rather put fuel in their tank that is produced right there near their home from people that they know and keeping that money right there in their local economy, as opposed to shipping those dollars off to the Middle East. So it is a number of reasons.

Chairman SHULER. What is the cost right now per gallon at the pumps?

Mr. BARNWELL. Well, we sell everything from B-2, 2 percent biodiesel, up to B-99, essentially pure biodiesel. And it ranges. In the lower blends, it is very comparable with petroleum, obviously, because it is mostly petroleum.

Our B-99 right now is selling in the Asheville area anywhere from 4.80 to $5 a gallon, which is right on par with petroleum diesel.

Chairman SHULER. Dr. Wooley, you talk about the transformation of cellulosic ethanol production and some of the problems and issues. I note that wood chips have always been mentioned in many different ways. We have seen how the production of corn has increased, and we had a hearing. Bakeries, for example, are experiencing higher wheat prices as a result of higher corn production.

Will using wood chips increase lumber prices and cost of homes if that goes into production or is it a lower quality of wood that is being used?

Mr. WOOLEY. Well, first, to help everyone understand the feedstock, so wood is, believe it or not, very similar in composition and structure to things like the corn stover and the grasses that we talk about. So as far as the conversion technology, it is very similar. And you just have to grind it a little bit differently.

Part of the challenge around wood and grass is that it is sort of the chicken and egg. How do I get somebody to commit to a large

tract of land for wood to supply to me? How do I get somebody to commit to a large tract of grass to commit to me?

So I am getting around to your answer. One way to look at it is using the agricultural residues, which are already there—they are not used for very much else—gets us so that we can develop the technology. Then we can move to wood feedstocks. Wood feedstocks are actually in some ways better. They are much more dense. You can haul them much more efficiently down the roads in trucks.

And to answer your question about how will that affect the lumber industry, it depends on what sort of the economic position is of who is producing it. And this is sort of secondhand information from myself. There are some areas of the country that have been traditionally producing wood pulp. There is less demand for wood pulp. So those stands of lumber or trees are under-utilized right now. And so converting those and using those for feedstocks for cellulosic ethanol would have little, if any, impact on anything else.

And so there is also the ability to use more of the second—and I am not a lumber guy. So I don't fully understand it, but there is certainly prime wood, the wood that you would like to have for two by fours, and then there is secondary wood that is not as useful for that industry, which can be used in the cellulosic ethanol industry. So, again, sort of that secondary wood that is not as useful for the prime industry.

Chairman SHULER. Mr. Trucksess, if you looked at one area, whether it be funding, policy, R&D, if you could have your wish list, what would it be for Congress to help incentivize companies such as yours to be able to grow and give us the independence that we need, the efficiencies that we need, and the technologies that can be and are available?

Mr. TRUCKSESS. Good question. I think it is two parts to that answer. One step you already took. The renewable fuel standard has sort of a carve-out for advanced biofuels. I think everyone here at the table qualifies under the advanced biofuels. It is a small sector of the policy right now, but I commend you for doing that because it has stimulated a lot of investment sitting here at the table. Make sure that stays in place because if it goes away, I think we all probably go away.

And, two, it is the, at least for my industry, extension of the biodiesel excise tax credit, broadly speaking, for these guys, whether it is the cellulosic credit or ethanol credit. It is absolutely critical because everyone really relies on private equity, banks to fund this technology. And you start giving unstable policies. And they just pull back their money. And they don't start up again next year when you change the policy.

I was just at an event for Representative Ciro Rodriguez. And one of the guys that attended started the Biodiesel Coalition of Texas. He was one of the major recipients of the CCC Bioenergy program, which has been re-funded, started the whole industry, really, in Texas.

And he is now out of business because some Texas policies changed, some government policies changed, disappeared, came back. He expanded, policies went away. He had overextended himself because of the disappearing policies. And now he is out of business.

So, again, the sooner you can act to extend the excise tax credit for us and when you go towards perhaps the next Congress, look at long-term extensions. Give investors the certainty to create new technologies.

And let us make partnerships with his company. He needs me behind him so he can go to a farmer and say, "Well, I am going to buy the product from you." If it is camelina, a farmer needs to know who is going to buy it if I grow it. We have got to create these partnerships. I can only partner. I can write the contract if you tell me, "Yes. Here is what" I am going to have in a year or two years.

So I appreciate it.

Chairman SHULER. One last question. Mr. Byrnes, the Ranking Member and I were wondering, how did you get that through security?

[Laughter.]

Chairman SHULER. I don't want to know the answer. At this time I will—

Mr. FORTENBERRY. We will erase that gap.

Chairman SHULER. Yes, we will erase that.

Recognize Mr. Fortenberry for his questions for the witnesses.

Mr. FORTENBERRY. Thank you, Mr. Chairman.

All of you have provided very engaging testimony in particular areas of expertise that you have. And, of course, that is very helpful. But for us as policy-makers, it is always helpful to take a step back and look at things from the high altitude.

And Congressman Bartlett said it quite well. I think we need an orderly transition to a more sustainable energy future. And you all have a role to play in that.

Now, the question is, how big is that role going to be? What chapter of a very large energy portfolio can you provide? If you will using your expertise about the variety of technologies that you all are using to make money and if you had a best case scenario as to the potential expansion of all of these opportunities that are obviously going to have to be done, integrated in an environmentally sensitive fashion—but talk about how big the potential here for this chapter of our overall energy portfolio. Will you potentially meet 10 percent, 20 percent of our overall energy needs in the country?

Mr. TODARO. You know, I can tell you from our point of view that for a company like Targeted Growth, it is actually quite quantifiable. So if you look at camelina, which is this canola derivative, we should be doing 100 million gallons in 2011-ish. That will grow to maybe 200 million gallons, basically a drop in the proverbial energy bucket.

The sugar-based corn ethanol I was speaking about, which really is a next generation technology, where you are doubling or tripling the amount of energy per acre that a corn farmer can get, that is a billion, so a billion to a billion and a half. So you are starting to make a dent, still reasonably small but a billion here, a billion there. It starts to add up.

The third generation technologies, the algal systems, we are talking about are limitless. You know, there are all of these great stud-

ies. If you took X number of square miles in just New Mexico, you could fuel the whole country.

You know, those sorts of scale-ups aren't really the right way to think about it, but the right way to think about it is it is massive. I am very comfortable say that. All terrestrial based oils that go away, if they are replaced by a biofuel, it will be a single cell organism.

So I would think of that as 100 million, billion. Infinite is the way to think about it.

Mr. FORTENBERRY. Okay. If everybody would respond to that, please? And when you say, "infinite," again, trying to quantify this for us in terms of a ten-year, five/ten-year horizon, it would be better if it were a six-month horizon because—

Mr. TODARO. Right.

Mr. FORTENBERRY. Yes. People are—

Mr. TODARO. Unfortunately, you know—

Mr. FORTENBERRY. But, again, in terms of the overall energy portfolio, how this potential—and if all of you could add to this, the percentage that it would make up of our overall energy portfolio, I think it would be helpful to know, just your best estimates, best case scenarios on continued development, sustainable policies that promote it, exceptions perhaps for regulations that adversely impact small businesses, ongoing development of small-scale distributed generation, new technologies that are coming online that will integrate even more types of biomass.

Mr. WOOLEY. If I could respond, in the ethanol industry, we certainly believe in what others have predicted as well, about 15 billion gallons easily from corn and other starch sources in the United States. And that is certainly technology that is there and can be expanded quickly. And we are doing our share to do that.

As far as the cellulosic industry, just from the corn stover and the wheat straw that is out there, we have got probably another 15-plus billion gallons. Now, that is going to take a little bit longer. And we really have to have a progression.

We are going to build a pioneer plant, really, in Hugoton, Kansas, as I mentioned earlier. And that is 12 million gallons. That is not very big, but that is a spot where we can prove the technology. We probably have to build one more that is more full-scale, maybe the 50 to 100 million gallons.

And then at that point—so now we are talking we are up into the 2015 time frame. At that point, if the financial markets are there and the proper marketing incentives are there to ensure that we can get that financing, then you can start to really expand that industry. So now you can start to see that 15-plus billion gallons coming from things like agricultural residues.

After that, we start to get into and we believe at the same time we need to continue to develop things like the energy crops, so whether it is wood energy crops in the case of hardwoods or whether it is grass crops, that can then go again to marginal lands.

And even with switchgrass, the current strains—and we are working with small business partners, too, to develop some of those strains. We are talking on the order of 1,000 gallons of ethanol from an acre of switchgrass.

So those start to open up new lands that are not necessarily useable for other purposes. And now my best guess personally would be another 15 billion gallons or so from those sorts of resources. So at the end of what I have just added up, it is 45 billion gallons. That is on the order of a third of our current gasoline usage and maybe in the 2025 time frame or so.

Mr. FORTENBERRY. Okay.

Mr. BARNWELL. With the current renewable fuel standard, we are looking at increasing to one billion gallons of biodiesel production. That represents almost two percent of all biodiesel that is used in a 60 billion-gallon market.

So that is the starting point just in the next couple of years. Going beyond that, we know that there is enough feedstock out there if it is tapped. And there is a lot of untapped feedstocks, like even in these second generation feedstocks, such as recycled waste oils and waste greases.

If we can have the right technology in place that we could tap into all of those and we can have an efficient collection system to bring all of this into the biodiesel market, we could see that number easily increase to five, six billion gallons a year. So right there you are getting close to ten percent. And I think that is feasible in the five to ten-year time frame.

And then going beyond that, the kind of work that some of the other folks here on the panel are describing in terms of increased feedstock, that is really the bottom line when it comes to biodiesel, availability of feedstock.

We can produce fuel as long as there is a feedstock to produce it from. And the new technologies with algae, in particular, are very exciting. I think infinite is a big number, but when you think about it, as long as we can produce enough on these marginal lands to meet demand and at the same time address the points that Dr. Bartlett raised with conservation and actually trying to keep that demand in check through other technologies, things like hybrid vehicles, even hybrid diesel vehicles, which are now coming on the market. And even buses driving around this city are using those technologies now.

By reducing those demands, it is sort of a—you know, we can get this balance. Let's get this scale into a better balance.

Mr. FORTENBERRY. Anybody else care to respond? Yes, sir?

Mr. TRUCKSESS. Several people have done a good job. DOE did a study a few years ago that said, you know, based on sort of current technology, you could do about 5 percent or 5 billion gallons of biodiesel from sort of current crops, you know, look at sort of the emerging technologies if we really get to sort of that is the bridge for the five or ten years that you need to get to the second generation technologies. Does that make a huge difference?

