RENEWABLE FUELS

HEARING

BEFORE THE

SUBCOMMITTEE ON RURAL ENTERPRISES, AGRICULTURE, AND TECHNOLOGY

OF THE

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HOUSE OF REPRESENTATIVES

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CONTENTS

	Page
Hearing held on July 24, 2001	1

WITNESSES

Dinneen, Bob, Vice President, Renewable Fuels Association	4
Donaldson, Guy, President, Pennsylvania Farm Bureau	7
Heck, Ron, American Soybean Association	8
Abnee, Conn, Executive Director, Geothermal Heat Pump Consortium	10
Smith, Megan, Co-Director, American Bioenergy Association	12

APPENDIX

Opening statements: Thune, Hon. John	35
Prepared statements:	
Dinneen, Bob	37
Donaldson, Guy	45
Heck, Ron	49
Abnee, Conn	52
Smith, Megan	57

HEARING ON RENEWABLE FUELS

TUESDAY, JULY 24, 2001

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON RURAL ENTERPRISES,
AGRICULTURE, AND TECHNOLOGY,
COMMITTEE ON SMALL BUSINESS,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:15 a.m., in room 2360 Rayburn House Office Building, Hon. John R. Thune [chairman of the Subcommittee] presiding.

Chairman THUNE. Good morning. This hearing will come to order. I apologize for my tardiness here. We have got a little subject in another committee I am working on, called the farm bill, which is in the works and something we only do every 5 years. So we are trying to get that squared away before the end of next week, and we hope to have it marked up.

Today's hearing has been called to discuss the issue of renewable energy and its importance in solving our Nation's energy crisis. The subcommittee will explore the ways in which Congress can help to create a more productive environment for the use of renewable fuels.

Renewable fuels play a productive role in improving our national energy security by providing stable, homegrown renewable energy supplies. Renewable energy can take many forms from ethanol and biodiesel to wind and hydroelectric power, to power generated by the Earth and sun.

To promote the increased use and availability of renewable fuels, I have introduced two bills to make it easier for producers to market renewable fuels.

The first bill, H.R. 2423, the Renewable Fuels for Energy Security Act of 2001 calls for renewable fuels such as ethanol and biodiesel to play a larger role in America's transportation fuel market. The bill sets a national fuel standard, not a gallon-by-gallon mandate, and will not force a level of compliance in places where compliance may be difficult.

It is important to note that this bill does not attempt to alter the Clean Air Act of 1990. The Clean Air Act mandates the use of renewable fuels and requires gasoline to contain cleaner-burning additives, called fuel oxygenates, primarily ethanol or MTBE, a methanol-based additive which has since been found to be harmful to groundwater. With MTBE now prohibited in 11 States and probably more in the near future, ethanol and biodiesel are the most viable options for abiding by the mandates of the Clean Air Act.

To enhance national security and improve the quality of our air, H.R. 2423 gradually increases the market share for renewable fuels to 2 percent by 2008, 3 percent by 2011 and 5 percent by 2016.

The United States Department of Agriculture estimates that for every gallon of ethanol produced domestically, we displace 7 gallons of imported oil. Today, ethanol is estimated to reduce our demand for foreign imported oil by 98,000 barrels per day. A 3 percent market share for ethanol and biodiesel would displace about 9 billion gallons of gasoline annually or between 500,000 and 600,000 barrels of crude oil a day, the amount we now import from Iraq.

To help promote the use of ethanol as a renewable fuel, I have introduced H.R. 1636, which would make ethanol cooperatives eligible for the current small producer ethanol tax credit. Under current law, a small ethanol producer is eligible for an income tax credit of 10 cents per gallon, up to 15 million gallons of production. H.R. 1636 expands eligibility for the credit to producers whose annual ethanol production capacity is below 60 million gallons.

Current trends in South Dakota indicate that co-ops are building larger ethanol plants with production capacities of 40 to 60 million gallons. Through this tax credit, a co-op that produces 15 million gallons could pass along $1.5 million to its members.

The use of renewable energy sources is crucial to building a stronger domestic energy policy and will provide a positive economic impact to many rural areas.

I thank the witnesses for attending today's hearing and very much look forward to your testimony.

At this point, I will yield to the gentleman from New Mexico, the ranking member, Mr. Udall.

Mr. UDALL. Thank you, Mr. Thune. At the outset, I want to thank you, Mr. Chairman, for holding this hearing today on the topic of renewable fuels and renewable energy policy.

Whether we are talking about rising gas prices or skyrocketing electricity costs, the problem is proving to be an almost crushing burden on small business owners. Statistics during the most recent set of rolling blackouts in California, in May of this past year, show that small businesses lost an average of $5,000 to $25,000 per day during that period. I think we can all three agree that the United States must develop a national energy policy that is mindful of not only the needs of the environment and the realities of future energy supplies and demands, but also that of small businesses.

As a Washington Post editorial put it, it may now be possible to discuss energy policy in a calmer way and that should lead to the acceptance of a principle the administration initially neglected, that the need to expand supply to keep up with population and economic growth has to be balanced with the needs of the environment.

Today's hearing focuses on the twin issues of developing renewable energy sources and the necessity for energy conservation. Renewable energy comes in a whole host of forms including ethanol, wind, geothermal, solar and biomass. To this end, small businesses play a key role in the production, marketing, conversion and implementation of renewable fuels in their everyday use.

Unfortunately, the administration's fiscal year 2002 budget contains several cuts to key energy efficiency and renewable programs,

which makes no sense at a time when we have to properly plan for our country's energy future. For example, funding for renewable and alternative energy sources, solar research funding, geothermal, hydrogen and wind research programs have all been cut in the administration's budget. Despite these cuts, the Appropriations Committee did restore some funds to renewable programs in the fiscal year 2002 energy and water development funding bill.

Instead of pushing for renewable and alternative energy sources, the administration has called for the construction of new power plants over the next 20 years, as well as nearly doubling coal production, more funding for nuclear energy and increased oil exploration and production. Should the administration continue to endorse an energy policy that focuses more on development and less on renewable energy and conservation, I am afraid that this argument could perpetuate an economic and/or national security crisis for our country.

There are several bills in the Congress that focus on renewable energy in one form or another. I have introduced the Small Business and Farm Energy Emergency Relief Act of 2001. My legislation would provide emergency relief through affordable, low-interest Small Business Administration disaster loans and USDA emergency loans to small businesses and small agriculture producers adversely affected by significant increases in the price of heating oil, propane, kerosene or electricity. One component of my legislation would allow small businesses to use these loans as capital to convert their systems from using heating oil or electricity to those using renewable or alternative energy sources such as fuel cells or wind energy.

Today's energy and environmental challenges call for a new and expanded approach to help address all of these concerns. We need an energy policy that will help fix our short-term energy needs as well as prepare us for any long-term energy crises we may face; and I believe that today's hearing is a start in helping us tackle this challenge.

I hope the information obtained at this hearing will serve as an opportunity to push for a national energy policy and can be supported by small businesses, consumers and industry alike. And I yield back to Mr. Thune.

Thank you.

Chairman THUNE. The Chair thanks the gentleman from New Mexico for that statement; and at this time I would also welcome to the panel today the gentleman from Pennsylvania, Mr. Shuster, and the gentleman from Illinois, Mr. Phelps, both of whom care a lot about this subject.

Before we begin receiving testimony from the witnesses, I want to remind everyone that we would like each witness to keep their oral testimony to 5 minutes, and in front of you on the table you can see a little box that will let you know when your time is up. When it lights up yellow, you will know you have 1 minute remaining, and when 5 minutes have expired, a red light will appear. Once the red light is on, the Committee would appreciate if you could begin wrapping up your testimony as soon as you are comfortable doing that.

So we will begin by introducing our first witness who is Mr. Robert Dinneen, and he is Vice President of the Renewable Fuels Association.

So, Mr. Dinneen, welcome to the panel today and we look forward to your testimony.

STATEMENT OF ROBERT DINNEEN, VICE PRESIDENT, RENEWABLE FUELS ASSOCIATION

Mr. DINNEEN. Thank you, Mr. Chairman and members of the committee. I want to thank you for the opportunity to be here today to provide comments on the role of renewable fuels such as ethanol in our Nation's energy policy.

As you know, small businesses have a prominent role in the production and the marketing of fuel ethanol and, thus, will be critical to developing a sustainable energy policy for the future. Thus, I commend you for convening this hearing and for your long-standing support for farmers, for value-added agriculture and for ethanol, Mr. Chairman.

The RFA is the national trade association for the domestic ethanol industry. We represent 56 ethanol production facilities operating in 20 different States across the country that, this year, are going to produce over 2 billion gallons of fuel ethanol. Our industry is growing at an unprecedented rate, particularly among farmer-owned cooperatives, the fastest growing segment of our industry and an example of small businesses providing jobs and economic growth throughout rural America.

Mr. Chairman, there are many benefits of fuel ethanol I would like to discuss today, including the positive impacts on the environment and consumer gasoline prices, but in the limited time that I have, I want to focus on the specific benefits to small businesses which are often overlooked in the broader public debates about energy and air quality.

First, the Federal ethanol program has created the most significant value-added market for farmers, perhaps the most significant small businesses across the country. As the third largest use of corn, behind feed and exports, ethanol production utilizes nearly 7 percent of the U.S. corn crop or over 600 million bushels of corn, adding $4.5 billion in farm revenue annually.

USDA has determined that ethanol production adds 25 to 30 cents to each bushel of grain. According to a Midwestern Governors' Conference report that was completed last year, the economic impact of the demand for ethanol boosts total employment by over 200,000 jobs, increases State tax receipts, improves the U.S. balance of trade by $2 billion and results in $3.6 billion in net savings to the Federal Treasury.

That is right, the reduced farm program costs and increased tax revenue attributable to ethanol results in $3.6 billion in savings to the Federal Government. In other words, for every dollar invested in this program, $7 is returned to the Federal Government.

Second, the Federal ethanol program has been good for small independent gasoline marketers, those mom-and-pop operations that do not refine gasolines, do not drill for oil and have no overseas investments to protect. They are the foundation of ethanol marketing in this country. Years ago they saw the potential of eth-

anol to provide octane and volume to the gasoline pool, giving them an important tool to compete effectively with their much larger, integrated refinery suppliers.

Consider this statement by the Society of Independent Gasoline Marketers, which represents those small businesses, quote: "the tax benefits afforded ethanol blended fuels constitute an important means by which independent marketers reduce their cost for product, enhancing independent marketers' ability to price-compete with their economically more powerful integrated competitors. Such price competition has consistently restrained retail market prices and thereby generated substantial benefits for consumers of gasoline.".

Mr. Chairman, we are more reliant than ever before on foreign nations to supply our insatiable and growing appetite for oil, importing 54 percent of our petroleum. At the same time, U.S. production has fallen to the lowest point in 30 years. There has not been an oil refinery built in this country in 25 years, but there have been 56 ethanol refineries built during that time, stimulating rural economies, creating jobs and improving air quality.

In addition to the over 2 billion gallons of current ethanol production capacity, 34 existing ethanol plants are undergoing expansions and 11 new plants are actually under construction today.