I have talked to API. And they said petroleum demand growth was growing six percent, supply was growing three percent. So at a three percent differential, you are now at $140 a barrel oil.

So does a percent or two make a difference? In the global scheme of things, it makes a huge difference in the short term because, you know, Goldman is predicting $200 a barrel oil or I have seen several different estimates. It is T. Boone Pickens. It is going up. And

so small percentages make a difference until you can get to some sort of—

Mr. FORTENBERRY. Well, I am asking a very hard question because it has to be a convergence of a lot of things, but we see a convergence of a lot of things. We see the high price of oil, the demand for new technologies, the policies that are lining up to promote that increased emphasis, appropriately so, on conservation that turn to looking at environmental stewardship as an integral part of managing our energy production.

But, again, all of this is helpful. And don't get me wrong, but if one of you could venture out and predict how big of a sector that the biofuels, these types of renewable energy processes can play in terms of replacement of overall energy or meeting overall energy needs in the country in a fairly short horizon, it would just be helpful.

Now, that is difficult, I know. But you are out there. You are on the front line. You are making money at it. You see the potential of this.

Mr. TODARO. I mean, you need to define your horizon. I would probably bet that no—

Mr. FORTENBERRY. You go ahead and—

Mr. TODARO. Yes. I would bet that probably nobody here is making money on it. I mean, seriously most of us are doing this because we believe. There are probably all alternatives we could do to get a bigger paycheck. But the issue is so enormous.

What there is a radical under-investment in is basic research and development. It is companies like my own. I am not tooting our horn. There are lots of other good companies and universities that should be promoted.

But if you think about the Manhattan Projects or times when the government really said, "This is a fundamental issue of national security. And we are going to devote resources necessary to win," we can absolutely do it. In five years, we will be able to show you that we are going to be done.

With engineering and process engineering done within ten years, can we be replacing just through a photosynthetic solution and a cellulosic based solution 20, 25 percent of currently useable fuels? Absolutely.

I don't know if you have children. By the time my children, who are four and six, go to college, I would venture to bet that half of what they do will be based on biofuels. And from there, it is a tipping point because at some point, what happens, of course, is you drive down the price of oil enough that it winds up being a commodity-based threat.

And once you get to $50 oil—but you know what? We get to there, and we are directly competing with oil after massive R&D done here in the U.S. I think all of us are going to be very, very pleased with that.

Mr. FORTENBERRY. Well, you make some excellent points about the need for a focused energy movement that builds rapidly toward a sustainable energy vision that meets important environmental goals, that untangles the question of particularly foreign oil from foreign policy considerations and creates a dependence on homegrown fuels that give us a real sustainable future.

You probably wouldn't find a Congress member around here who doesn't want to do that. Yet, the dynamics of our system, for whatever reason, have not created a breakthrough moment in which we can coalesce around a vision that is grand and meaningful and doable.

And I think that is one of the important reasons that we are doing this today, and I really appreciate the leadership of the Chairman in holding this hearing. And to the degree that we can make a contribution in that regard, here we sit.

One more question, Mr. Byrnes. You talked about some exemptions for the development of small-scale distributed generation of energy systems. That might be helpful to small business because, again, whether it is the old technology that used to take place in the mountains or innovative ideas that are taking place in the garage shops that tweak engines and put new things in them, to allow the innovation, to not inhibit the innovation of those opportunities may be the way in which we create an important component of this large energy breakthrough that we are looking for. So why don't you review some of those key points that you made earlier in that regard?

Mr. BYRNES. As a registered small producer, the first producer in Nebraska with a license, I did work with Motor Fuels. And they were very helpful in creating classifications for different production categories based on capacity, based on numbers of gallons per year. And I think Nebraska has a pretty good model there, but they don't have an exemption.

And at the small scale, if you are producing 5,000 gallons a year or less and that is a number that is a very significant number because that is average fuel consumption for a farm over an annual basis. That is a common number I hear from folks.

If they can avoid some of the red tape and just do it and get it done in a safe and environmentally responsible manner, that is a huge benefit. The reporting, the potential fines, the time and investiture and the paperwork and the bonding and the insurance and licensures and all of that stuff, that oftentimes costs more than the potential savings of doing it to begin with.

I think the amount of innovation that I see, I talk to people all day long, I mean, just citizens doing stuff and floating ideas by me and stuff. The amount of innovation is just staggering, what people are doing out there. And it is increasing.

Necessity is the mother of invention. And we are approaching that cusp where it is going to have to be. Hopefully we can get ahead of it with a little foresight before it smacks us with a two by four.

We don't have time to respond, but I think we will most efficiently and certainly most quickly respond with the little guy who has this equipment in the wood line or already doing it. Half is already in place. And the amount of dollars that is spent in that kind of research and the take-away from that kind of research far outweighs any other way of doing it.

You learn a lot more by doing it. I mean, on wind systems, I read about wind systems for two years, burned-out printer cartridges printing and reading. And I learned more in two days of installing

my system than I did in two years of reading about it. We need you to just do it.

And I echo the gentleman's comments here about the Manhattan Project type of necessity and focus. There is nothing this nation cannot overcome if we put our mind to it. I don't know that we have put our mind to it yet.

Mr. FORTENBERRY. Thank you, Mr. Chair.

Chairman SHULER. Couldn't agree more. Couldn't agree more.

At this time the gentleman from Indiana, Mr. Ellsworth, will be recognized.

Mr. ELLSWORTH. Thank you, Mr. Chairman. Thank you, gentlemen. I can't imagine a more important hearing that you could have held and five better guests and witnesses.

Mr. Byrnes, I get hit with a two by four every time I go home from people that want to do something about $4 gasoline. When I don't go home, then they hit me on the e-mail with that. So I think we are all getting hit with that two by four.

Mr. Todaro, you said earlier you don't understand the legislative process. I have got to tell you that sometimes people on this side of the table don't fully understand it either.

I would like to associate my comments with Mr. Bartlett first. And I have got to tell you when I start reading about this stuff I go to his Web site and look at his energy speeches. And thank you for all you do in your research. It helps us young-ins down here. And I appreciate everything that you do and your comments on this. Just a couple of questions.

And, besides that, Mr. Wooley, thank you for what you are doing in my area. And if you want to locate those other two plants in Evansville, we will try to roll out the red carpet for you. We sure wouldn't be opposed to that.

Tell me the difficulty of retrofitting as we move into the second phase or the second generation fuels. Are we going to be able to retrofit or is it all new technology? Are we going to be able to retrofit some of the phase one plants into the phase two, where we are going to save some costs there or is it a whole new process? We may have touched on it with the wood earlier, but is that going to be a difficult switch?

Mr. WOOLEY. We plan to follow the concept that we are doing in Kansas right now, and we will go back to what at that point will be an existing plant in Indiana and retrofit a hybrid facility. So we will have both to start out with.

And so the first challenge in an area is the feedstock availability. So it is very local. It is not like corn. I mean, we could pretty much site a corn plant anywhere in the country with delivering corn by rail and that sort of thing or barges. But sourcing the biomass feedstock in the area of the plant. So that is challenge number one.

As far as there is a synergy. There is a good synergy between the two facilities. There is a lot of infrastructure, a lot of power, steam, and waste water and all of those sorts of facilities that can be shared between the two.

And then longer term as the cellulosic technology really proves itself out, then there is a very good likelihood that we could start to retrofit and move away from the corn in that plant. And when we do that, we still maintain much of the fermentation.

Those very large tanks that you see, those are all very much the same. In some of the front end, how we process that, the corn stalks, into sugar, turning the corn into sugar would have to change.

But that is kind of our progression. We go back and we retrofit our current starch with the cellulose technology, take advantage of everything that we have already got there, the know-how, the people, the technology, and the expertise, and really start to really understand the cellulose.

And I agree with the gentleman earlier about doing it. I mean, that is a key thing. I mean, I personally have been involved in cellulosic ethanol research for the last 12 or 15 years. And I have sat around and read about it and studied it in labs and things like that.

And actually going out and building this plant, building this pilot plant first and building this plant in Kansas, we are going to learn a lot. And that is going to really enable us to make those steps.

And the key thing is along with us knowing how to do it, getting the risks down to the financial community. They have to see that we know what we are doing, too. And by actually doing those, we will demonstrate that. And then it becomes any incentives that you all can provide for us of loan guarantees or making sure that we have got a place to sell the ethanol.

That just continues to force that financial community to see, "Yes, we have got a viable business here. And we understand technology." And that will come back to the gentleman's issue about how fast we can do this. A lot of it has to do with how fast the money can come after we have proven the technology.

Mr. ELLSWORTH. I think that leads into my second. It is not a question, it is a comment, but if you have a comment on it, I would appreciate it. When we approved the incentives on—we always talk about unintended consequence. And I think that is one of the big fears of Congress, one of the unintended consequences.

I think we need your help because Congress—I think Mr. Fortenberry was talking about this—that we try to look at the big picture. And we don't have a crystal ball on what that is going to be.

So as you go through your process with the plants, that we look ahead and we try to fight those unintended consequences so we don't end up with egg on our face. And we want to supply those incentives and do exactly what you are doing. Thank you, but help us find those. And if you see them, let us know.

If anybody wants to comment, that is fine. But if not, Mr. Chairman, thank you all very much. It has been a great hearing.

Chairman SHULER. Thank you.

I now recognize a person who knows as much about this energy policy as anyone in Congress. Dr. Bartlett, thank you. Have as much time as you would like.

Mr. BARTLETT. Thank you very much. Thank you all very much for your testimony.

I would like to start out by kind of putting in context where we are. We use 21-22 million barrel of oil a day in our country. We use 70 percent of that in transportation for liquid fuels. What we have been doing for 150 years now is harvesting what nature has

stored away in the ancient past over a very long time period. We are now mining that resource very, very quickly.

The National Academy of Sciences has said that if we turned all of our corn into ethanol, every bit of it, and discounted it for fossil fuel input, which is very high, at least 80 percent, that it would displace 2.4 percent of our gasoline. They noted that we could save as much gasoline by tuning up our cars and putting air in the tires. And that is all of our corn crop.

The relatively trifling contribution that corn ethanol has made has doubled the price of corn. Farmers have diverted land from soybeans and wheat to corn. So soybeans and wheat prices have gone up.

Drought in rice-producing areas around the world has driven the price of rice up. So we now have a food shortage worldwide and food riots in several countries. And our corn ethanol at least is partly responsible for that.