Let's just take one State for an example; I don't know, South Dakota. There are three ethanol plants in South Dakota today, producing 31 million gallons. But there are another three plants under construction with a planned production capacity of 95 million gallons, and there are five others that have been proposed that will have 125 million gallons of production capacity if they are built. All but one of these new plants are farmer-owned cooperatives.

The ethanol industry expects to have an additional 300 million gallons of production capacity on line by the end of this year and a total of 3 billion gallons of production capacity by the end of 2003. Now is the time to extend this important program. For plants being built today there will be less than 4 years to recoup the investment.

President Bush recommended extending the Federal ethanol program in his energy recommendations to the Congress, and I would urge each of you to strongly consider such action as energy legislation is contemplated by the Congress in the next several months.

Second, as you know, Mr. Chairman, the existing small producer tax credit doesn't work for those smaller farmer-owned cooperatives that it was intended to help. I commend your efforts to address this issue through your H.R. 1636. We support it, and we look forward to working with you to assure its passage this year. Indeed, similar legislation has already passed the Senate three different times and was just not included in a final piece of legislation. We hope with your efforts, and with your commitment and with our help, we will be able to get it done this year.

Finally, as the Congress contemplates a comprehensive energy policy, renewable, domestically produced fuels can and should play a larger role in meeting our Nation's energy needs.

Mr. Chairman, your bill, H.R. 2423, the Renewable Fuels for Energy Security Act of 2001, which would create a national renewable fuel standard, is the kind of progressive legislation that must be in-

cluded in national energy legislation. When fully implemented, this program would reduce the need for more than 600,000 barrels of oil. That is roughly twice the energy we import each day from Iraq.

America has the resources to address our long-term energy needs without having to rely on the benevolence of OPEC. We should be investing here at home, not overseas, to build a sustainable energy future for our children. America's farmers and small businesses are willing and able to help us with our energy needs.

Again, Mr. Chairman, I want to thank you for holding this important hearing, and I want to add my voice to those that have applauded your efforts and those of others that have helped to promote the increased production and use of fuel ethanol. You have helped create a vitally important domestic renewable energy resource. You can be proud of your accomplishment, and we certainly thank you for your commitment to value-added agriculture, small businesses and a sustainable energy future.

I thank you very much and shall be happy to take your questions.

[Mr. Dinneen's statement may be found in the appendix.]

Chairman THUNE. Thank you, Mr. Dinneen, and we will get a chance to ask some questions in a moment. But at this time I would yield to my colleague from Pennsylvania, Mr. Shuster, to introduce our second witness.

Mr. SHUSTER. Thank you, Mr. Chairman, for giving me the opportunity this morning to introduce Guy Donaldson. Guy is the President of the Pennsylvania Farm Bureau. Although Guy lives in Gettysburg, Pennsylvania, it is a neighbor to the east of the Ninth Congressional District which I represent. He clearly understands the needs of the Pennsylvania farmers, and I am pleased you have asked him here today to testify.

Guy's been a fruit grower all his working life, and in fact, today he and his wife Betty are in a partnership with their children. They farm over 550 acres of apples, peaches, cherries and vegetables. In addition to farming, the family also operates a retail farm market from May to October.

Guy has been a long-time leader in farm organizations. He has served as the President of the Adams County Farmers Association, was a director of the Pennsylvania Farm Bureau State board of directors, Chairman of the Pennsylvania Farm Bureau Growth Study Committee and was elected to two 3–year terms representing the agricultural community on Penn State's board of trustees.

If that hasn't been enough, Guy is a member of the Adams County Fruit Association, on the board of directors of the Mount Orchard Cooperative and a member of the Knouse Foods Cooperative.

As the current President of the Pennsylvania Farm Bureau, I look forward to hearing his testimony today.

Thank you, Mr. Donaldson, for being here. I think it is extremely important that people such as yourself are here before Congress testifying. You are out there working the fields, and it is important we hear your testimony.

Thank you, Mr. Chairman.

Chairman THUNE. Mr. Donaldson, please proceed.

Mr. DONALDSON. Good morning, Mr. Chairman. Congressman Shuster sort of stole my thunder in the opening remarks there, but that is okay. Let me move on down the page here a bit.

As you know, times are tough in farm country and commodity prices across the board have been too low for too long. As an industry, we must expand the markets for the crops that we grow. Congress needs to pass trade promotion authority legislation for one thing, and American farmers and ranchers need open and fair access to foreign markets and to those consumers anxious for the safe, abundant and affordable food that we produce in this country.

Farm Bureau also supports the use of commodities to produce goods other than food. Nothing has more potential in this area than the use of agriculture commodities to produce energy. The potential for our farmers, our consumers, our environment, our economy and our national security is staggering. We are close to realizing this potential and we simply, gentlemen, cannot miss this opportunity.

Mr. Chairman, Farm Bureau strongly supports your legislation, H.R. 2423, the Renewable Fuels for Energy Security Act of 2001. This is the type of policy that must be implemented to bring prosperity back to rural America and energy security back to the United States.

According to a report from the Midwestern Governors' Association, the economic impact of the demand for ethanol adds $4.5 billion to farm revenue every year; Produces more than 195,000 jobs, mostly in rural areas; Replaces $2 billion of imported oil, thus improving our balance of trade; and Saves the Federal Government, as was mentioned before, $3.6 billion.

But the point most important to our membership is that the current use of 600 million bushels of corn for ethanol production adds another 25 to 30 cents to the price a farmer receives for a bushel of corn. With the low price of corn, this market is vital and it is important that it expands.

H.R. 2423 requires that by 2016, 5 percent of the Nation's fuel contain renewable energy. It will provide an income to our corn farmers from the marketplace and not the Federal Government. And both farmers and government should work toward that goal.

But it is not only corn producers who benefit. The use of soybean-based biodiesel will receive a tremendous boost as an important part of our energy mix.

Other commodities will find opportunities under H.R. 2423. Currently there are 26 different feedstocks used in this country to produce ethanol. Think of that, 26. With the exponential growth in technology and the ethanol industry, we can anticipate the increased use of those feedstocks and the use of cellulose feedstocks such as corn stover, rice straw, and waste from processing of agriculture products.

We all gain when we better utilize all the production from our farms and ranches. The technology to use these sources is now in the research lab. With a new demand created for biobased energy, that technology continues to develop and to become economically viable.

We should also look at other energy production that can occur on farms and ranches. There is a great deal of interest among our

members in siting of wind and solar generators. Some are weighing the economic return on micro-hydro generation. One area that holds promise as a source of energy and a solution to a problem is the capture of methane from the manure that we produce in this country and that is abundant. Our livestock producers are increasingly concerned as to how they will be able to comply with restrictions on the storage and disposal of animal waste.

We need research in the development of farm-sized facilities that can store manure and capture the methane therein; and beyond that, we should look at taking that manure after the methane is captured and using it as a fuel in the generation of electricity to provide heat.

Mr. Chairman, farmers and ranchers have long provided safe and affordable food to this Nation. We will continue to do so. But as we have produced such an abundance of food, agriculture needs to provide energy, as well, when we can. But it will take time to build this industry to the point where that production becomes a major component of our energy mix.

Some in Congress question a mandate for renewable fuels. They believe that this is just another subsidy for farmers. Mr. Chairman, we spend billions of dollars every year to protect our petroleum sources in the Middle East. American servicemen and women have lost their lives in a war against Iraq, and we today import more energy from Iraq than we produce in this country from ethanol. Our servicemen and women are still risking their lives in an area where we must have a military presence. Let's put our faith not in the benevolence of Saddam Hussein, but in America's farmers and ranchers.

Mr. Chairman, we stand ready to work with you to build a domestically based renewable energy industry in America. We should, and we must; and I thank you, sir, for having the opportunity to testify.

Chairman THUNE. Thank you, Mr. Donaldson.

[Mr. Donaldson's statement may be found in the appendix.]

Chairman THUNE. Next the subcommittee will hear from Mr. Ron Heck, who is a soybean and corn farmer from Perry, Iowa, our neighbor State.

Where exactly is Perry in Iowa?

Mr. HECK. Central Iowa, 30 miles north of Des Moines.

Chairman THUNE. It is too far away from South Dakota for an exit then, I suppose; but anyway Mr. Heck is here on behalf of the American Soybean Association. We welcome you and look forward to hearing your testimony.

STATEMENT OF RON HECK ON BEHALF OF THE AMERICAN SOYBEAN ASSOCIATION

Mr. HECK. Thank you, Mr. Chairman and members of the subcommittee. I appreciate the opportunity to come here today and talk with you regarding the need for a national comprehensive energy policy that includes a meaningful renewable fuel component for biodiesel and ethanol.

Farmers are small business owners and much of current biodiesel production is by small businesses and cooperatives. There

are two farmer cooperatives in Iowa that are producing biodiesel now.

These are times when the prices for our commodities are very low and the prices of our energy input costs are very high. This causes great concern across the countryside, and producers are reviewing options for both reducing input costs and also opportunities for increasing prices of what we grow.

While in the short term there is little we can do to completely alleviate this situation, the American Soybean Association believes the development of a comprehensive national energy plan would help avoid these crisis situations in the future. We feel strongly that a national energy plan should include a renewable fuels component and include both biodiesel and ethanol, and that is why we strongly support the renewable energy legislation you, Chairman Thune, introduced last month, H.R. 2423. We commend you for this bold and innovative step in moving our country to homegrown energy sources.

As you know, Mr. Chairman, for the last 8 to 10 years, U.S. soybean growers have invested in the research, development and commercialization of biodiesel. Biodiesel is a cleaner burning fuel produced from renewable resources such as soybean oil. It contains no petroleum, but can easily be blended with petroleum. Biodiesel is typically blended at the 20 percent level with diesel or at 2 percent or lower levels.

It can be used in compressed ignition diesel engines with little or no modifications. Biodiesel in its neat or pure form is biodegradable and nontoxic and is the first and only alternative fuel to meet EPA's Tier I and Tier II health effects testing standards. Biodiesel has the highest BTU content of any alternative fuel similar to Number 1 diesel.

This year EPA finalized regulations that require a reduction in sulfur content of highway diesel fuel of over 97 percent from its current level of 500 parts per million. Current industry methods to decrease sulfur in diesel also negatively impact the fuel's lubricity and, therefore, engine life. Biodiesel has no sulfur or aromatics, and tests have documented its ability to increase fuel lubricity significantly when blended with petroleum diesel fuel even at blends as low as 1 percent.

According to Department of Energy tests, biodiesel has an 80 percent life cycle reduction of CO_2 compared to petroleum diesel. This means that it offers the best opportunity for greenhouse gas reduction of any heavy duty vehicle and equipment application. Biodiesel also has the highest energy balance of any alternative fuel, which means that it offers some of the most promising benefits for conservation efforts. Additionally, biodiesel offers significant reductions in virtually all regulated emissions and a 90 percent reduction in EPA-targeted air toxics.

With the chairman's permission, I will include additional information regarding the environmental benefits of biodiesel for the record.

Soybean growers began to invest in biodiesel almost a decade ago with our own money, not because we wanted to have our own ethanol. Instead, we were driven by the economics in the soybean industry.

Soybeans are widely produced for the protein source in the soybean meal. It is the plant protein of choice in the pork and poultry industries, leaving soybean oil as a valuable but too abundant coproduct. Because of large supplies of vegetable oils in the world market, we have a surplus of soybean oil, which depresses the price of the oil and, thus, the whole soybean.