Mr. Wooley, you mentioned the difficulty in getting financing, which is the reason I am a very strong proponent of ARPA-E. Much of the really cutting-edge technology in our military today is there because of DARPA. And what DARPA does is to fund technologies that are so out there that you can't ask your stockholders in your company to finance that. And that is a legitimate role of government.

And so I am a strong supporter of ARPA-E. It is now the law. But this administration is not supporting that. I hope we pass another law that punishes them if they don't support it.

There are two bubbles that have broken, Mr. Chairman. The first was the hydrogen bubble, the hydrogen economy. It was supposed to solve all of our problems. I think people finally figured out that hydrogen is not an energy source. Hydrogen is simply a carrier of energy.

Think of it as a battery, and you have got it right. And it will be very useful by and by when we have an economically supportable fuel cell, probably two decades off because a fuel cell is at least twice as efficient as the reciprocating engine. And when you burn hydrogen, you get water.

By the way, for those who tell you that they have got some new technique for getting energy out of water. They probably also believed that they were going to get energy out of the ashes and no furnace because water is the oxide of hydrogen. Water is what you get when you burn hydrogen. There ain't no energy in water, but a lot of people believe that there is.

The second bubble that broke was a corn ethanol bubble. And the third bubble that will break is the cellulosic ethanol bubble. We will get something from cellulosic ethanol.

I, among other things in a life of 82 years, have been a farmer. And it is hard for me to imagine if we are going to get a whole lot more from our wasteland, not good enough to grow anything on, than we could get from all of our corn and all of our soybeans.

Mr. Barnwell, the General Accounting Office has said if we turned all of our soybeans into soy diesel, all of it, every bit of it, that that would displace 2.9 percent of our diesel, again trifling. If we just took our trucks off the road except for the last mile and

put that cargo on trains, trains are at least five times as efficient as trucks than hauling cargo.

Aren't we straining at a nut and swallowing a camel? And shouldn't we really be looking at the big picture? We can drastically reduce our use of gasoline if we had HOV-3 and HOV-2. We could drastically reduce our use of diesel if we simply put that cargo in the train except for the last mile.

By the way, if you could move it by water, that is at least five times as efficient as moving it by train. So you need to move it by water as far as you can and then by train and trucks only the last mile.

Mr. Todaro, you mentioned algae. We are now exploiting algae, which is probably algae that grew—you are right—in these ancient subtropical seasons. By the way, our Earth was at one time very much warmer because we had subtropical seeds in the north slope and in the seed beds. They weren't seed beds then. The land was higher north on England.

So what we are now trying to do is to explore the technology which nature used over a very long time period. And they squirreled the product away in these gas and oil reserves.

When you are looking at how much gasoline we will displace, I suspect that we are not really using energy-profit ratio, that we are not discounting it in the fossil fuel input.

And isn't it a little silly to pretend that you displaced gasoline, oil when 80 percent of the energy that you get out of ethanol came from the fossil fuels that helped grow the corn and produce the ethanol.

Mr. Byrnes, you mentioned syngas. Would you tell us a little bit about the efficiencies of syngas as compared to cellulosic ethanol with steam reforming? Can't you take about any biomass and get syngas from it? And can't the chemists, starting with that hydrocarbon, make about anything he wishes from it, just as we do from oil today?

And why isn't syngas a better place to start, which is, what, a century-old technology? Why isn't that a better place to start than cellulosic ethanol, about which we know very little and it is hugely challenging?

Mr. BYRNES. I would be glad to respond, sir. I have often felt that one of the challenges to cellulose ethanol is that getting the cellulose, you have kind of a gold rush of cellulose at the end of the growing season and you've got to get it to the plant and preserve it and keep it in a certain condition to undergo a fermentation process. I think with gasification, burn it. It will burn.

Any time of the year whenever it is available—and I think that there is a wider variety of feedstocks available from trash, all kinds of things. Whether old or new carbon, they are going somewhere. I think it is something to consider.

And I think gasification in the reforming process through an adjustment of catalysts and pressure and temperature, you could make any carbon link chain that you want from 2 carbon ethanol to 4 carbon butanol to 16 carbon diesel or whatever you need almost with a dial, you know, with these kind of inputs going in. That is a solid technology.

I am uncertain what the efficiency is, the energy efficiency is. I know in a gasification process, the energy input is a match and oxygen and then waste heat is evolved in the process, which can be recovered for something else. But other than that, the energy comes from the material itself.

The ethanol facilities in Brazil, they don't have a DDG feed. They burn that. And that biomass goes back to feed their ethanol process. Those BTUs go back to their ethanol production. So they have a different system there.

But I don't see why we don't use that. I think in 1932, you know, it was at its height. And it was replaced with electricity that took its place once Tesla figured out how to transport that. I think that should be considered.

I know there is a pilot plant going up in Germany. Korn Industries is doing that. I don't know that that is happening here except on a very small scale.

Mr. BARTLETT. Syngas is what, hydrogen and carbon monoxide?

Mr. BYRNES. Yes, sir. Syngas is any carbonaceous material in an oxygen-starved environment. So it is C plus one-half O2 is H2 and CO.

Mr. BARTLETT. Yes. Isn't this fundamentally the process that is used in getting gas and liquids from coal?

Mr. BYRNES. That is correct. The technology grew up on old carbon. That same technology can be utilized with new carbon inputs with the same chemistry. The gasification process does not care where the C comes from, whether it is old or new carbon.

And the Fischer-Tropsch reaction reforms it under different temperature and catalysts and pressure into the liquid, but it is a fairly—the reforming process does have some energy input because of the compression that is required to get from a gaseous dispersed state into a concentrated liquid state. So that is where your energy input is, not on the actual gasification itself.

Mr. BARTLETT. How would you suggest that we make these decisions? Clearly you start with a biomass. I would like to caution, by the way, that we don't really know what is sustainable in biomass.

I grew up during the Depression. And I remember farmers then who would brag that they had worn out their third farm. There weren't many others, then, and a lot of land. And they just moved from one farm to another. And they wore it out. That is because they didn't return the fertility they took off the land.

We now just pour fertilizer onto the land. Almost half the energy that goes into producing corn comes from natural gas, with which we make the nitrogen fertilizer. Before that, the only nitrogen fertilizer available was barnyard manures and guano. And the guano that took tens of thousands of years to farm is now gone. If we wait another 10-20 thousand years, there will be some more guano. And we can mine that.

Guano, by the way, is the droppings of birds and bats that accumulated in bat caves and in tropical islands over tens of thousands of years.

I don't know what is sustainable in biomass. I look out there, and there is a lot of biomass, all of those weeds. To at least some extent, this year's weeds grow because last year's weeds died and are

fertilizing them. And I don't know what that extent is. I just don't know what the sustainability is.

I know that switchgrass is quite unique in that it pushes most of the nutrients back in the roots. It is very deep-rooted. So it is pulling nutrients up from the subsoils. And so switchgrass is really kind of unique.

Don't you think we need some experiments in sustainability before we leave? Go back to the words of Alan Greenspan when the market was just going way out of control and he talked about what was irrational exuberance. Was that the term he used? I think that we have a lot of irrational exuberance relative to these alternatives.

The amount of oil that we use is just incredible. Every barrel of oil has the energy equivalent of 12 people working all year. And 25,000 man-hours of effort, when I first read that, I said, "Gee, it can't be true."

And then I thought I drive a Prius. And I thought, "Gee, one gallon of gas at $4, still about the price of water in the grocery store, by the way, not all that expensive."

It takes my car 48 miles. Now, I could pull my Prius 48 miles with a come-along and chains and stuff, with a guard rail. But it took me a long time to pull my Prius 48 miles.

When oil was $12 a barrel, what that meant was that you could buy the equivalent of one person working all year for you for one dollar. Wow. That is what has established the incredibly high standard of living that we have.

And please go and read Hyman Rickover's article, great, great article, literally a speech that he gave. It was found a few years ago and put on the Web. There is a link on our Web site, too. Just Google for "Rickover" and "energy speech," and it will pop up. And it will pop up there.

I am a farmer, the biggest industry in my district. And I am very high on biofuels. But, you know, I am really concerned about unrealistic expectations. And the down side of realization, when these unrealistic expectations are not met, there were enormous unrealistic expectations relative to corn ethanol.

The chairman of our Agriculture Committee has spent a lot of time thinking about this. Collin Peterson believes that at the end of the day, when we finally have transitioned to renewables, that we will be able to produce about a third of the liquid fuels that we use today. That is fine. I think we can live very well on a third of the liquid fuels that we are using today.

We need to transition there. The opportunities for conservation are absolutely enormous. And, Mr. Chairman, one of the things that really disturbs me is that neither of our parties is emphasizing the only thing that will bring down the price of oil now. And that is conservation.

You know, the things that we are proposing for the moment, more drilling, it takes energy to drill. That will simply compete for oil and drive up the price of oil. Am I right? And it takes energy. Every one of you use energy in developing these biofuels. And that simply will now drive up the price of oil.

We tragically have run out of time and run out of energy. We never run out of dollars. We simply borrow that from our kids and

our grandkids without their permission. But we have run out of time, and we have run out of energy.

With an aggressive conservation program, one of the great giants in this area, Matt Simmons, believes that we can buy two decades of time.

One of you mentioned the Manhattan Project. We need more than that, Mr. Chairman. We need a program in our country that has the total commitment of World War II. I lived through that war. Everybody had a big—we had Daylight Savings Time so you could work in your victory garden. There was no legislation that said you had to have this. It is just what you did if you were a patriotic American. We saved our household grease. Not a single automobile was made in '43, '44, and '45. We need a total commitment of World War II.

The American people are the most creative and innovative society in the world. But we are deceiving our constituents. They believe that the oil prices are high because the oil companies are gouging us or the Arabs are holding back on it. Neither one of those is true.

The oil companies are the beneficiaries of a supply/demand side, where they are getting enormously rich. I hope they use their profits in a better way than they have used them so far.

We also need a technology focus of putting a man on the moon. And I can remember that. I remember that cartoon that really said it. It was a buck-toothed redhead kid that said, "Gee, six months ago I couldn't even spell engineer and now I are one." Everybody, everybody wanted to be an engineer.

Today the best and brightest of our kids are going into potentially destructive pursuits. They are becoming lawyers and political scientists.

[Laughter.]

Mr. BARTLETT. And this year China will graduate six times as many engineers as we graduate. And half of our engineers are Chinese and Indian students. And we really do need a program that has the urgency of the Manhattan Project.

Now, I lived through the Manhattan Project. And the professor in the college I was going to came home with the Manhattan Project and wanted me to major in physics. He was a physicist. But that was a secret squirreled away. But what it did was to cut all of the roadblocks so you could proceed very quickly.

So we need a program that has the total commitment of World War II, the technology focus of putting a man on the moon, and the urgency of the Manhattan Project.

I am excited about this. You know, our young kids spend far too much time watching dirty movies and smoking pot. They need something that really captures their imagination and challenges them. Mr. Chairman, this could do it, but we need leadership.

And, you know, our presidential candidate is running away from the White House. I think he needs to run away from the Republican party, too, if he is going to win. We really need leadership in this area.

And although I am a very optimistic person, I tend some days to be a little down because I just don't see knowledgeable leadership in either of our parties. I am sorry.

I thank you very much for yielding more time than my share.

Chairman SHULER. No. Thank you, sir.

I want to thank all of the witnesses for their time, their commitment to come here and give their testimony today. I ask unanimous consent that members have five legislative days to enter statements into the record. Without objection, so ordered.

This hearing is now adjourned.

[Whereupon, at 11:51 a.m., the subcommittee was adjourned.]

HEATH SHULER, NORTH CAROLINA
CHAIRMAN

JEFF FORTENBERRY, NEBRASKA
RANKING MEMBER

Congress of the United States
U.S. House of Representatives
Committee on Small Business
Subcommittee on Rural and Urban Entrepreneurship
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STATEMENT
of
The Honorable Heath Shuler (D-NC)
House Small Business Committee
Subcommittee on Rural and Urban Entrepreneurship, Chairman
"Second Generation Biofuels – the New Frontier for Small Businesses"
June 11, 2008

I now call this subcommittee hearing order.

We are here to examine the issue of second generation renewable fuels, and the opportunities for small businesses. At a time when our country is paying $4 a gallon for gasoline, it is critical we continue to develop alternative energy supplies to help reduce prices and our dependence on foreign oil.

While this may not be the only answer to our challenges, entrepreneurs have been instrumental in developing this new and affordable energy. Renewable fuels hold the potential to have an enormous impact on domestic fuel supplies, rural economies, and small businesses. At the same time they help provide this nation with alternative sources of cleaner energy. In an industry driven by small businesses, growth in renewable fuels has been a win-win for the U.S. economy.

Today's hearing will focus on the next generation of biofuels. The advancement of corn-based ethanol is a step in the right direction, but it carries with it great consequences, mostly due to its low efficiency. Because of this, we must continue to progress toward more advanced and sustainable models for biofuel production.

Currently, renewable energy producers are investing in research and new technologies that will enable production of both cellulosic ethanol, as well as biodiesel from alternative sources. This means ethanol will be produced not only from corn, but also from wood chips, corn cobs, and biomass inputs like grasses. Diversifying the sources of production will mean that farmers and small businesses in areas like Asheville will play a larger role in developing these clean energies.

While the growth in these industries has been advancing, challenges remain. Cellulosic ethanol producers face high capital investments with no guarantees of a return. By addressing these barriers, small firms will be able to make large scale production a reality in the near future.

It is critical that policies encourage the development of these new innovations to expand this source of energy. These range from tax incentives and trade policies, to usage requirements and financing assistance. Our energy policies must not only look to short term fixes, but also to the long-term energy security of our nation.

Recognizing the obstacles to growth, the House recently passed the Energy and Tax Extenders Act of 2008. This step was important because it includes a variety of renewable energy tax provisions. Specifically, it extends a biodiesel tax incentive for 1 year - through Dec. 31, 2009. But perhaps more importantly, it provides a $1.00 per gallon incentive for all biodiesel.

Though renewable fuels have grown exponentially over the past decade, they still make up less than one percent of current U.S. production. This hearing will provide us with a better understanding of the current state of the next generation of the renewable fuels industry and what it needs to grow. In the end, we need to do what it takes to ensure small businesses in these areas will continue to have the resources enabling them to develop new fuels.

I appreciate the witnesses coming here today to talk about these important issues and I look forward to today's discussion.

U.S. House of Representatives
SMALL BUSINESS COMMITTEE
Representative Steve Chabot, Republican Leader

Wednesday,
June 11, 2008

Opening Statement of Ranking Member Jeff Fortenberry

Second Generation Biofuels: The New Frontier for Small Businesses

Good morning, and thank you, Chairman Shuler, for calling this timely hearing on second generation biofuels and the role of small businesses in renewable energy production. We're also privileged to have Ranking Member Chabot joining us today to offer his perspective.

We are here to examine possible new technologies that can bridge the transition to a sustainable energy future, and how small businesses can participate in these ventures. Geopolitical instability and high energy costs make clear that our nation needs to chart a new path that can lead to lower, more predictable energy costs for communities, small businesses and families.

The causes of recent high energy prices are numerous, including geopolitical instability, commodity speculation, supply restrictions, boutique fuels, the Strategic Petroleum Reserve, lack of sustainable alternatives, and the oligopolistic leverage of OPEC. While Congress toils with policy responses, grain ethanol and soy biodiesel are components of a portfolio of renewable energy sources that will help us build a more sustainable future.

There is a long history of grain-based fuels in our country. While ethanol use was considered viable by many pioneers of industry, including Henry Ford, it was the rising energy costs of the 1970's that hastened the advent of the current biofuels age. Additional concerns about the safety of the additive MTBE (methyl tertiary butyl ether) in gasoline in recent years led toward a consensus in favor of further development of grain-based ethanol as a safer alternative. In 2005, Congress passed a new energy bill in order to foster greater energy independence, as a result of rising concerns over global tensions and the security of our energy sources. A centerpiece of this legislation was a renewable fuels standard, mandating that a minimum level of renewable fuels be produced annually.

Given its relative infancy, questions have arisen about the efficiency of grain based ethanol and biodiesel. New synergistic developments and rapid improvements in efficiency, however, are continuing to prove the usefulness of these technologies. One example of this can be found in Jackson, Nebraska, in my district, where an ethanol plant is powered in part by methane gas produced by a local landfill.

Researchers and small firms must now consider the next step in this evolution, such as second generation biofuels from sources such as switch grass, corn stover and biomass. Small-scale production, utilizing partnerships between government, small businesses and communities, is the future now being realized as a result of public policy and business opportunity.

Whether it is from improvements in cellulosic ethanol technologies or utilizing combinations of different renewable sources, new biofuels can alleviate some of the pressures placed on existing energy supplies.

During this hearing we will hear from a diverse group of witnesses, including an innovative Nebraskan who is a leader in small-scale progressive renewable energy production. Mr. Chairman, thank you again and I yield back.

U.S. House of Representatives
SMALL BUSINESS COMMITTEE
Representative Steve Chabot, Republican Leader

Wednesday, June 11, 2008

Opening Statement of Ranking Member Steve Chabot

Second Generation Biofuels: The New Frontier for Small Businesses

Mr. Chairman, I would like to thank you for holding this important hearing and for allowing me a few minutes to speak. I'll be brief. Disturbingly, each time I talk about gas prices, I have to revise my statement to reflect yet another increase. Last weekend we surpassed the unfortunate $4 a gallon milestone. It seems every day brings a new record high and my constituents are rightfully outraged and are demanding answers. They want to know why we aren't drilling in the United States, why we aren't building more refineries, and why we aren't doing more to promote alternative energy sources. In response, we give them legislation that purports to fix our energy problems simply by raising taxes by billions of dollars on domestic energy companies and hoping for the best. That's not an energy policy. That's a tax increase on every American family.

Critics of domestic drilling point out that even if we drilled in ANWR and the OCS, we wouldn't have oil available to us for another ten years. This is the same argument that was made ten years ago. Yet, I'm willing to bet there are a number of strapped American consumers wishing we hadn't waited. Over time we have improved the technology mitigating the environmental impact of oil and gas development. For instance, rather than having several stations drilling straight down, horizontal and directional drilling can reach oil and gas deposits as far as 10 miles away.

But instead of taking immediate steps to reduce our dependence on oil-rich but unstable foreign governments, members of this Congress have focused on placing our nation's sources of oil off-limits, hamstringing the construction on new refineries and requiring the production of boutique fuels that drive up the prices on consumers.

Just as no nation has ever taxed itself into prosperity, it is simply not plausible to believe that we can tax and regulate our way to energy independence and lower gas prices. I have and will continue to support efforts to encourage investment in biofuels and other renewable energy technologies. I have every hope that we will discover energy alternatives that will change the world. I look forward to hearing from our witnesses on their ideas and again thank the Chairman for the time.

I yield back the balance of my time.

U.S. House of Representatives Committee on Small Business,
Subcommittee on Rural and
Urban Entrepreneurship hearing

Second Generation Biofuels: The New Frontier for Small Businesses

Wednesday, June 11, 2008
Room 1539 of the Longworth House Office Building

Thank you Chairman Shuler.

Members of the Subcommittee, my name is Robert Wooley and I am Director of Process Engineering for Abengoa Bioenergy. I appreciate this opportunity to participate in today's hearing to discuss second-generation biofuels. After briefly introducing the company, I will focus my remarks on some of the challenges facing second generation or cellulosic ethanol.

First, I would like to say that Abengoa Bioenergy is committed to the renewable fuels industry. Our corporate leadership believes the existing energy model, based on fossil sources, is showing clear signs of exhaustion. Because of that belief, our company will have invested almost $500 million in research to advance cellulosic ethanol, and signed an agreement with the city of Phoenix to provide them with greenhouse gas free, solar power. Extending the 30% investment tax credit for solar, as the House has done, is very important to our parent company.

As I mentioned, my name is Robert Wooley. I have spent the last 12 years developing and engineering the cellulose to ethanol process as the Biofuels Technology manager at

the National Renewable Energy Laboratory, as the Biomass Technology Development leader at Cargill's NatureWorks and now at Abengoa Bioenergy.

I would like to provide subcommittee members with some background on Abengoa Bioenergy. We entered the US market when we purchased the High Plains Corporation in 2002. Abengoa produces starch-based ethanol in York, Nebraska – where our cellulosic ethanol pilot plant is located- Ravenna, Nebraska, Colwich, Kansas, Portales, New Mexico, and we are in the process of building two new plants, one in Illinois and a second one in Evansville, Indiana, in your District, Mr. Ellsworth,. In addition, we have four starch based ethanol plants in Europe, including a demonstration scale cellulosic plant that should be operational yet this year, and recently purchased an ethanol company in Brazil that produces ethanol from sugarcane.