While biodiesel offers environmental energy security and economic development benefits, it is not competitive in the U.S. on a pure cost comparison. Public support will be necessary to help the industry develop.

Our culture and our policies are focused on petroleum products, most of which are imported. I did not want to imply that soybean growers are opposed in any way to the use of petroleum products. In fact, agriculture is a major user of petroleum-based products. However, I would make the challenge that our country needs to have an aggressive energy policy that includes clean, renewable fuels as well as significant domestic production of both oil and gas.

The current biodiesel market is growing rapidly from 500,000 2 years ago to 5 million gallons last year, with an expected target of 25 million gallons in 2001. Just last week the USDA released a study that shows biodiesel production can have significant economic benefits for producers, rural consumers and the overall U.S. trade balance.

The study shows an increase of 200 million gallons of biodiesel per year would boost total crop cash receipts by $5.2 billion, cumulative, by 2010, resulting in an average net farm income increase of $300 million per year. The price for a bushel of soybeans would rise by as much as 17 cents a bushel and also increase more than 13,000 jobs in the production and distribution. New jobs are created in the farm sector, food processing, manufacturing and service.

Just this weekend, our industry, along with the ethanol industry, learned the results of an economic analysis conducted by John Urbanchuk of AUS consultants. The report shows that if your bill, Mr. Chairman, is enacted, soybean prices and farm income will increase and result in direct benefits to American consumers. We will be happy to share this report with you when the details become more available.

We think the timing is right for these major proposals to promote the use of biodiesel. We look forward to working with you on this agenda and other issues of interest.

I will answer questions at the appropriate time. Thank you.

Chairman THUNE. Thank you, Mr. Heck.

[Mr. Heck's statement may be found in the appendix.]

Chairman THUNE. Next, the Subcommittee will hear from Mr. Conn Abnee, who is the Executive Director of the Geothermal Heat Pump Consortium.

Mr. Abnee, welcome.

STATEMENT OF CONN ABNEE, EXECUTIVE DIRECTOR, GEOTHERMAL HEAT PUMP CONSORTIUM

Mr. ABNEE. Thank you. Mr. Chairman, members of the subcommittee, let me thank you for the opportunity to testify this morning. My name is Conn Abnee. I am the Executive Director of

the Geothermal Heat Pump Consortium. The consortium is based in DC, was established in 1994 by the Department of Energy and the Environmental Protection Agency to promote the use of energy-efficient and environmentally friendly heating and cooling technology. We are a nonprofit organization.

Geothermal heat pump technology is a renewable technology that uses the relative constant temperature of the Earth below the frost line to heat and cool buildings and heat water with a savings of 25 to 40 percent for the owner of the building, home or institutional facility. It is the world's most efficient way to heat a commercial or an institutional building.

Geothermal heat pumps are not standard or conventional heat pumps nor do they use the geothermal resources from deep reservoirs. Rather, geothermal heat pumps take advantage of the constant temperature of the subsurface Earth to provide an energy-efficient and environmentally friendly means to heat and cool buildings and homes.

Geothermal heat pump technology relies on the fact that the Earth remains at a constant temperature throughout the year. It is warmer in the winter than the outside air; and cooler in the summer than the outside air.

In winter, geothermal systems bring the Earth's natural warmth up to a building through polyethylene heat exchange piping buried in the ground, then transfers it to each room of your home or your building via heat pump. In the summer, to cool the house, this process is simply reversed. The system can work in any climate, any geographical location, coast to coast, border to border.

For example, in South Dakota, the St. Thomas Catholic Church in DeSmet saw a dramatic reduction in energy costs after installing a geothermal system. Its energy bill dropped from $13,900 a year to only $2,000 a year after the installation of geothermal heat pumps.

In Wilmot, an addition to a school uses geothermal heat pumps; the original structure uses a conventional system. The electric bill for the older half of that building was $18,000 just for heating. The electric bill for the new half of the building was only $3,100, and that includes heating and cooling.

Mr. Chairman, the General Accounting Office has studied geothermal heat pumps and concluded in a report that the Federal Government has the responsibility and the authority to promote geothermal heat pump technology as a tool to meet our national energy goals. The EPA has recognized the technology for its efficiency, and its ability to reduce greenhouse gas emissions.

President Bush has installed a system in his new home in Waco, Texas—right outside of Waco.

Here at the consortium, we are working to jump-start the technology. Let me mention those now: research and development, demonstration programs across the country, training for designers and installers, and implementing a design assistance program where the engineering community is not aware of our technology.

Mr. Chairman, this technology can make a real contribution now to energy savings and energy efficiency in both urban and rural America. Currently, we are not included in the national energy policy, but let me offer our help to working with the Small Business

Administration to help overcome what you earlier mentioned were high energy costs to small businesses across the country.

I appreciate the opportunity to testify this morning and tell you about the technology, and will welcome any questions that the subcommittee might have.

Thank you very much.

Chairman THUNE. Thank you Mr. Abnee.

[Mr. Abnee's statement may be found in the appendix.]

Chairman THUNE. And finally we will turn to our last witness, who is Megan Smith, and she is Codirector of the American Bioenergy Association.

Ms. Smith, thank you for being here.

STATEMENT OF MEGAN SMITH, CODIRECTOR, THE AMERICAN BIOENERGY ASSOCIATION

Ms. SMITH. Mr. Chairman and distinguished members of the Subcommittee, thank you for allowing me this opportunity to testify on behalf of the members of The American Bioenergy Association of which I am Codirector.

The United States is at a critical time for the development of alternative energy sources, particularly for transportation, where the majority of our precious oil is used. Our dependence on foreign oil has put our economy and national security at great risk. These two issues—increased energy demand and the need for reducing our dependency on foreign oil—have put us at a crossroads today, where creating a win-win situation is more than just possible.

Low-value, high-quantity cellulosic biomass is widely available throughout the U.S. and is found in virtually every State, particularly in rural communities. However, any plan regarding the use of cellulosic biomass for conversion to ethanol is going to take a large commitment on the part of key decision-makers. At the same time, an increased use of corn for ethanol production will also require a large amount of support, especially to reach the production goals contained in various legislation now before Congress.

Biomass is any matter composed of the two sugars, cellulose and hemicellulose, and lignin, which is the high-energy glue holding these two sugar chains together. Examples of biomass include wood waste, agriculture residues, fast-growing grasses and trees and the paper component of solid waste. Low-value biomass can be converted to several high-value products such as electricity, ethanol and chemicals. Markets will determine which of these three is the highest value in that particular situation, and industry will adapt these biorefineries accordingly.

In using biomass as an energy resource, we are essentially weaning ourselves from a hydrocarbon or oil economy and, instead, creating a robust carbohydrate economy, or one relying on sugars in the form of starch and cellulose.

The current corn-based ethanol industry converts to ethanol only part of the available sugar in the corn plant, the remainder being mostly cellulose. Industry's new, highly efficient technology for bioethanol has shown conservative estimates for energy efficiencies at four to one, that is, four energy units and output compared to energy used during production. This is largely due to the use of lignin's high-energy content.

The world's first biomass ethanol plant with expected start-up in 2002 will be located in Jennings, Louisiana, and will use sugar cane bagasse as its feedstock. Other plants under development include ones using waste feedstocks, such as rice straw, sawmill waste and small diameter trees, which are largely responsible for Western catastrophic fires.

Benefits of biomass ethanol include job creation with a job multiplier for a 20-to-25-million-gallons-per-year ethanol plant creating about 500 jobs, both direct and indirect. Most importantly, these jobs are largely in the poor rural communities of the U.S.

The area of biomass conversion to chemicals may provide the largest market potential in the future. This November, Cargill Dow will start up a plant that will make polylactic acid, or PLA, from corn. From PLA "beads," Cargill Dow will be able to produce such products as carpet, clothing and plastic cups which are all biodegradable and renewable.

Here is one such example. The material in this shirt was about, 1 year ago, carbon dioxide in a farmer's cornfield. PLA can greatly help to displace petroleum now used as feedstock for these products.

The ABA applauds Congressman Bartlett's Bioenergy Act of 2001 which builds upon the Lugar-Udall biomass bill of last year. The Bartlett bill will fill a void by doubling authorization over a period of 5 years for biomass research conducted by the Department of Energy. In addition, moneys are authorized for the biorefinery concept developed by DOE.

Regarding the bills that would increase the ethanol market by three to ten times the current market, ABA would like to point out that no analysis above a threefold increase has yet been carried out by USDA. The repercussions of a larger increase than threefold on the corn community is, therefore, unknown. We would like to point out also that the ABA supports the inclusion in these bills of a leverage for biomass of 1.5 to 1, as contained in S. 670, the Daschle-Lugar legislation.

Thank you, Mr. Chairman and members of the subcommittee, for allowing me to speak on behalf of the many benefits of biomass conversion to energy and chemicals for a cleaner and stronger nation for future generations to come.

Chairman THUNE. Thank you, Ms. Smith, for that testimony. And we are all trying to figure out who fits that shirt here.

Ms. SMITH. You can each have one.

[Ms. Smith's statement may be found in the appendix.]

Chairman THUNE. Let me also welcome to the committee Mr. Carson from Oklahoma and Mr. Bartlett from Maryland. Do either of you have comments you would care to make before we go to questions?

All right.

I appreciate all your testimony. Obviously, this is an issue which I think has great importance not only to agriculture—which is obvious, I guess—but also in terms of the impact that it has on our energy security as we move into the future. And I really believe that the use of renewables and providing incentives encouraging production and use of renewable energy sources is going to be profoundly important in making sure that we diversify our energy supplies as

we move into the future, and that is why I think hearings like this are so important.

I guess one of the questions I would like to pose to the panel is, what do you think is the greatest obstacle in terms of increasing public acceptance and use of renewable fuels as a legitimate energy source? I mean, are there things out there that perhaps we are not doing in trying to educate and make the public more aware of the value of these types of energy sources?

Mr. Dinneen.

Mr. DINNEEN. Mr. Chairman, I am not sure that there are barriers out there to the public. I think every survey that has ever been done of public attitudes towards renewable fuels wants to see a great deal more ethanol, for example, used.

I know that the Sustainable Energy Coalition a year or so ago had conducted a rather extensive voter poll to determine the receptivity to the use of ethanol, and overwhelmingly, about eight in ten wanted to see the increased use of ethanol fuels.

I think the barriers, to the extent that they are there, are that we don't necessarily sell to the public. We are selling to oil refineries or refineries that are not in the business of through-putting renewable fuel products. They are in the business of through-putting hydrocarbons, and to the extent that you are able to look at incentives that would create the market pull for refiners to act in the public interest, as opposed to their own self-interest, would be very helpful.

That is why the legislation that you have proposed, which would create a standard that would require the use of renewable fuels in a very sound way, makes so much sense.

Chairman THUNE. Does anybody else care to comment on that?

Mr. ABNEE. With the geothermal heat pump technology, our technology is known to be very efficient, very environmentally friendly; but we are facing an awareness issue. We have less than 1 percent of the marketplace for heating and cooling and water-heating devices. Consequently, it is not an accepted technology, and we are looking for an advantage, some way to help us increase that awareness among the engineering and architectural communities, so we can build awareness of this technology now to provide an energy-efficient process for our society. In schools, commercial buildings and for small businesses across the country.