We are designing a hybrid facility to be built in Hugoton, Kansas. This hybrid facility will produce 88 million gallons a year of starch based ethanol and 12 million gallons a year of cellulosic-based ethanol. The launching of the second generation cellulosic industry will only be possible through first generation (starch-based) cash flows, know how, and infrastructure.

Our pilot cellulosic plant in York, Nebraska is the proving grounds for the technology that we will be incorporating into the Hugoton plant. We have produced cellulosic ethanol at that facility. In fact, cellulosic ethanol can be produced today; however, the main concern is how much it costs to produce that gallon of cellulosic ethanol. We are working as quickly as we can to figure out how to produce and lower that cost of production.

Fuel production from biomass is currently offering considerable savings in greenhouse gas emissions from transportation energy use and has the potential for more. The current technology has a life cycle reduction of greenhouse gas as compared to fossil fuels such as gasoline of about 28%. Introducing biomass as the energy supply for converting corn

to ethanol increases the reduction to 52%. By using cellulose, rather than corn, as the raw material for ethanol the reduction in greenhouse gases can be as high as 90%.

Regarding the impact of biofuels on world food prices, the current starch ethanol has little impact and production from cellulosic materials will have no impact (if residues of current starch production are utilized) or little impact if dedicated energy crops are used. Many other factors, such as growing demand in developing countries, dietary changes, commodity funds, and energy prices have contributed most. . Energy prices have a much bigger impact, as much as 3 times more. Grain production in developing countries is considerably below that if the US and other leading countries. The potential productivity increases by improving agronomics practices in these countries could easily exceed the demands for food even while some less productive land is used for dedicated energy crops.

What are the barriers to lower the cost of production?

First, because of the rapid increase in the price of feedstocks, banks and Wall Street are concerned about the profitability of the industry. Financing for new starch- ethanol plants is difficult to obtain and almost impossible for new, unproven technology like cellulosic ethanol. For that reason, we worked with the Agriculture Committee to create a loan guarantee program at USDA that its Rural Development agency will operate. We are also working with DOE regarding their loan guarantee program created in the Energy bill but are afraid that they will not be available in time for use on this project.

To obtain a financing package, financial institutions will require the cellulosic industry to line up long-term contracts with feedstock suppliers. Feedstock collection, harvesting, storage and transportation will be significant challenges that the industry will need to addressed. We will need 700 to 1100 tonnes of biomass daily to operate just our cellulosic ethanol and steam facility and we will need 90,000 bushels a day to operate the starch facility. That is about 100 trucks delivering sorghum or corn stover, or wheat straw and another 100 trucks delivering corn or milo starch to our processing facility every day.

Storing the feedstock to maintain the quality of the feedstock will be important also. Significant resources need to be dedicated to this issue over the next year to make a system work.

To insure the stable supply of cellulosic feedstocks for fuel production, the development and deployment of energy crops, such as switch grass, miscanthus and others is a must. There are lands that are not necessarily suitable for prime commodity crops that could support the growth of these low impact feedstocks. These crops generally require less water and fertilizer and because they are perennial help further enhance the soil. These crops will further improve the greenhouse gas emission reductions, and stabilize the availability of feedstock to the processing plant. These crops are currently being developed. Producers need to be encouraged and supported to deploy these in large quantity.

Cellulosic biomass needs to be developed as a commodity market. Specifications, quality control and the assurance of a reliable supply needs to be developed to insure a prospective cellulosic ethanol producer that a long term supply of feedstock will be available to enable the investment to be paid off.

There are still areas of technology development that can help reduce the cost of converting cellulosic material to ethanol freeing up more of the cost of production to be available to the farmer to produce the feed material. These include the cost of enzymes for conversion of cellulose to sugar. Currently starch conversion to ethanol spends a few cents per gallon of ethanol produced on enzymes. Initially cellulosic processes will probably spend between 50 cents and 1 dollar per gallon. With further research this can be reduced to 10 cents per gallon (it will always be a few times greater than with starch conversion). In addition, cellulosic feedstocks contain glucose and non-glucose sugars. The fermenting organisms to make ethanol from these non-glucose sugars are in their infancy and need more development.

In conclusion, Abengoa is committed to the renewable fuels industry. Unfortunately, pressure from those who defend fossil energies can make us all have doubts. We will have to show that we are able to understand the advantages of renewable energy sources, confident in knowledge of renewable fuels and continue to devote significant financial resources to research.

Written Testimony
Of the
National Biodiesel Board

Scott Barnwell
General Manager
Blue Ridge Biofuels
Asheville, North Carolina

Submitted to the
U.S. House of Representatives
Committee on Small Business

Subcommittee on Rural and Urban Entrepreneurship

Second Generation Bio Fuels:
The New Frontier for Small Business

Wednesday, June 11, 2008

10:00 a.m. in room 1539 of the Longworth House Office Building

Chairman Shuler, Ranking Member Fortenberry and Members of the subcommittee, I appreciate your giving me the opportunity to testify.

I am Scott Barnwell, General Manager of Blue Ridge Biofuels, which is located in historic Asheville, North Carolina. I am here today on behalf of the National Biodiesel Board (NBB), the trade association for the U.S. biodiesel industry.

Blue Ridge Biofuels began in 2004 as a cooperative supplying sustainable biodiesel to its membership in the greater Asheville area and we currently employ ten people. Blue Ridge Biofuels is an employee owned business that produces and distributes biodiesel in western North Carolina. Our biodiesel facility can produce up to 1.5 million gallons of fuel per year, and a significant portion of the fuel we produce is derived from the used cooking oil we collect from 150 restaurants in Asheville and the surrounding area.

The cooperative grew over time into a sustainable fuel production business, employing local residents and providing some of the first publicly available biodiesel in the southeast. By focusing on the use of used fryer oil as a fuel feedstock, we have been able to maintain some control over the cost of fuel production, and have eliminated wasteful inefficiencies of transporting waste vegetable oil over long distances. By making local fuel from local waste vegetable oil, we keep these valuable resources in our local economy.

We supply fuel to 10 publicly accessible biodiesel pumps in the greater Asheville region. Blue Ridge Biofuels also supplies biodiesel blends to the Asheville Municipal Airport, the University of North Carolina in Asheville, and the city's electricity provider. We also deliver biodiesel to on and off road bulk facilities as well as provide BioHeat to more than 500 homes as a cleaner burning replacement for petroleum based home heating oil.

The citizens and businesses of Western North Carolina have responded enthusiastically by using our fuel to power personal vehicles, farm machinery, construction equipment, truck fleets, and home heating systems. In a few instances, we have even been able to collect waste vegetable oil from businesses like the Biltmore Estate, turn that oil into clean-burning biodiesel, and then sell the finished fuel back to the business for use in their diesel equipment. In doing so, we are closing an important loop by turning what was once considered a waste product into a valuable source of fuel that in turn keeps our mountain air cleaner and our economy stronger.

Blue Ridge Biofuels is making a positive difference in our community. Not only are we creating jobs and opportunities, we are doing our part to reduce America's dependence on oil by producing quality, clean-burning fuel from a feedstock that was previously a waste product. Your support for this sort of innovation will go a long way towards achieving energy independence.

My company's experience is a perfect example of the larger public policy benefits America gets from the production and use of biodiesel.

Biodiesel helps reduce our reliance on foreign oil and can play a major role in expanding domestic refining capacity. Increased use of renewables in the transportation sector can play a significant role in helping achieve these objectives. Merrill Lynch commodity strategist Francisco Blanch recently noted that oil and gasoline prices would be about 15% higher if biofuel producers were not increasing their output.

The 500 million gallons of biodiesel produced in the U.S. in 2007 displaced 20 million barrels of petroleum, and increased production and use of biodiesel will further displace foreign oil. In addition, biodiesel is an extremely efficient fuel that creates 3.5 units of energy for every unit of fuel that is required to produce the fuel.

Expanded biodiesel production is good for the environment. Biodiesel is an environmentally safe fuel, and is the most viable transportation fuel when measuring its carbon footprint, life cycle and energy balance. The USDA lifecycle study shows a 78% reduction in lifecycle CO2 for B100. The use of 1 billion gallons of biodiesel – consistent with the current Renewable Fuels Standard (RFS) - will reduce lifecycle greenhouse gas emissions by 16.12 billion pounds, the equivalent of removing 1.4 million passenger vehicles from U.S. roads. In 2007 alone, its contribution to reducing greenhouse gas emissions was equal to removing 700,000 passenger vehicles from America's roadways.

The biodiesel industry is also creating new, green jobs. In 2007 alone, the U.S. biodiesel industry contributed over $4.1 billion to the nation's Gross Domestic Product (GDP) and supported 21,803 jobs. In addition, economic modeling suggests that a vibrant biodiesel industry will positively impact the U.S. economy in multiple ways. America's biodiesel industry will add $26 billion to the U.S. economy between 2007 and 2012, assuming biodiesel growth reaches 1.0 billion gallons of annual production by 2012. Biodiesel production will create a projected 38,856 new jobs in all sectors of the economy and additional tax revenues from biodiesel production will more than pay for the federal tax incentives provided to the industry. Equally as important, it will keep billions of dollars in America that would otherwise be spent on foreign oil.

These benefits and the progress our industry has made and will continue to make in the future, would not have been possible without the bipartisan support that has put in place a public policy framework that allows renewable fuels like biodiesel to prosper. For example, the biodiesel tax incentive, which was enacted in 2004, is clearly working. The biodiesel industry has grown from 25 million gallons of production in 2004 to 500 million gallons of production in 2007.

Extension of the biodiesel tax incentive beyond its current date of expiration at the end of this year is our industry's most important request to Congress, and we are pleased that H.R. 6049, the Renewable Energy and Job Creation Act, approved by the House prior to Memorial Day, extends this important incentive. We are also supportive of the change in this legislation that allows all biodiesel, regardless of feedstock used to make the fuel, to qualify for the $1 per gallon incentive. This will provide added incentive to use non-food-waste-feedstocks such as restaurant grease in the production of biodiesel. From our personal experience, we know that quality fuel can be produced from restaurant grease. Think of the potential, if we can significantly increase the nationwide use of this waste product as a source of transportation fuel.

It is also worthwhile to note the importance of the expanded RFS that was included in the Energy Independence and Security Act enacted last December. For the first time, this legislation provides a renewable requirement for diesel fuel in the U.S. – a requirement that will reduce our dependence on foreign oil and constructively address the issue of climate change.

As the U.S. biodiesel industry continues to grow and mature, the development of second generation feedstocks will be a continued industry priority. The only limit to biodiesel's potential is the availability of new feedstocks. Fortunately, investment in new non-edible raw materials sources such as algae, seashore mallow, mustard, camelina and jatropha continues at an aggressive rate. The production of higher content oilseeds will likely create new opportunities for additional raw material supplies to the biodiesel industry. Already, private firms are offering camelina feedstock contract opportunities in the

Pacific Northwest and the U.S. Canola Association has established a new feedstock initiative to increase canola acres by 2010.

Algae is another potential feedstock for biodiesel. Biodiesel production from algae oil holds much promise for our industry. Though large scale production is still a few years away, many companies and universities are working to unlock the potential of these single-celled plants, which can contain up to 50 percent oil by weight. Once realized, oil yield per acre is expected to be the highest of any triglyceride source currently available. Yield projections in the medium term are estimated to range from 2,000-5,000 gallons per acre as compared to 61 gallons per acre for soybeans.

Ongoing research over the next four to five years will prove necessary in the development of new feedstocks, which is why the National Biodiesel Board (NBB) and its membership will continue to seek partners in the private, public, academic and non-profit sectors to promote this research that is of vital importance to the nation's energy needs.

Chairman Shuler and Ranking Member Fortenberry, I again want to thank you for giving me the opportunity to testify, and I would be more than happy to answer any questions you may have.

United States House of Representatives
Small Business Committee's
Subcommittee on Rural and Urban Entrepreneurship

Hearing on
"Second Generation Biofuels: The
New Frontier for Small Businesses."

Testimony of Tom Todaro
CEO, Targeted Growth Inc.

June 11, 2008

Good morning Chairman Velazquez, Ranking Member Chabot, and Members of the Committee. My name is Tom Todaro. I am the CEO of Targeted Growth, a biotechnology company focused on the development of low-input, high-output dedicated energy crops. We are located in Seattle, Washington.

The biofuels industry, particularly traditional corn-based ethanol, has come under significant attack over the past few months. Biofuels are being blamed for everything from increased national food prices to global food shortages. There are many factors contributing to increased food prices, including higher energy prices, expanding market demand in India and China and drought in Australia. Increasing demand on corn and soybeans for biofuel production is just one small contributor.

I am not here to defend the current U.S. biofuel industry. I am here to explain how biofuels produced from next-generation, non-traditional feedstocks can meet the goals of stimulating rural economies, reducing reliance on imported oil, and decreasing greenhouse gas emissions. These new energy feedstocks will also help alleviate any competition between biofuel production and our food supply.

Targeted Growth is undertaking pioneering work on three energy feedstocks: sugar corn, camelina and algae. With each of these feedstocks, we look to isolate certain desirable gene traits, and then undertake a selective breeding process that enables us to grow a better plant.

Sugar Corn

Last year, the U.S. ethanol industry produced 6.5 billion gallons of ethanol using corn as a feedstock. In Indiana, the heart of the U.S. Corn Belt, a farmer can expect an average yield of about 145 bushels of corn per acre. Targeted Growth's sugar corn is very different from what we currently grow in the United States. The plant traces it's origins to Peru. It does not have a cob or kernels. Instead, sugar corn has an extremely high sugar content, all of which is stored in the plant's stalk. Sugar corn requires less water or fertilizer than food corn, produces more biomass and produces more energy in its sugars. We are in the process of doing selective breeding with sugar corn to identify those gene traits that will promote high biomass as well as sugar yields and reduce cell wall recalcitrance – the fundamental building blocks of a specialized energy crop.

Our initial field test results demonstrate that sugar corn could improve biofuel yields on an acre of farm land by two to three times that of traditional corn. This is a potential game changer for the U.S. corn ethanol industry. It means that we can grow more dedicated energy feedstocks on less farm land. Ethanol production from sugar corn will have a dramatically higher energy balance and a significantly lower carbon footprint. Targeted Growth hopes to commercially launch sugar corn by 2011.

Camelina

Targeted Growth has developed a non-GMO oilseed called camelina that can be used to make biodiesel. Camelina is a member of the mustard seed family. It is well suited to cooler climates and can be grown in the Northern Great Plains States: Washington, Oregon, Montana, Colorado, North Dakota and Minnesota. It requires very low inputs of water, fertilizer and pesticides. Camelina can be grown as a rotational crop with wheat or on marginal land that is not currently in agricultural production. It has a short growing season and good direct harvestability.

Camelina has several distinct advantages over soybeans, the dominant biodiesel feedstock in the United States. First, camelina has a cost advantage of approximately 57 cents

per gallon over soybeans. Second, camelina is a dedicated energy feedstock. It does not compete in the food market. Finally, biodiesel produced from camelina has a very favorable carbon footprint.

Targeted Growth recently entered into a joint venture with Green Earth Fuels and created Sustainable Oils. Sustainable Oils will focus on the commercial introduction of camelina and aims to produce and market up to 100 million gallons of camelina-based biodiesel by 2010. This is the single largest U.S. contract for a dedicated biodiesel feedstock.

Prokaryotic Algae

The most speculative crop that Targeted Growth is currently working on is prokaryotic algae. It is also the crop that has the greatest potential to displace petroleum. Algae are single cell organisms. That means that they can only do one thing at a time. In the case of algae, it can either grow in mass or it can grow lipids, which contain oils that can be used to make biofuels. These two functions are biologically opposed to each other, which mean that algae is not a commercially viable energy feedstock.

Targeted Growth is using advanced genetics and high throughput screening to create robust high yield algae strains. Put simply, we have identified genetic markers in certain algae strains that we can either prompt to accelerate biomass growth or increase oil production. Our goal is to develop the ideal algae strain that can be cultivated in low cost pond systems. Algae requires carbon dioxide to grow, so we are in active discussions with potential utility partners to locate an algae facility adjacent to a coal fired electric generation facility. If this technology can be successfully proven and commercially developed, algae will emerge as a primary biofuel feedstock, as well as an efficient carbon capture technology.

Targeted Growth is bullish on the future of biofuels. However, there are a number of actions that Congress could take to help promote the long term success of this industry.

First, Congress needs to stand firm in its commitment to biofuels. This Congress took a bold step in passing an ambitious renewable fuel standard in the Energy Independence and Security Act of 2007. Requiring U.S. biofuel production to reach 36 billion gallons – one quarter of current U.S. petroleum consumption – by 2022 sends a strong signal to investors and developers that biofuels are more than a fad. Unfortunately, investor confidence is eroded when members of Congress clamor to suspend the RFS before the ink has barely dried on the U.S. Code.

Second, Congress needs to provide certainty to the industry. Like many fledgling industries, the biodiesel and cellulosic biofuels industries will require a tax subsidy for a few years until the industry has matured and realized basic efficiencies to drive down costs. Unfortunately, many of these tax subsidies are renewed on a year by year basis. I understand the political realities that drive this result, but the practical effect is that the tax credit is not as effective as it could be as investors are reluctant to commit capital when the tax credit that underpins the industry could go away. Congress needs to extend tax credits for at least three years at a time in order to provide certainty.

Third, Congress needs to invest in basic research and development to bring new energy feedstocks and new refining processes on line as quickly as possible. Biofuels will never be a sustainable, substantial source of energy if the industry remains focused on corn and soybeans. Competition for these crops will continue to drive up the price of biofuels and cause conflicts with competing users. The industry needs a diverse array of feedstocks that can all contribute toward the goal of 36 billion gallons of biofuel production. The recently passed Food, Conservation and Energy Act of 2008 will invest upwards of $1 billion in bioenergy. This is a good start, but the industry needs much more. It is my hope that the new Congress and the next Administration will dramatically increase federal funding that is available to help support work being done by our national labs, universities and the private sector to develop the next generation of biofuels.

Thank you.

United States House of Representatives
Small Business Committee's
Subcommittee on Rural and Urban Entrepreneurship

Hearing on
"Second Generation Biofuels: The
New Frontier for Small Businesses."

Testimony of Jeff Trucksess
EVP, Green Earth Fuels, LLC

June 11, 2008

Mr. Chairman, members of the committee, I would like to thank you for this opportunity to speak with you today. I am Jeff Trucksess, Executive Vice President of Green Earth Fuels. Green Earth is a Houston-based company dedicated to lessening our country's dependence on foreign oil and increasing the diversity of America's fuel sources by the production, distribution, and use of biodiesel. We operate a state-of-the-art biodiesel production and storage facility in the port of Houston, and have plans to expand our operations nationwide. We are also making significant investments in second generation crop development.

With your support, I am proud to report that the production of biodiesel in America not only will increase our nation's energy independence, but also strengthen our nation by adding to the economic security of our country's rural communities and small businesses.

Allow me a moment to explain a few facts about biodiesel. It is a renewable, clean-burning, alternative fuel derived from select plant oils and animal fats. I believe it to be the fastest growing and most efficient alternative fuel in America. Biodiesel typically is blended with petroleum diesel for use in diesel vehicles, but it is important to note that the lower biodiesel blends most commonly used today require no engine modifications for our cars, trucks or diesel-vehicle fleets. Biodiesel has demonstrated significant environmental and economic benefits for consumers. It is biodegradable and nontoxic. Biodiesel reduces greenhouse gas emissions and other harmful organic compounds found in traditional fuel, and, equally important, biodiesel has the highest life-cycle energy balance of any commercially available fuel.

There are a myriad of facts on the benefits of biodiesel that I might provide the Committee, but I am here today to address the importance of biodiesel and second generation biofuels to small business and small communities in America.

Currently, soybeans are the major source of biodiesel in the U.S. But this will not always be the case. Biodiesel can be generated from fats, vegetable oils, recycled cooking grease and dedicated non-food energy crops. This is important. Increasing

production of biodiesel does not necessarily impact food industries as is often errantly reported. Research shows that new crops like camelina, jatropha and algae can play a significant role in fueling our nation. And these are crops well suited for rural communities and small businesses with dry land currently out of production. These are crops that have low environmental impact and require little water, but offer potentially commercially significant yields in parts of the United States such as Washington, Oregon, Montana, Colorado, North Dakota and Minnesota. It is also appropriate as a winter crop in warmer climates such as New Mexico and Texas. For example, camelina can yield over 100 gallons per acre with less than 16 inches of rain per year. That is roughly double the yield of most current crops.

While most of the research on camelina has been done in the Northern Great Plains states, early research also suggests that certain varieties of camelina can be grown across the country. In states such as Georgia, camelina, or a similar crop could be an excellent rotation crop for Cotton, and can add to the economic stability of small communities and businesses throughout the South.

Increasing the use of biodiesel will result in increasing the potential for small businesses throughout America, particularly small rural businesses, to become major players in the production of biodiesel feedstocks.