Chairman THUNE. Go ahead, Mr. Heck.

Mr. HECK. Yes. Although I am here for biodiesel, I want to point out the market acceptance of ethanol gasoline in Iowa is very high; over half of our gasoline is sold with ethanol in it. There is not significant resistance among consumers. And I say that to highlight my second point, where it is an infrastructure problem.

Our manufacturers are supposed to know that there will be a market for their biofuels. After they are produced, will there be regulations or resistance from the industry that is already there? As I said in my testimony, we have a culture in our society based on oil, and before you can make the investment to venture into these wonderful products, there has to be some assurance that there will be a market available for product that is produced.

Chairman THUNE. Ms. Smith.

Ms. SMITH. I would agree with Mr. Dinneen that if left to the oil companies, they probably won't be blending a whole lot of ethanol; so something like a renewable fuel standard is necessary, particularly if they get rid of the oxygenate standard that is now in place.

Also, for biomass ethanol, incentives are needed early on to stabilize the market and for when the people go in to get—the entrepreneurs go in to get loans from the bank, they can point to something that is already enforced in law or whatever.

Also, the DOE authorization, appropriations such as Mr. Bartlett introduced about a month ago, will help stabilize research dollars.

Chairman THUNE. It just seems to me that part of it—and I was asking the question, and you mentioned on geothermal—I asked Mr. Udall—of course, he was much more knowledgeable on the subject than I was.

But it was interesting for me to hear about the Catholic church in DeSmet, too, because that is a technology I am not familiar with. But there are many types of those technologies out there that I think could really be useful in terms of meeting our energy needs.

Let me ask, and I think in terms of Iowa, South Dakota, I think we are about 50 percent, too, use of ethanol; but my assumption is that that is not something that when you get out of our part of the country, people are as well acquainted with.

Question for—I guess, for perhaps Mr. Dinneen.

One of the questions that is always raised with me when I talk about ethanol—as you note in your testimony, we have a number of plants that are coming on line—is, if we begin to produce and we have the supply of ethanol to meet, for example, California's demands, which, with the denial of the request for a waiver from the Clean Air Act, will become a bigger market for ethanol, getting it there, is the infrastructure in place? Are we going to be able to supply the demand that exists, or will exist, we hope, in the future for ethanol?

That is one of the questions that is often posed, and the transportation of it and that sort of thing. What is your response to that?

Mr. DINNEEN. Well, there is absolutely the infrastructure to get the product to wherever it needs to go.

Take California, for example. I mean, it is often suggested that because ethanol is not shipped via pipeline today that there is just no way to get all this product there. Well, that argument sort of misses the fact that 90 percent of the MTBE that is currently being used in California and polluting their groundwater is imported. California is getting their MTBE from Saudi Arabia and from the Gulf Coast. Well, there are no pipelines that go from Saudi Arabia to California, frankly, there are no pipelines that go from the Gulf Coast to California.

The MTBE that is shipped to California today is shipped via vessel. That is exactly the same way that ethanol will be shipped to the State of California, by vessel. And Mr. Chairman, because ethanol has twice the oxygen content of MTBE—I like to say it is twice as good as MTBE—we only need half as many vessels.

We actually in the past week have gotten letters from the American Waterways Operators, which represent all the barge and vessel operators across the country, that have said with no reserva-

tion, there are absolutely enough vessels, enough barges, to get the product to California. There are also letters from Union Pacific and other railroads that say we can ship product to California or the Northeast or wherever it needs to go that way as well.

So there is absolutely no question in our minds or in the minds of the industries that would actually move the product that we will be able to get it there.

Chairman THUNE. I yield to Mr. Udall.

Mr. UDALL. Thank you, Mr. Thune.

My first question is for Ms. Smith, on this issue that you mentioned in your testimony about using fuels from the forest. As you are probably aware, we have had a huge buildup in the West over the last 100 years—because of overgrazing and fire suppression and clear-cutting, we have an overgrowth of smaller trees, and we are seeing these catastrophic wildfires. And in order to get the forest back in a healthy situation, we are going to need to do some significant thinning of smaller trees, 12 inches in diameter and under; and you mention in your testimony that one of the things that is needed—and you highlight this, you say, "If long-term reliable feedstock contracts, at least 5 to 10 years, are not put in place, biomass energy plans will not multiply anytime in the future in great numbers that is enough to make a difference in the forest fire abatement plan."

What specifically are you talking about there that needs to be done in order to grow this industry to the point where we make a real impact?

Ms. SMITH. I was talking about basically, the Forest Service needs to put into place long-term feedstock contracts. I am not sure they have. I think they are looking into that, if they could—their legal department was looking in to see if they could do that; but they have stewardship contracts which are long term, but were looking to possibly expand that, so they have the authority to do 5 to 10 years.

Without biomass, the biomass putting a plant in without contracted feedstock supply is—you know, again, when they go to their banks for loans, unless they have that in hand, it is very difficult for them to get the loans that they need.

Mr. UDALL. What we are really talking about is creating a market for these plants and then allowing them to develop and grow.

Ms. SMITH. Right, it is a chicken-egg thing.

Mr. UDALL. You talk about, on some of these renewable fuels that they are carbohydrate-based versus carbon. I didn't hear any of the panel do any comparisons of CO_2 emissions. I mean, we are all very aware of this climate change, global warming situation.

Are any of you aware of—what are the comparisons there in terms of, if you are talking combustion between carbohydrate versus carbon? And any of you.

Mr. DINNEEN. Congressman Udall, Argonne National Laboratories had done a comprehensive national analysis late last fall in which they took a look at the greenhouse impacts relative to gasoline to determine that there was a 12 to 19 percent reduction in greenhouse gases. Other studies have shown higher levels of reductions. A previous DOE study had suggested 35 percent.

But there is just no question, because you are taking carbon out of the atmosphere in the production of the crops, that there is a cycle there that is very beneficial to the environment.

One environmental group in California, after the President had announced his decision on the California waiver, issued a news release saying that that one decision was responsible for taking 580,000 tons of carbon out of the air. So from the standpoint of global warming, that one decision was incredibly important.

But anything that is encouraging the increased production and use of renewable fuels, like ethanol, biodiesel, whether it is from crops that are being used today, like corn or the cellulose and lignin that Megan Smith has talked about in her testimony, is going to have tremendously positive greenhouse gas benefits.

Mr. ABNEE. Mr. Udall, I draw your attention to our submitted testimony, on page 2, where we quote, "Geothermal heat pumps lower electricity demand by 1 kilowatt per ton of capacity." This would mean that a conventional, average-size home would reduce the KW demand on that home by 3 KW. "If 100,000 homes began using geothermal heat pumps, the United States would reduce annual electric consumption by 799 million kilowatt hours and reduce carbon dioxide emissions by 588,000 metric tons. Those numbers are equal to converting 129,000 cars to zero-emission vehicles or planting 38.4 million trees."

Mr. HECK. The Department of Energy study showed that biodiesel reduces CO_2 emissions by 80 percent compared to petroleum diesel.

Ms. SMITH. And for biomass, depending on how large you draw the box, if you take a green field, say, with just grass growing on it, and plant trees, you are going to absorb more carbon. So it can be upwards of 80 to 90 percent for greenhouse gas reduction.

Mr. UDALL. Mr. Abnee, you talk about geothermal, and the one geothermal project I am familiar with is up in my district near Los Alamos National Laboratory, and they drill down 3 miles into the Earth and they hit what they call hot dry rock; and the theory is to inject water, or something along that line, that then takes advantage of the heat, and then transfer it back up in order to generate power.

Is this the same technology you are talking about, more or less?

Mr. ABNEE. In theory, it is the same technology, but we only use the top 150 to 300 feet of the Earth's surface, which allows us to use this technology across our country. You don't have to go to the hot reservoir to get the power production.

We are not generating power; we are only using the thermal mass of the Earth to heat and cool commercially. It is a heat transfer process.

Mr. UDALL. And this hot dry rock phenomenon is also one that could be very effective, I think, in terms of producing power on a renewable basis; couldn't it?

Mr. ABNEE. The hot dry rock process is very efficient in producing power, but there again what our technology is—in theory, we are using the same principles, but we are only using the top surface of the Earth, bringing that technology to everyone's use, not only in your part of the country, but all over the country where they don't have the hot reservoirs.

Mr. UDALL. That is great. Thank you.

I yield back, Mr. Chairman.

Mr. SHUSTER [presiding]. Thank you.

Mr. Bartlett, do you have any questions?

Mr. BARTLETT. Thank you very much.

I want to make sure I understand the geothermal heat pump. What you are doing in your geothermal heat pump is simply working against the relevant constant temperature of the Earth, rather than working against the hot summer and cold winter?

Mr. ABNEE. That is correct, Mr. Bartlett. What we are looking at are the efficiencies that are derived from—geothermal heat pumps based on the fact that the Earth has a constant temperature below the frost line, and in the summertime, the Earth is cooler than the ambient air that you are trying to cool within your home, business or school; and in the winter, the Earth is warmer than the ambient air, and that is where you get the 25 to 40 percent efficiency for the customer.

Mr. BARTLETT. If you really think of—what we do with the standard heat pump is, you are trying to heat up the outside air in the summer and you are trying to cool down the frigid outside air in the winter.

Mr. ABNEE. That is exactly correct, and you are defying the law of physics by doing that. And this way, we are using the constant 55°F to 60°F degree Earth to our benefit. The heat transfer is much more efficient; and consequently, you get the efficiency of our technology.

Mr. BARTLETT. Yes. There is also the potential advantage of storing heat during the summer so that you can now reclaim it in the winter?

Mr. ABNEE. That is essentially what we do, because you are adding heat in the summer that is actually drawn back out of the Earth in the winter. So the process is a reversible process and that is what makes it efficient. That is correct.

Mr. BARTLETT. Thank you.

Just spend a couple of moments on the biomass energy bill. To kind of put this in context, we have in this country 2 percent of the known reserves of oil in the world, 2 percent. We use 25 percent of the world's oil. We now import 56 percent of our oil, compared to 34 percent during the Arab oil embargo. This is a critical national security concern in addition to an economic concern.

I am opposed to rushing out and finding that measly 2 percent and pumping it. I think that we need to husband that. This may be a rainy day; I think there is going to be a rainier day, and so I am very supportive of these alternate technologies.

Ultimately, essentially all of the energy that we use except the bit of geothermal, true geothermal where you drill down to the hot core and nuclear, just about all the rest of the energy we use came from the sun, or comes from the sun—whether it is photovoltaic or whether it is the corn and the soybeans that you grow, whether it is the rain that the sun lifts and drops on the mountain and runs down through our turbines, whether it is the wind that blows as a result of differential heating and cooling on the Earth's surface, produced by the sun—essentially, all of our energy came from the sun in the form of our fossil fuels, or comes from the sun today.

There are about 1,000 gigabarrels of oil remaining in the world. At the current use rate, that is about 30 years. Now, we are going to find more, but we are also going to use more. So if you can make the assumption that the more that we will find is going to match the more that we are going to use—if the Third World is going to industrialize and if we are going to continue to grow—then we have got about 30 years of readily accessible oil available in the world.