I recently spoke at a biodiesel conference in Albuquerque, New Mexico that included scientists from our national laboratories, as well as the foremost agricultural experts in our field. The conference made clear, as does an abudnance of research, that the use of alternative feedstock sources such as algae, cellulosic materials, or biomass, and other non-food feedstocks – such as camelina and jathropa – in the production of biodiesel demonstrate exceptional promise for long-term sustainability. This means that a dry-land farmer in Washington can rotate in camelina, or a cattleman in New Mexico can plant jathropa in his grazing land, and increase the profitability of his small business. It means that the cotton farmer in Georgia can rotate camelina and make a better living. Biodiesel translates directly into a more stable economy for the small businessman.

I have no doubt that non-food crops such as camelina, algae and jathropa, for example, can produce biodiesel and preserve America's and the world's food supply. Camelina can prove to be a high-quality, competitively priced energy crop; while boosting small businesses and farm revenues. It can benefit both the environment and national energy security. Farmers can rotate camelina on land as a rotation for cereal crops such as wheat, rather than periodically leaving such acres fallow, or on marginal lands where traditional crops are too input-intensive or uneconomic to grow. The meal produced from crushing the camelina to create the oil can even be used in the production of high omega-3 enriched feedstock for livestock.

The beauty of camelina, and similar non-food crops such as jatropha, is that they are here today and don't require new technology breakthroughs. Indeed, they only need your commitment to see them succeed.

I would be remiss if I did not remind the committee that Biodiesel significantly reduces greenhouse gas emissions. A staggering amount of data demonstrates the carbon benefits of biodiesel. For every unit of energy it takes to make domestic biodiesel, 3.5 units are gained, giving biodiesel the highest energy balance of any commercial liquid fuel. Many crops for biodiesel have even higher energy balance ratios.

Biodiesel also has a 78 percent life-cycle carbon dioxide reduction, according to the U.S. Department of Agriculture and Department of Energy. This takes into account everything from planting the soybeans to delivering biodiesel to the pump. Additionally, the use of biodiesel substantially reduces unburned hydrocarbons, carbon monoxide, and particulate matter.

In 2007, biodiesel's contribution to reducing greenhouse gas emissions equaled the removal of 700,000 passenger vehicles from America's roadways. Biodiesel helps extend domestic energy supplies, minimizes diesel fleet conversion costs, and reduces America's dependence on foreign oil.

Another lesser known fact about biodiesel is its potential to be integrated into the oil and gas infrastructure system. Test runs have demonstrated that biodiesel can be shipped through the oil and gas pipelines; Europe is already running biodiesel through certain pipelines. While there remain a few regulatory and technical hurdles to overcome, the U.S. has the very real possibility of shipping biodiesel blends in its pipelines within a year. This form of distribution will reduce costs and dramatically reduce the number of trucks, trains, and ultimately energy and emissions required to distribute the fuel.

It is a fact that biodiesel fuel production can be environmentally and economically advantageous. Feedstock sustainability for biodiesel production is abundant and viable; biodiesel has the potential to reduce carbon and other emissions; add good-paying, green jobs to the small business economy; decrease dependence on foreign oil; and increase the availability of protein for humans and animals to eat, resulting in a positive energy balance that is good not only for America, but for the future of our planet.

Thank you for this opportunity to speak with you today. I look forward to your questions.

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09 June 2008

Subject: Testimony On Second Generation Biofuels and Small Business

I appreciate the opportunity to provide my perspective on this important topic. As a small business owner engaged in the development of these technologies, I hope my testimony will be of some value to the committee in their considerations.

As the first registered producer of biodiesel in Nebraska, I have been involved with developments in my state from the ground floor and just recently completed technical development and commissioning of a second generation commercial biodiesel facility capable of 5 million gallons of biodiesel per year. This facility is also currently the largest completed facility in Nebraska and is 100% farmer owned. I am now personally involved in the development of second generation feedstocks for biodiesel and processing facilities on a daily basis and appreciate the opportunity to visit with this committee. I operate an Energy Farm in Northeast Nebraska that has produced its own energy for years and these advanced biofuels will continue to be part of our mix. This facility is currently in use to as an energy training facility to help others reach these types of energy goals. I co-founded the Nebraska Renewable Energy Association in 2006 and am in the process of spinning off another energy business focused on the needed processing of the materials that will supply these second generation oils and feed to the market. Transportation to (and from) this hearing is being done using 100% biodiesel fuel produced in Nebraska (and Virginia) using my unmodified 2005 Jeep Liberty.

I will do my best to characterize for the committee, but please understand market niches and variations exist throughout the industry and that my primary focus is on developing these fuels in my home state of Nebraska which finds itself way behind in developing these technologies.

US Current Situation:

When we started the Northeast Nebraska Biodiesel facility two years ago, soybean oil was $0.23/lb which reflected the ten year average. Since soybean oil tracks with petroleum, board values have increased as well and are currently trading in the $0.67/lb range which reflects almost a doubling of the cost of a gallon of finished biodiesel. Biodiesel production cost per gallon is 75% feedstock based and currently costs about a dollar a gallon to convert the oil into fuel that meets the strict ASTM (American Society for Testing and Materials) tests that are established for this material using standard base catalyzed technology.

As a result of this surge in commodity vegetable oil costs, at least half of the biodiesel production capacity built in the last three years is currently off line. Similar price surges have also been seen in animal fats and used vegetable oil markets. It is clear that the first generation of feedstocks available for biodiesel have run their course.

A diverse pool of biodiesel plants have been built. The seemingly more profitable large biodiesel facilities in the 30-50million gallon/year (MM GPY) range have not done as well as many would have expected. Most of these larger facilities that were required to buy refined vegetable oil as a biodiesel input became the first to shut down as their processing technology required them to buy the most expensive oils available. Many have looked to increasing their ability to handle crude and diverse oils and fats. The smaller producers that serve local markets using local oilseed feedstocks have largely weathered these storms as they are able to not only purchase the raw material seeds as inputs, they also have a variety of options as to where they send their outputs. In many cases it can be more profitable to simply sell refined oil to others who make biodiesel instead of producing fuel. Increasing costs of transportation will continue to support the trend for the rapid growth of decentralized oilseed processing for biodiesel, crude oil and animal feed markets, as well as decentralized energy production in general.

It is clear that the majority of the gallons produced are produced by 'smaller' producers of 60 MM GPY or less. A greater number of those gallons are made by plants 10MM GPY or less. These facilities have also been tremendously helped by the $1/gallon blending credit extended through HR 6409 and the producer is still able to access quite a bit of this credit, although it is feared as more gallons come on-line in the future, the petroleum blender and retailer will retain more of this credit until it reaches the point that ethanol is at where the biofuel producer receives virtually nothing from this credit any longer.

Biodiesel itself is a trademarked term that is defined as a material that meets certain standards covered by the ASTM method defined by the National Biodiesel Board. Not everything that can run a diesel motor is biodiesel according to this definition, though, in order to gain access to this blending credit, proof of meeting this standard and other requirements must be met which represent a huge burden to the small biodiesel producer. While any fuel that enters the general distribution system must be known to meet certain guidelines, small businesses that use these materials for themselves or convert the motors to allow their use cannot gain access to this credit. Indeed, straight vegetable oil (used or virgin) can be utilized in a converted motor directly without conversion which displaces petroleum diesel gallon for gallon but does not qualify for this credit. Use of oils directly in this manner reduces the cost per gallon by approximately $1 and dramatically increases energy return. The original diesel engine designed by Rudolf Diesel at the turn of the century was designed to run on these straight oils (as the original Fords were designed to run on ethanol) but have since been modified to run primarily petroleum based fuels. I myself have provided power to my off-grid farm for years using a renewable diesel produced from animal fats, waste and alternative seed oils that could not technically be called biodiesel although it directly replaces petro-diesel.

With the first generation biodiesel feedstocks basically run through, there is a mad scramble to expand the available pool. While these oils abound in nature with amazing diversity, oilseed crops like soybean and canola are most prevalent, but oils can be found in bacteria, fungus,

algae and can be converted from biomass through gasification and reforming through the old German Fischer-Tropfsch process, however, these feedstock pools will take significant time to develop, so I am seeing the industry react in two directions in the short term. Waste streams are being looked at more carefully and being returned to the available feedstock pool, or taking the place of something else so that it can. Since the US wastes more energy than it consumes, this is an important step that can be quickly done. The second is the development of vegetable oil production and processing in highly productive tropical areas so that oil can be imported to the US.

The first strategy of waste recovery is a highly productive pathway, but has a limited potential in terms of the volumes potentially available. One of the biggest current examples is the fractionation of corn (5% oil) prior to ethanol production. The removal of this oil before ethanol production (where it does no good at all) is largely undeveloped due to cost, but options abound. The recovery of this corn oil in Nebraska alone would result in 150 million gallons available for other uses. This oil is also a limiting factor in DDG (dried distiller's grain) animal feed utilization. The average 40 MM GPY ethanol plant can each realistically recover in excess of 2-3 MM GPY of high value corn oil for inclusion in this pool.

The recovery of waste vegetable oils holds promise for urban small business utilization, but these oils are simply not present in any significant quantities in the Midwest as these gallons are driven by population density. In the country, our oil is in the fields while in the city, used oils can be found behind restaurants and food processors. Having been involved in a business that used these oils and know others in the industry, this is no longer as easy as it once was. Industry used to pay for these oils to be removed, so when the biodiesel producer came in and offered to pick the oil up for no cost, there was a win-win. With these used oils trading at record levels, many people have to pay the restaurants now for this oil to keep their supply and risk having their collection containers pumped out by others who do not want to pay. While Nebraska currently produces over half a billion gallons of virgin fats and oils, it has no significant waste vegetable oil streams. Where they do exist, an increasing number of regulations are appearing that make it difficult for small business to capitalize on these feedstocks for their subsequent conversion to biodiesel. Utilization of these used oils has been going on for many years and they should not be considered a second generation oil source.

In terms of regulatory requirements, biodiesel facilities have an ever increasing regulatory burden upon them. They are categorized with chemical processing facilities and have strict guidelines in many areas that are extremely burdensome. While environmental and personnel safety must always be ensured, current regulatory requirements are a tremendous cost for the renewable small business owner.

Outlook for the Future:

While Nebraska produces almost 550 million gallons of fats and oils annually and consumes almost the same amount of petroleum diesel, how many states can claim an energy 'balance' in this area? Geometric expansion of the feedstock pool is required to make a significant impact on current petroleum diesel consumption levels. Because of delay and short sighted goals in development, we will have to wait for the second generation of feedstocks to become

available before further development can occur. We need to drive these solutions home quickly to bring our biodiesel industry back on line, growing and innovating not fighting to survive. Small business is the quickest and most efficient way to get that done. If all of the fats and oils currently produced on the 950 million acres in production were used for biodiesel, only 10-12% displacement of petroleum diesel would result.

There are a number of things that should be considered to develop a climate more conducive to both centralized and decentralized facilities. While we need production of these fuels at all levels, the industry also needs to work together to broaden the inputs and outlets it can utilize.

Future feedstocks will challenge the strict soy driven ASTM standard requirements. The tax credit of $1/gallon should be extended to any new carbon biodiesel or biofuel that is used to directly displace consumption of petroleum-based diesel or gasoline. While industry standards must apply to retail locations, farmer cooperatives , for example, could put together an oilseed facility to produce the renewable diesel that supplied energy in their modified engines that work fine but are not necessarily ASTM grade but reduce imports with every gallon. The tax credit requirements that only recognize a strict ASTM definition for these fuels are narrow and better access to this credit for small business is badly needed.

There are two excellent examples of future feedstocks that will challenge these strict definitions which will come from biomass and algae. These feedstocks offer the geometric increase of the available biodiesel feedstock pool.

Biomass fed gasification will create the building block of organic chemistry, syngas. This gas is made up of Hydrogen and Carbon Monoxide produced in an oxygen starved combustion environment. This gas is then reformed to a liquid using 100 year old German chemistry techniques back to a liquid fuel which is how they made fuel from coal in two world wars. In this technology, waste and low grade materials can be recovered into renewable diesel with a waste heat byproduct to do other things. Next generation biomass fed gasifiers could even develop into a facility that could recover energy from local waste streams and ag waste inputs to create any chain length biofuel required from the 2 carbon ethanol to the 22 carbon crude oils by using variations of temperature, pressure and catalyst. The 'clean diesel' fuels are anticipated to have trouble with ASTM parameters.

Algae oil production is a tremendous growth area with small businesses leading the way in innovative production. Algae has been shown to provide over 50 times the productivity per acre as soybean and will actually expand the human food stream by adding a completely new and protein rich food/feed product. While production methods have matured, final processing, refining and conversion to fuel are the last link before demonstration. Nebraska has had its first algae project announced this week in a rural area owned by small business. This project is being developed by a new renewable energy firm that grew out of my original work with the broad spectrum of available technologies. This algae project will recycle process waste heat and biomass combustion emissions to boost photosynthetic production of these oils and process the in house to close the loop and enable algae oil to get into the marketplace.

Decentralized growth of algae and production of oil could be done most quickly through

municipal waste facilities where treatment, capacity and food are available. Large facilities will take time to construct and processing infrastructure for removing from the oil from the algae and refining the oil will need to be established. Algae biodiesel is also anticipated to have trouble with ASTM based on a vastly different fatty acid profile.

There are also a number of technologies being developed by small businesses across the country that use more efficient conversion pathways to create biodiesel. While the major input cost remains the feedstock oil, a number of these new process technologies can use lower grade materials with less yield loss than the standard base catalyzed trans-esterification technology that is found in almost all current biodiesel plants. These innovative techniques are being spearheaded by renewable small businesses and should start coming on line next year. However, the major challenge remains the exponential expansion of the feedstock pool.

A tremendous boost for decentralized utilization and small business production of alternative biofuels would be to exempt all biofuel producers from state and federal road taxes up to 5,000 gallons per year. These producers would need to show verification of new carbon biofuel gallons used and not ASTM certification of fuel quality. Every gallon of renewable fuel we utilize is another gallon that doesn't travel here from somewhere else.

Small business will remain a leading and cost effective innovator in this area. The decentralized energy production systems being developed in many cases could be of significant value to the US military, Homeland Security or FEMA. These agencies could greatly benefit from the creation of a streamlined process to partner with small businesses that can support the goals of these agencies for continued operations without requiring vulnerable energy logistical transport.

I thank you for your invitation to address this body and interest in this area. I would be glad to provide answers to any questions you might have in these areas.

Robert M Byrnes
Owner, NRES

Attached is a recent article written by Dan Owens of the Center for Rural Affairs in Lyons Nebraska that describes opportunities that decentralized energy development offers rural economies:

"In our hometown of Lyons, Nebraska (pop. 950) several newly-arrived young adults are strolling the streets, a result of an internship project sponsored by Nebraska Renewable Energy Systems. They have come to Lyons to learn about and build renewable energy systems-primarily wind and biodiesel.

Living in a small town, we know that far too often, our young adults leave town for college, never to return. This is the reason many of us are so enthusiastic about renewable energy. Rural America has one heck of an asset urban America lacks - land. And Lord knows we've got plenty of wind. If we build the renewable energy industry the right way- and that's a big if- there is real potential to bring a new generation of young people to our small towns.

That's why it is so important that we encourage locally owned, community-scale renewable energy production by locally owned small businesses. We don't need an ethanol plants owned by an investment firm out of Boston (or Omaha, for that matter). We need locally owned biofuel facilities that employ accountants, engineers, marketing specialist, etc. in our small towns. We need wind companies that employ locals not only for construction needs, but for manufacturing, design, power distribution and other jobs.

For rural communities to thrive, we must attract and retain top-notch young adults, relying on economic activity that is built on the assets of rural America. Nebraska Renewable Energy Systems has brought young adults to our small town, and they're building a future for all of rural America".

The American Agriculture Movement, Inc

Strength From The Land

Testimony to the
Rural and Urban Entrepreneurship Subcommittee
of the
Small Business Committee
United States House of Representatives
hearing on
Second Generation Biofuels: The New Frontier for Small Businesses
Submitted for the Record by
Larry Matlack, President
American Agriculture Movement
June 11, 2008

The American Agriculture Movement (AAM) commends Chairman Shuler, Ranking Member Fortenberry and the rest of the subcommittee for your leadership and initiative in holding this hearing on "Second Generation Biofuels: The New Frontier for Small Businesses." AAM is honored to submit this written statement for the record, and I would have loved to speak before your committee today, but I am currently harvesting wheat straw to promote biomass energy usage.

AAM, a leading advocate of renewable energy since our inception three decades ago, fully supports the advancement of all forms of renewable energy, including new and better ways to produce biofuels. When AAM brought thousands of farmers and tractors to the nation's capital in 1979, we came with much more than protests; we came with solutions as well. Farmers, camping on the National mall set up a small ethanol still and produced renewable "gasohol" and made cookies from the distiller's grains. Those cookies were served to members of Congress, including several currently sitting in key leadership positions in this 110th Congress. Working with Congress and President Carter, we were able to enact the nation's first ethanol programs, and thirty years later we are here to remind you that we not only identified solutions to help farmers find alternative markets for their crops and better prices, but also helped America move towards energy independence.

AAM has always supported the advancement of ethanol and we are currently focusing on the expansion and utilization of biomass production. That is why we supported the credit for production of cellulosic biofuel, the extension of small ethanol producer credit, the ethanol tariff extension, the extension and modification of credit for biodiesel used as fuel and the extension of alternative fuel vehicle refueling property credit as passed in the recent farm bill.

AAM also supports the new Biomass Crop Assistance Program (BCAP), contained in Section 9011 of the farm bill. The BCAP is a critical first step in helping farmers shift to new alternative crops which will help America move towards energy independence. This program will encourage farmers to establish and produce local, home-grown, renewable energy for industrial heat, electric cogeneration and cellulosic ethanol utilizing biomass crops in areas around biomass facilities producing bioenergy. The program will help producers willing to switch a portion or all of their acreage to dedicated energy crops and is critical to the development of the infrastructure for the production, harvest, storage, transportation and utilization of dedicated energy crops for the production of cellulosic ethanol, as well as direct heat and power.

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As you know, we have come a very long way since the late 1970s, but I submit this testimony today to urge you to keep moving forward with additional programs to advance the production of biofuels from crops other than corn. Therefore, AAM requests this committee to consider taking a few more steps towards new frontiers for renewable fuels and other renewable power.

AAM's first suggestion is to establish a program to provide a ten-cent per gallon tax credit for producers of fossil-free ethanol. This provision was part of the farm bill passed last fall, but was dropped in the final version of the bill. We see this key provision as the best way to expand the utilization of biomass and rural employment opportunities, improve the environment and reduce our nation's dependence on imported energy. We also offer a suggestion to make the provision work even better for smaller and older ethanol plants, which is to allow the purchase of renewable (green tag) electricity for the smaller and/or older facilities. Retrofitting plants to produce their electric generation needs from biomass will be too expensive for these smaller plants.

I realize that the focus of this hearing is biofuels, but we wish to bring up a related suggestion. There needs to be a production tax credit (PTC), similar to the PTC for wind, established for biomass used to meet energy requirements outside of cellulosic and/or non-fossil fuel ethanol. To help our nation cope with an over-dependence on natural gas, more and more of which is now imported, and which has experienced huge price increases, there should be a $1 to $2 per-million BTU tax credit for the use of renewable biomass, including crop residues such as corn stalks and wheat straw which are not covered by the BCAP. Incentives to use biomass for cogeneration, and industrial heat and power, will, just as renewable fuel production, provide opportunities for farmers, jobs for rural America and less reliance on imported energy while at the same time building an infrastructure base for cellulosic ethanol industry and providing a great economic stimulus to small business throughout the country.

We also recommend that this committee and your Congressional colleagues help advance a process being pioneered in Southeastern Minnesota to use wind-generated electricity to produce nitrogen fertilizers. With the recent escalation of energy prices, including natural gas which is used to produce most nitrogen fertilizers, much of our domestic nitrogen production has ceased. We are now importing too much of our nitrogen from Russia and other places outside the U.S. Using imported fertilizer to grow corn for ethanol production is not, in our opinion, the best way to move America toward energy independence. Using renewable power from the wind to produce domestic fertilizer is a much better option.

One last suggestion to advance the utilization of renewable energy, though not within the jurisdiction of this committee, is to amend the Commodity Credit Charter Act (Section 4(h)) to provide for the expansion of the "on farm storage facility loan program" beyond "grain on a farm." By expanding the CCC Charter Act in this way, USDA would be authorized to provide low interest loans to farmers who build biomass storage and handling facilities.

AAM appreciates the work of this committee and we stand ready to help you in your endeavors to advance the production of more locally produced, renewable, domestic, environmentally sound energy. Please feel free to call upon us at anytime.

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