By the way, ever since 1970 in this country—a little blip with Prudhoe Bay—every year since 1970 we have found less oil and pumped less oil than we did the year before. As a matter of fact, in 1982, we spent more energy drilling for oil than we will ever get from all the oil that we found in 1982.

A question was asked, how do we get the message out to the American people that bioenergy and all these other alternative sources of energy are very important? I think the average American understands the statistics that I just went through. And they are really understandable; when you present them to the people, they will be more than supportive of what you all want to do and what we want to do.

How do we get this message out? High gas prices help us. You know, that is a very regressive way to help us. That hurts the poorest of the poor the most. If it didn't hurt them, I would pray for higher gas prices because it gets the message home. But I don't want to hurt those that can least afford to be hurt.

How do we get that message out, so that we get support to do what we really need to do for our national security, as well as for the environment?

Mr. ABNEE. Mr. Bartlett, I think your example of higher fuel prices, higher energy prices is an excellent one; and the analogy I make to that is, no one likes to go to the dentist, but you always go when you have a toothache. And as energy prices go up, people continue to look for alternative ways to heat and cool their buildings—to alternative fuels and so forth.

Working in this particular setting with the Small Business Administration, hand-in-hand, in developing ways that we can help reduce those energy cost is one way to do that. Make people aware, develop some way to get this technology—whether it is nontraditional fuel, as you have heard today, or a technology such as geothermal heat pump technology—we have to get that message and awareness out; and the way we do that is working with alliances, working together. And one is with the Small Business Administration, helping to work hand-in-hand, developing ways to deploy that type of technology and that type of alternative fuels.

Mr. BARTLETT. Even if you don't think there is an environmental threat to using fossil fuels the way we do—and I think there is, but even if you don't believe that, you still have to be concerned about the national security and the economic impacts of our having only 2 percent of the oil and using 25 percent of the oil.

Anything you all can do to help us get that message out helps all of us to move more quickly from a fossil fuel economy to a renewable fuel economy. Thank you very much.

Thanks, Mr. Chairman.

Chairman THUNE [presiding]. Thank you Mr. Bartlett.

Mr. Phelps.

Mr. PHELPS. Thank you, Mr. Chairman. Thank you for this hearing and valuable discussion that we all find important.

And thank you, Panel, for your testimony.

Mr. Donaldson, you alluded to some portion of your testimony about the handling of manure. I know you came to the right place. You know we are experts in that up here.

Mr. DONALDSON. I didn't mean it that way.

Mr. PHELPS. You had mentioned that the connection between renewable fuel development and eventually reducing farm subsidies as an item. How do you believe that should be?

Mr. DONALDSON. Well, it has got to work through the marketplace. There is a demand for the products that the farmer produces out there, whether it is manure or whether it is the crops that he grows.

As I said, the use of corn could increase that price 25 to 30 cents a bushel if it was used for ethanol production.

The farmers today are not looking for a handout from you folks. They are looking for a helping hand. So if we can gather our income in the marketplace, that is where we want to get it. And I think that the things that I have talked about, if it is developed, if the technology is there and everything develops as all the panel has talked about, there is an opportunity for agriculture to receive from the marketplace the income that we are looking for.

Mr. PHELPS. Thank you. I believe that, too.

In your testimony, you had mentioned that you would suggest that we have a stronger partnership between the oil industry and ethanol industry. How do you suggest that would be accomplished?

Mr. DINNEEN. Well, the biggest problem with energy markets today, quite frankly, is indeed a lack of refining capacity. Refineries are operating at 96, 97 percent of capacity today. So you can get more crude oil from wherever, and it does not make any difference if they can refine that product into gasoline for consumers.

Indeed, last year when the Administration had released some product from the petroleum reserve, that product actually had to be exported to European refineries to make gasoline and then reimported back into the United States.

Ethanol offers a way of adding volume, adding clean octane to the liquid gasoline pool without having to go through that refinery bottleneck. So, in that way, I think finally refiners are recognizing that ethanol may not be quite the threat that they may have thought it was; and we are working very closely with refiners today to try to figure out a way, how we can work with them to continue to provide high performance, high quality fuels for the driving public.

Mr. PHELPS. Thank you very much.

Mr. Heck, in your testimony, you had mentioned that including the combination of clean renewable fuels and domestic oil and gas would be the way to go. Do you feel that the administration's budget proposal includes enough of that for your support or encourage our support?

Mr. HECK. We are encouraged by the support that is in the President's proposal, but there is no specific mention of what specifically could be done for biodiesel, so we believe we need to go further. In the chicken-and-egg market concept, there is a problem because we

have millions of individual buyers, but we have bulk distributors. And there is no way for our customers to go to the store and buy one unit of biodiesel. It has to be introduced through the distribution system and that requires legislation such as you are considering.

Mr. PHELPS. Hopefully, before the debate is over, maybe it will include some of those items. We hope so.

Finally, Ms. Smith, you mentioned increase in the ethanol market by nearly 10 times may be actually detrimental to the corn market. Why do you think this to be the case?

Ms. SMITH. I am not absolutely positive, but I just know that USDA has not studied anything larger than a three-time growth factor. Anything larger than that, until—it is not studied extensively. Anytime you get involved with a commodity such as corn, which is volatile because of—you know, just because of atmospheric—you know, things going on in the atmosphere, the weather patterns, et cetera, I think you just have to study it extensively. Ten times market growth over 15 years is very large. Not that I don't support the premise of the bill, I do; but it is just very large.

Mr. PHELPS. So you don't think it is worth the risk in stabilizing our investment in lieu of the energy crises we are facing?

Ms. SMITH. I do if we are sure of the path that we are going down, that it is not going to be detrimental to something else, if you push here, something else is not going to push out in the other direction. I would hate to see us go down that path.

Mr. DINNEEN. Congressman, could I just add to that real quick?

We are conducting a comprehensive analysis of the interrelated agricultural impacts of the bill that is being discussed. We don't believe that there is going to be a negative impact. We think that there is going to be a tremendous farm income impact as a result of increase in the demand for ethanol in this fashion. I mean, 16 billion gallons of ethanol sounds like a heck of a lot, and it is, but not all of that is going to be corn. We think probably about half of it is likely to be cellulose.

The next generation of ethanol production facilities that are going to be built are going to use a variety of different feedstocks, new technologies. This is still relatively an infant industry, and as the industry grows, you are going to see expanded feedstocks, expanded technologies.

Ms. Smith mentioned some of the new cellulose technologies that are likely to come on line in the very next year. Sixteen years from now, who knows what is going to be possible, what is going to be economic. We know there is tremendous expansion in our industry today.

Mr. Phelps, you happen to represent a state and indeed a congressional district where more ethanol is produced than any other district in the country.

But, Mr. Carson, you probably don't recognize that the second largest ethanol producer is a Tulsa-based company, Williams Energy, which operates two different ethanol facilities in other States. And the State of Oklahoma is looking at trying to promote the increased production and use of ethanol right there in the State.

Mr. Udall, the third largest ethanol producer operates a facility in Portales, New Mexico.

There are also planned facilities in York, Pennsylvania.

I have been working with the Maryland Corn Growers, Lynne Hoot, Mr. Bartlett, you are probably very familiar with.

I mean, the planned expansions and the excitement in our industry, you know, goes from coast to coast, and we don't see any difficulty at all in meeting the demand that is created by the bill. And we believe it is going to be done in a way that is very beneficial to farmers across the country.

Mr. PHELPS. Thank you for that valuable information. And that is why we sit here as a team.

Chairman THUNE. Even though we would like to see South Dakota get to the top of that list.

Mr. Shuster.

Mr. SHUSTER. Thank you, Mr. Chairman. I would also like to thank all the panels for being here today. I appreciate your testimony. My question is a two-part question.

First, the cost of ethanol-blended gasoline and biodiesel versus standard gasoline, typical gasoline we use in Pennsylvania? And also what does it do to the efficiency of the vehicle that is using it to operate?

Mr. DINNEEN. Mr. Shuster, the cost is very competitive with gasoline as a result of the Federal Tax Incentive Program. But if you look at the cost of ethanol versus other octane components in gasoline, be they MTBE or benzene or toluene or any of the other aromatic components that refiners might use for octane in place of ethanol, we are very competitive today.

The fact of the matter is, though, they are going to use those refinery-based products if they can despite the cost impacts.

Second part of your question was——

Mr. SHUSTER. What does it do to the efficiency of the vehicle?

Mr. DINNEEN. Adding ethanol to gasoline is going to increase the octane 3 percentage points. So if refiners want to, they could produce at lower cost a lower octane base fuel, 86 octane or 84, blend it with ethanol and have an 87 or 89 midgrade.

The performance of ethanol fuels is exceptional, and that is why many marketers today are using ethanol in markets where it is not required to be used.

Mr. SHUSTER. Mr. Heck, do you care to talk about biodiesel?

Mr. HECK. For biodiesel efficiency in its 100 percent pure or neat form, which is not generally the way it is commonly used, the efficiency is the same as it is for number 1 diesel fuel—not marginally better or worse—just approximately the same.

The most exciting use for the biodiesel is, in a low blend, at a 1 or 2 percent level, where it improves the lubricity, improves the quality of the petroleum diesel fuel that it is blended with. And in that case, it does improve the performance of the engine marginally, not by a lot, but it does extend the life of the engine quite a bit because of the improved lubricity.

However, on the cost question, we don't yet have biorefineries like the oil company refineries, so our cost is higher. It is a new industry; we have not gotten the cost economies of scale going. And we definitely need some help, through a excise tax exemption, so we can get this industry started.

Mr. SHUSTER. You mentioned that some vehicles need modification. What kind of modification would they require?

Mr. HECK. At a 1 or 2 percent blend, there is absolutely no modification required. Your engine will just run better and you will hardly know that it is in there; there is no change.

If you choose to run 100 percent biodiesel, perhaps because you are in a pristine wilderness area, for example, and you do not want to risk a fuel spill on a lake or you are in an enclosed mine or something and you do not want any toxic exhausts, the engine will still run. But if you want to keep your fuel efficiency up, you will have to have a timing change, which means—on a modern diesel engine means going in and reprogramming the computer.

Mr. SHUSTER. Mr. Abnee, could you tell us what the cost differential is between installing a geothermal system versus in a house, for instance?

Mr. ABNEE. In a conventional, normal-sized house, you are looking at a premium cost of—between $4,500 and $7,500 for the geothermal heat pump versus conventional heating and cooling.

Mr. SHUSTER. I am not quite sure I am clear on that.

Mr. ABNEE. A conventional home of 1,800 to 2,000 square feet, typically, a 3 to 3½, or 4-ton system depending on the geographical location—the premium cost for the geothermal heat pump, is essentially the cost of the heat exchanger loop that is buried in your yard or under your parking lot or driveway. That will cost an additional $4,500 to $7,500.

Mr. BARTLETT. How quickly do you get that back in decreased energy costs?

Mr. ABNEE. We are looking at somewhere between 3½ to 5 years on a conventional home.

On a commercial building, you have a wash as far as the capital investment is concerned. So it is the same investment cost up front on a commercial or large-scale building. You have a payback from day one. You immediately get the savings.

But on a home, we are typically seeing 3 to 5 years.

Mr. BARTLETT. And the system will last very much longer than 3 to 5 years?

Mr. ABNEE. The system historically will last longer than conventional systems because you are working that equipment at lower stress than you do with conventional equipment, because you are using the 50 to 55 degree Earth's temperature as the temperature transfer medium, so the equipment works at its optimum level.

So you are extending the life over 22 years of that heating and cooling system versus around 17 years for conventional systems.

Mr. BARTLETT. Thank you for yielding.

Mr. SHUSTER. One final question. Compared to the rest of the world, where do we stand with renewable fuels?

Do any of you care to comment?

Mr. DINNEEN. In terms of ethanol, we are growing at a pretty rapid pace, but we are still far behind Brazil, which has a very aggressive ethanol fuel program. Indeed, 50 percent of the vehicles that operate in Brazil run on a 22 percent ethanol blend. The other 50 percent of the vehicles run on a 100 percent ethanol blend. So they produce about 4 billion gallons of ethanol from sugar cane in that country.

But aside from Brazil, while there is a lot of activity in many countries around the globe, ethanol in the United States is probably—still produces more and uses more than most other countries as well.

Mr. HECK. For the biodiesel, it would be easy for me to say more than I know for certain. I believe the market share in Europe is around 4 percent. And I am not certain of that, but we are certainly behind what Europe is doing.

South America has not been involved in biodiesel to any large extent yet.

Mr. SHUSTER. Thank you, Mr. Chairman.

Chairman THUNE. Mr. Carson.

Mr. CARSON. Thank you so much, Mr. Chairman.

And thank you all for being here. Mr. Bartlett and Mr. Shuster touched on a couple of questions I have about geothermal energy.

You said right now, it is a premium of $4,500 to $7,500 for a home?

Mr. ABNEE. For a typical home, that is correct.

Mr. CARSON. What are the energy efficiencies that you gain from installing that versus a conventional——

Mr. ABNEE. It is 4½ to 1. That means for every unit of energy that you purchase, in exchange, you will receive 4½ units of energy—using the Earth as well as the technology that is in the box for the heating and cooling device. So it is 4½ to 1.

Mr. CARSON. A question to the rest of the panel.

One of the big criticisms about ethanol, biodiesel, biomass fuels is that many times it costs as much energy to produce them as it does—as, in fact, they might save for us.

I would like you to comment on that. And I guess the key metric would seem to be the cost per BTU of energy or watt of energy or however you want to measure energy production, if you could talk about what the production costs per BTU are going to be for the various alternative sources we are talking about here today.

Mr. DINNEEN. Mr. Carson, I will get myself into trouble if I try to start quickly doing the math in my head of the cost per BTU, but I will supply that to you and the committee.

Generally speaking, however, there is just no question that ethanol provides far more energy as a fuel than is used to produce it. In 1980, when some of the first reports were used—and the oil industry continues to cite—that may have been the case, but our industry has been getting far more sophisticated in terms of how it uses energy.

The energy input now in terms of ethanol is probably about 32,000 BTUs for a gallon of ethanol that produces 76,000 BTUs when used as a fuel. So we are very energy efficient in that regard, which is why Argonne National Labs, when it is doing greenhouse gas emission studies, has determined that we have such a positive global warming benefit. Because if we were a negative energy user, we would not have that kind of a benefit.

The industry is getting more energy efficient all the time. Again, we are a relatively young industry. And the next generation of ethanol production facilities is going to be more energy efficient than the last, using the most up-to-date technologies. So as the industry

grows, those economic benefits, those efficiencies are just going to expand.

Mr. CARSON. Did you say it takes 32,000 BTUs to create a gallon of ethanol?

Mr. DINNEEN. That is correct.

Mr. CARSON. For 76,000 BTU payout. How does that compare to gasoline?

Mr. DINNEEN. Gasoline has about 111,000 BTUs, but it takes gasoline or takes petroleum products to make it. So its energy efficiency is not anywhere near as good.

Mr. CARSON. How about biodiesel?

Mr. HECK. Biodiesel made from soybean oil, I believe the energy balance is 3.24 to 1. An even more important point is that we raise soy beans for the protein and the oil is the leftover by-product.

As far as the production costs go, we are behind the ethanol industry in our time frame and in developing the industry. We really do not know what the price is going to be. We know that there are valuable products within the soybean oil, but without the biorefinery, we do not know what the eventual price would be. We know that we are in the early development stage, and the price has been dropping sharply over the last few years; without the necessary infrastructure, we do not know what the net cost will be.

We are certain it will be coming down. We are certain that biotech will allow us to make the oil source more readily available.

Any answer I would give you would be tend to be misleading. But it is a positive energy balance and a by-product of our primary product, which is protein.

Mr. CARSON. Before going to Ms. Smith on this, let me come back over here. Do you have a cost per BTU for ethanol? How much are we talking about per BTU—the cost of the product?

Mr. DINNEEN. The production costs of ethanol are probably between 95 cents and $1.05, depending on the facility and the current price of corn.

Mr. CARSON. Per gallon?

Mr. DINNEEN. Per gallon.

Mr. CARSON. Ms. Smith, just for a housekeeping measure, oftentimes you use the term "biomass." do you consider biodiesel, when we are talking about ethanol, a type of biomass fuel?

Ms. SMITH. It is a type of biofuel. Biomass, we define as cellulosic.

Mr. CARSON. Same questions I asked earlier about, kind of the cost per BTU and the energy required to produce a unit of energy from biomass fuels.

Ms. SMITH. The energy efficiency is about 4 to 1 and that is largely due to the lignin that is contained, holding the cellulose and the hemicellulose together. It is like a clean coal. It has the same BTU content. It is 4 to 1, so it is pretty efficient; and that is conservative.

As far as cost, it is about the same as the first plant—it is going to cost about the same as a corn ethanol plant. And from there, as they develop these enzymes called cellulase to break down the cellulose, it should ratchet down the cost of the ethanol production. And we hope to be competitive with gasoline in 10 years' time.

Mr. CARSON. Very good.

I yield back the remainder of my time, Mr. Chairman.

Chairman THUNE. Just a couple more questions and then I will yield back to the panel to see if anybody else has additional questions they would like to ask.

I would like to come back, Mr. Dinneen, to the whole question—the problem in the petroleum market. Obviously, one of the problems is refining capacity. They are max'd out or close to it. How does that compare with the number of ethanol refineries, and is refinery capacity going to be a problem with ethanol in the same fashion as it would be with—and I do not know how the different—the refineries differ in terms of——

Mr. DINNEEN. We are operating closer to the norm in terms of all manufacturing industries. We are operating at about 84, 85 percent of our production capacity today. We have got a production capacity of about 120,000 barrels per day. We are producing about 110,000 barrels per day. We think we can grow more, even with existing capacity. But we are putting steel in the ground because we want to continue to grow this industry.

Chairman THUNE. It just seems to me they have got to go on parallel tracks, because you have got to have the refinery capacities—we continue to get more production, obviously—so we do not run into the same problem that they run into.

Mr. DINNEEN. Absolutely. And we have seen our demand grow tremendously over the past several years. That is why you have seen the growth in our industry.

I was telling somebody earlier today, I started with the Renewable Fuels Association a few years ago—14 years ago, but we were producing about 600 million gallons at that time. We are going to produce over 2 billion gallons this year. I mean, it has grown exponentially in the last 5 years, and as I said in my testimony, primarily in farmer-owned cooperatives, as farmers across the country have recognized that this is an opportunity for them to seize the economic benefits of ethanol production more directly.

Take a $2.50 bushel of corn, and rather than just giving that to a grain silo for that amount of money, having ownership in that ethanol-production facility, producing ethanol out of that plant, as well as food and feed by-products, you have got $4 or $5 worth of product coming out of those facilities. They are economic engines across rural America, and that is the model that is going to continue to be followed in many States across the country.

Chairman THUNE. It really has been the only bright spot in the ag economy in the last few years, if you think about it. And it really is not just—obviously, it puts more dollars in farmers' pockets, but it also creates economic activity in rural areas. That is one thing we have seen with all the out-migration, and that is one of the issues that we were discussing with this new farm bill. Production agriculture is one aspect of it, but also how do we support and continue to keep our rural economies going? That is a broader, broader issue. And that is where value-added industries like ethanol have been successful.

A question for Mr. Heck on biodiesel, and you have mentioned that it is not yet competitive in the U.S. necessarily on a pure cost comparison. What, in your mind, needs to be done to make it com-

petitive—I should say, the question of making it an affordable alternative?

Mr. HECK. That is the correct question, affordable alternative.

Within the renewable standards legislation, we also would have to have a excise tax exemption, so our fuel would be one of the fuels of choice in competition with the other renewable fuels.

And another answer that is also relevant here: The impact on consumers for the low blends of biodiesel is very slight. At a 0.5 percent or 1 percent blend, the cost doesn't matter as much because we are talking about pennies per gallon or less. And in exchange for that, their engines last longer. They get slightly better economy. It makes petroleum diesel a better fuel.

So we are not trying for the whole market. We do not have that much. We are not trying to be competitive on a gallon-for-gallon basis. We are going for the lubricity qualities in regular petroleum diesel.

Chairman THUNE. How is the trucking industry accepting biodiesel as a fuel additive?

Mr. HECK. The people who make the engines for the truckers are enthusiastic about it. And Stanadyne, the largest fuel injector manufacturer, has written a letter to the EPA endorsing the low blends as an aide for longer diesel fuel injector and engine life. Among the trucking industry, they have a great many concerns about any type of a local program, because of the ease with which their competitors can cross State lines and buy a different kind of fuel. It is really a situation that is tailor-made for a Federal regulation of some type to introduce the renewable fuel standard and all the diesel fuel at the same time.

Chairman THUNE. Thank you. Mr. Udall.

Mr. UDAL. Thank you, Mr. Chairman.

Mr. Bartlett, you mentioned earlier this figure of 1,000—is it a 1,000 gigabarrels? The Chairman and I——

Mr. BARTLETT. 1,000 gigabarrel. A gigabarrel is a billion barrels. And somehow, they do not go to a trillion; It is 1,000 gigabarrels.

If you want to talk about gigatons, it is about 295 gigatons of oil.

This is the general consensus from a number of authoritative sources. We had a hearing on this in our Energy Subcommittee on Science. And there is general agreement it is about 295 gigatons, or 1,000 gigabarrels, of oil remaining in the world.

Mr. UDAL. So about a 30-year supply?

Mr. BARTLETT. Roughly. We use almost 20 million gallons a day. The rest of the world uses about 60. If you multiply those—say that the year has roughly 400 days, it comes out to be 30 years more or less.

Mr. UDAL. And one of the other crucial factors in this whole equation is when we peak in terms of oil production in the world, isn't it? I mean, it seems to me we peak in the United States. That is why our imports are going up, as you mentioned, 57 percent.

But when world oil production peaks, which I think many experts are saying is 7 to 10 years, the price impact is going to be enormous, because the control of the price will be from outside the United States, from those producers. And small businesses and others that can't weather these ups and downs, I think, are going to be impacted severely.

Would you——

Mr. BARTLETT. It is beyond our control. We believe in about 7 to 10 years, and maybe earlier than that, we will have pumped about half of all the oil there is in the world.

And Hubbard suggested a number of years ago what turned out to be true. In this country, when we reach the midpoint of our oil pumping, which is about 1970, try as hard as we might after that, we would not pump more oil, and we have not.

So whatever they would like to do when we have reached that midpoint, it will probably be impossible to meaningfully increase oil production beyond that. And since the oil demands are going to keep going up, we can expect meaningfully higher prices in oil, and nobody will be able to do anything about that. It is the marketplace that determines that supply and demand.

Mr. UDAL. Thank you. And the reason why I wanted to ask those questions is that I think it emphasizes once again the importance of renewables at this point in time in our history, and how we have to move forward very quickly on this renewable front.

Do any of you have any thoughts on how we could use, in addition to the testimony you have already given, use the government to create markets in these areas? I mean, there are always ideas in terms of government fleets and government buildings and for geothermal. Are there any ideas out there and any thoughts on using government as an entity to create markets?

Ms. SMITH. I think consideration of an E85 vehicle that uses 85 percent ethanol—they have got a chicken-and-egg problem also. You probably know about the CAFE standard trade-off with the 85s. And the vehicles are out there, but there are no filling stations with ethanol to put into the vehicles. So if the government could help straighten that out, that would help in creating a market for the ethanol.

Mr. ABNEE. As far as geothermal heat pump technology, first of all, we would love to see it in a national energy policy and point out that this is a way to reduce energy costs across the board.

Other ways we are finding to be beneficial, if we can get memorandums of understanding with GSA, the military installations, the United States Postal Service, where we have been very effective in pushing that technology—having them review the technology and giving us an honest assessment or letting us show them that we can compete and beat not only on, first, cost in some cases, but also energy efficiency, I think that would be a help.

Mr. HECK. The bioindustry has been helped a great deal by the Ag Research Service, using biodiesel B20 blends in all of their motors that they run that are diesel, 143 motors, from portable diesel generators to combines and trucks and vans to transport visitors around. So we would appreciate very much if this was extended and more government agencies were asked to burn B2 or B20 or any biodiesel blend.

We are currently working on and asking for CMAQ legislation to be modified to allow for the purchase of biodiesel as a way to negate air quality in cities.

And there is also been some talk of legislation to allow more EPACT credits for biodiesel use. Currently you can only satisfy half of your credit for EPACT and perhaps that could be extended.

Mr. UDALL. Thank you. Just a final comment.

I note in the March blueprint of the administration's plan for a national energy policy, they link renewable tax credits to drilling in the Arctic National Wildlife Refuge. So the proceeds from leasing of ANWR would be used for extended tax credits for renewable fuels and, in particular, to fund and expand the tax credit for the purchase of hybrid or electric vehicles.

It just seems to me that linking those to such a controversial activity is not the direction we should head. I think those should be decoupled, and we should be looking at those kinds of tax credits as standing on their own, and find another source for them.

And with that, I yield back, Mr. Chairman.

Chairman THUNE. Mr. Bartlett.

Mr. BARTLETT. Thank you very much. I just would like to return for a moment to the geothermal heat pumps. There is no reason that every government facility shouldn't be using these because it is going to ultimately save money and be easier on the environment. And that is something we ought to be—we can do that—the government needs to be a leader here. The average homeowner has no idea of the savings that would accrue to them as a result of using a geothermal heat pump. Somehow we have to get the architects and builders familiar with this so that they will be encouraging that.

What can we do to promote this in the private sector so that the people understand that they really will be many dollars ahead and also be very much kinder to the environment if they do this?

Mr. ABNEE. One of the things that comes to mind is some kind of a tax incentive. If we can get some type of a tax incentive for the customer, for the homeowner, that shows the benefit of this, as well as working with us and giving us some opportunity to do an awareness campaign for the general public to show them this technology is the most efficient, is the renewable example that we need to employ—to deploy for the masses. It is efficient and environmentally friendly.

I would say, a tax credit is one of the things I would encourage for homeowners.

Mr. BARTLETT. All we need to do to get this started. Once people understand that if you are going to make money—it is like making an investment that is going to pay dividends in 3 years and continue ever after that, as long as the system lasts, to pay dividends, just education alone, if we can get it out there, should be effective.

Let me ask you a question about the potential for energy from agricultural products, a couple of different sources of ethanol, the biodiesel, the biomass, these are all potential sources of energy. We have been encouraging farmers for the last number of years to cut back on production. If we stop doing that and farmers could just produce what they could produce, how much of our energy needs could be met with energy from ag products? This is really beneficial to farmers.

We now have a farm economy which is in real trouble, because they are too efficient. They produce too much in the marketplace. The supply and demand has driven prices down so the average farmer is barely meeting expenses. If a rain doesn't come this week in our state, they won't be meeting expenses this year.

How much of our energy could we ultimately produce from agriculture products if farmers weren't discouraged from growing, if they could get a reasonable price for their product?

Mr. DONALDSON. I do not know how much. I can't give you an accurate answer to that. But I know if there is profit in it for the farmer, he will produce it.

The ag economy, as you said, and as I alluded in my testimony, as a fruit grower, it is the worst I have seen in the last 12 years. Our input costs continue to escalate at about 5 or 6 percent a year. The price for the product that we sell has declined. Now that can only go on so long.

I think if there is profit in ethanol and in renewable energy sources, farmers are very innovative; they will find ways in which to do that. But there has to be that carrot out there to entice them to do it.

Our production problem right now is worldwide. It is not necessarily just here in this country. You look at the soybean—and Mr. Heck can talk about the soybean situation in Brazil and South America. I do not know if this will enter into this picture or not. I am no economist there. But the farmers in this country, if they see an opportunity here—and we have talked about farmer cooperatives to generate ethanol—there is one being proposed in New Jersey, close to your neck of the woods.

So there is interest there. And it will depend on what the profitability is, whether farmers are going to really get involved in this and go all out and do it.

Mr. BARTLETT. Megan, is chicken litter a good biomass feed stock? If it is, we are rich on our Eastern Shore.

Ms. SMITH. Actually, it is. I went and visited Fibrowatt's chicken plant over in England, and it was fascinating. It was very pungent, but it was functioning and it works. It works for electricity.

Mr. DINNEEN. Congressman, ethanol is actually important to both ends, because a by-product, corn gluten, is used as a feed product for poultry. There is a rather large chicken producer, Purdue, that uses corn gluten extensively in its feed mix; and I am told that is what gives the Purdue chickens that yellow coloring. So whatever end you want to talk about with the chicken, we can help you out.

Mr. DONALDSON. To follow up on what Megan said, I saw a segment on television Sunday evening about the Eastern Shore and the poultry manure being generated down there. And I think it is a British—and maybe that is the same one you saw—a British outfit has a process by which they can make methane out of that chicken manure and then burn the chicken manure after they have reduced that for heating energy.

Mr. BARTLETT. Our landfills make methane, don't they?

Mr. DONALDSON. Maybe we ought to be looking at that to generate.

Mr. BARTLETT. If you just set it aside and try to ignore it—out of sight, out of mind—you are going to get methane from it, aren't you?

Thank you very much, Mr. Chairman.

Chairman THUNE. That, as they say, is the smell of money. And I think, to seize on a term of the gentleman from Maryland—and

you referenced it, Mr. Donaldson, too—with the prices we have had and the costs and the farm economy in the last few years, that we have a gigaproblem with the ag economy which is only going to be corrected by, hopefully, a turnaround in the economic conditions.

Mr. Carson.

Mr. CARSON. Just a couple of follow-up questions on that, and a note of skepticism as well. I mean, it seems like in this whole debate and the whole larger debate about renewable sources, we have gotten about two different policy objectives, one of which is to provide better, more efficient energy to our country, which is a serious problem. Mr. Bartlett has talked about some of the long-term problems we face on that.

The second is, how are we going to help the rural economy.

I am a strong supporter of ethanol, for research for these programs, because they are great programs to our rural economy. The chairman outlined the jobs, the dollars, that will be created for the rural economy.

If we are talking about energy policy where our goal is to provide a more efficient energy, which means higher BTU, lower cost energy for us, I remain a bit skeptical about it. For example, on the geothermal side, you know, we typically provide tax incentives or we tax activities or products that the market itself will either generate too much of or generate not enough of—where the social costs differ from the private costs. We have a situation of these geothermal heat pumps, a great program, where it pays for itself over 4 to 5 years, as you said. You know, that doesn't seem to be typically the kind of activities that we are providing tax incentives for.

I wonder if we could talk not about the rural issues and how it will help rural America. I have a reason to support it. Our rural economy is in serious trouble. But the economics of biodiesel or ethanol or geothermal and why the market is not driving increased production of these or why government, from a pure energy perspective, should be trying to step in through subsidies and credits and programs like that to encourage more production of them.

Mr. ABNEE. Let me address the geothermal heat pump technology issue. And your comments are well founded.

The tax incentive that I alluded to or the subsidies that I alluded to are nothing more than to stimulate or jump-start the market. We are still less than 1 percent in the marketplace in the heating technology; this is not a mature industry. In order for us to benefit from the energy efficiency that this technology can deliver, we have to get more and more utilization and usefulness out of the technology.

I would not be a proponent of or suggest that we continue tax incentives or subsidies for any longer than to where we can become a mature technology, and then let the marketplace and the private sector begin to take over.

Mr. CARSON. By mature technology, you mean have greater penetration in the marketplace?

Mr. ABNEE. That is correct. The technology itself, the research and development is there. It is completed. It is done. This is a deployment activity to utilize the benefits of the technology that we have today.

The private sector industry will more than keep up the pace to be competitive and continue to advance and become more and more efficient. But the utilization of the technology is where we think we need some stimulant.

Mr. CARSON. Would you not agree that advertising would be an effective private market substitute for a tax credit in that situation?

Mr. ABNEE. You have to keep in mind that the majority of these companies that are building these boxes and this equipment are small companies. They are very small and some people would say, actually in their infancy, although we have been doing this for over 15 to 18 years.

But keep in mind the heating and air conditioning industry has a tendency to rely on what has occurred and what has happened 20, 30 and 40 years ago. They are reluctant to make changes or to have a paradigm shift from one technology to another, much similar to what we are hearing here with alternative fuels.

It is not a case where we can just tell someone how great this is and they do it.

Mr. CARSON. Let me ask two technical questions about how the geothermal heat pumps work. Is it a substitute for, is it supplemental to conventional heating and cooling units?

Mr. ABNEE. And it is a substitute for; It is not a supplement. We take the technology of the heat pump itself and couple that with the Earth, instead of the outside air as Mr. Bartlett had discussed. So this is a substitute for heating and air conditioning.

Mr. CARSON. And can it be installed in existing homes or does it have to be new construction?

Mr. ABNEE. Yes, it can. It can be installed in buildings such as this. It can be installed in retrofitted applications of schools, and homes. It is not just for the new building market.

Mr. DINNEEN. Congressman, in terms of the renewable fuel side, I think you sort of need to look at gasoline that has a BTU content of 111,000 BTUs. There are 200 or so different hydrocarbons that will form that blended gasoline, some of which will have higher BTU content than ethanol. Others that would have a lower BTU content than ethanol. All we are suggesting is that there are, as you mentioned, externalities that are important in terms of public policy, health, environment and energy security, that are helpful to make sure that at least a component of that gallon of gasoline is domestically produced renewable fuels like ethanol. When compared against other important octane enhancers like toluene or benzene, ethanol has tremendous benefits to society and, frankly, to the refiner in meeting clean air objectives under the current law and other things.

I mean, I am not sure I am quite getting at what your question was, but I think ethanol has significant vale.

Mr. CARSON. Clarify for me, what is ethanol aspiring to be a substitute for, other gasoline additives or as a primary source of fuel in and of itself?

Mr. DINNEEN. The ethanol industry doesn't think we are actually going to replace gasoline. Our future is likely as a blend component with gasoline, to boost octane, to provide cleaner fuels, high performance fuels for the public. If you were to blend 10 percent eth-

anol in every gallon of gasoline, I think you would be making a pretty bold statement in terms of energy security.

The State of Minnesota has a tremendously aggressive ethanol blend program. And actually in that State, every gallon of gasoline is blended with 10 percent ethanol. It is the only State in the country meeting its EPACT goals, because it has replaced 10 percent of its fuel with an alternative.

That ought to be our goal as a Nation; it is certainly our goal as an industry.

Mr. CARSON. Does anyone else care to respond?

Mr. HECK. The world and the United States made the decision to go to an oil-based economy 100 years ago, and it was a good decision that has served us very well in quite a few areas, and not served us quite as well in other areas.

But if we could take time out today to rethink the whole process and decide which way we were to go if we were starting from scratch, would we decide to go with an oil-based economy with an uncertain energy supply from foreign countries or would we decide to grow our own energy? I think the answer is obvious that if we could just call a time out and start over, if we made that decision today for energy security, for environmental and for economic development, we would decide to use our own fuel and our own products that are made from biomaterials. But we have an energy industry and oil industry that is firmly entrenched with 100 years of experience and billions of dollars of research and great production facilities, all of which I am grateful for.

But to make this transition to where we should be 50 years from now or 100 years from now, we need government help to facilitate this change as rapidly as possible.

Ms. SMITH. If you look at the history of energy subsidies, every conventional energy source has had lots of government funding in the form of subsidies put behind it before it becomes commercial. We are just starting out, as Bob Dinneen said. We are the new kid on the block as far as being market-driven.

I am not sure that the technologies, such as nuclear and coal, just went on their own; oil is still getting all types of subsidies that are hidden.

Ms. CARSON. Thank you very much. Thank you all.

Chairman THUNE. Mr. Shuster. I believe we have exhausted our questions, so we appreciate your patience, panel, and your great testimony and your responses.

As I said earlier, I think this is an issue which bears strongly not only on the issue of agriculture, but on the future of our energy security in this country. And we welcome your input as we continue to have a dialogue and discussion on energy policy. In my mind, it is very, very important that renewable sources be a part of our energy mix as we head into the future.

Mr. Donaldson.

Mr. DONALDSON. The question was raised or discussed here awhile ago about the acceptance by the public. That is important. You fellows sitting up there and the rest of the Congress, political leadership is going to be key if it is going to move ahead.

The time is now. The time is critical. Gentlemen, do not let it pass by.

Chairman THUNE. You can count on that in South Dakota. The one member from South Dakota agrees with you.

With that, the hearing is adjourned. Thank you.

[Whereupon, at 12:00 noon, the subcommittee was adjourned.]

JOHN THUNE, SOUTH DAKOTA
CHAIRMAN

TOM UDALL, NEW MEXICO
RANKING MINORITY MEMBER

Congress of the United States
House of Representatives
107th Congress
Committee on Small Business
Subcommittee on Rural Enterprises, Agriculture and Technology
2361 Rayburn House Office Building
Washington, DC 20515-6319

Opening Statement
Chairman John R. Thune

Hearing on Renewable Energy

Subcommittee on Rural Enterprises,
Agriculture and Technology
House Committee on Small Business
July 24, 2001

Today's hearing has been called to discuss the issue of renewable energy and its importance in solving our nation's energy crisis. The subcommittee will explore the ways in which Congress can help to create a more productive environment for the use of renewable fuels.

Renewable fuels play a productive role in improving our national energy security by providing stable, homegrown, renewable energy supplies. Renewable energy can take many forms, from ethanol and biodiesel, to wind and hydroelectric power, to power generated by the earth and sun.

To promote the increased use and availability of renewable fuels, I have introduced two bills to make it easier for producers to market renewable fuels.

The first bill, H.R. 2423, The Renewable Fuels for Energy Security Act of 2001, calls for renewable fuels, such as ethanol and biodiesel, to play a larger role in America's transportation fuel market. The bill sets a national fuel standard, not a gallon-by-gallon mandate, and will not force a level of compliance in places where compliance may be difficult.

It is important to note that this bill does not attempt to alter The Clean Air Act of 1990. The Clean Air Act mandates the use of renewable fuels and requires gasoline to contain cleaner-burning additives called fuel oxygenates – primarily ethanol or MTBE, a methanol-based additive which has since been found to be harmful to ground water. With MTBE now prohibited in 11 states, and probably more in the near future, ethanol and biodiesel are the most viable options for abiding by the mandates of the Clean Air Act.

To enhance national security and improve the quality of our air, H.R. 2423 gradually increases the market share for renewable fuels to 2 percent by 2008, 3 percent by 2011, and 5 percent by 2016.

The United States Department of Agriculture estimates that for every gallon of ethanol produced domestically, we displace seven gallons of imported oil. Today, ethanol is estimated to reduce our demand for foreign imported oil by 98,000 barrels per day. A 3 percent market share for ethanol and biodiesel would displace about 9 billion gallons of gasoline annually, or between 500,000 and 600,000 barrels of crude oil a day – the amount we now import from Iraq.

To help promote the use of ethanol as a renewable fuel, I have introduced H.R. 1636, which would make ethanol cooperatives eligible for the current small producer ethanol tax credit. Under current law, a small ethanol producer is eligible for an income tax credit of 10 cents per gallon, up to 15 million gallons of production.

H.R. 1636 expands eligibility for the credit to producers whose annual ethanol production capacity is below 60 million gallons. Current trends in South Dakota indicate that co-ops are building larger ethanol plans with production capacities of 40 to 60 million gallons. Through this tax credit, a co-op that produces 15 million gallons could pass along $1.5 million to its members.

The use of renewable energy sources is crucial to building a stronger domestic energy policy, and will provide a positive economic impact to many rural areas. I thank the witnesses for attending today's hearing, and look forward to your testimony.

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Testimony of

Mr. Robert Dinneen
Vice President
Renewable Fuels Association

Before the

U.S. House of Representatives
Committee on Small Business
Subcommittee on Rural Enterprises, Agriculture and Technology

July 24, 2001

Mr. Chairman and Members of the Committee, I would like to thank you for the opportunity to provide comments on the role of renewable fuels in our nation's energy policy. Renewable fuels such as ethanol are a critical component of the U.S. gasoline market, extending refining capacity and reducing imports of refined petroleum products, improving air quality and providing an important economic stimulus to rural America. Ethanol can and should play a prominent role as we develop a national energy policy that recognizes the need for increased production of domestic fuel sources. Moreover, it is important to note that small businesses have a prominent role in both the production and marketing of ethanol, and thus will be critical to developing a sustainable energy policy for the future.

The Renewable Fuels Association is the national trade association for the domestic ethanol industry, located in Washington, D.C. Our membership includes ethanol producers and suppliers, gasoline marketers, agricultural organizations and state agencies dedicated to the continued expansion and promotion of fuel ethanol. Today's domestic ethanol industry consists of 56 production facilities located in 20 states with an annual production capacity of 2 billion gallons. In 2000, the U.S. ethanol industry produced a record 1.63 billion gallons of high quality, clean burning fuel ethanol. Production capacity continues to expand, particularly among farmer owned cooperatives, the fastest growing segment of our industry and an example of small businesses providing jobs and economic growth throughout rural America.

Background:

Ethanol is a clean, energy efficient, environmentally friendly fuel that provides jobs and economic opportunity for rural communities where production facilities they are located. Ethanol is an alcohol produced primarily from grain using a process almost as old as civilization itself. Today, however, ethanol production has come a long way from the wineries of ancient Greece or the stills of Prohibition. Fuel ethanol is produced on a mass scale utilizing millions of bushels of grain annually in a fermentation/distillation process. While the fundamentals of ethanol production have remained constant, the process technology has become quite sophisticated. There are now two general types of processing facilities, known as wet mills and dry mills that produce fuel-grade ethanol in the United States.

Wet mills are also commonly known as corn refineries. These facilities produce starch, ethanol and corn sweeteners, along with corn oil, corn gluten feed and corn gluten meal. Both corn gluten feed and meal are sold into the animal feed market. Dry mills use simpler technology to produce ethanol and distillers dried grains (DDG) that are also sold as a high-quality feed ingredient. Ethanol production utilizes the relatively low-value starch in the grain while leaving behind vitamins, minerals, fiber, oil and protein to be utilized in higher-value markets.

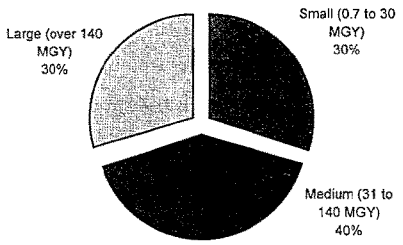
Ethanol producers continue to improve efficiency. Modern technology makes it possible to build a state-of-the-art, cost-effective dry mill ethanol plant for about $1.15 per installed gallon of annual production. Technological improvements throughout the industry have driven the cost of producing ethanol down dramatically. A 1986 report by the USDA Office of Energy predicted that the cost of producing ethanol in 1995 would be $2.11 per gallon. Instead, those costs were about $1.15 per gallon in 1995, and industry surveys now suggest that the average production cost is in the range of $0.95 to $1.10 per gallon.

Ethanol facilities are not only cost effective; they are energy efficient. A recent study by Argonne National Laboratory found that for every 100 BTUs of energy used to produce ethanol, 135 BTUs of ethanol are produced. That is because corn plants are really very efficient solar panels. USDA analysis has found that corn farmers use about half the energy to produce a bushel of corn than they did just 25 years ago. The Argonne report also provides an analysis of ethanol's greenhouse gas emissions compared to gasoline. Using ethanol produces 35-46 percent fewer emissions of greenhouse gases than gasoline for the same distance traveled. If engines are optimized to use ethanol, mileage will increase along with greenhouse gas benefits.

Farmer Owned Involvement in Ethanol Production

The majority of growth in the U.S. ethanol industry is the last several years has been the result of farmer ownership of ethanol production facilities. Today, farmer-owned dry mills account for one-third of all U.S. ethanol production. Ethanol provides a value-added market for farmer cooperatives while offering profit sharing dividends as the industry prospers.

U.S. Ethanol Production Capacity



Federal Ethanol Program

The federal ethanol program has been an unmitigated success. From just 175 million gallons in 1980, the industry has increased more than ten-fold to 2 billion gallons today. As a result, farmers across the country have received higher prices for their commodities, more than 200,000 jobs have been created in rural America, the U.S. has reduced its oil imports, and most importantly, Americans are breathing cleaner air.

Economic Benefits: The processing of grains for ethanol production provides an important value added market for farmers; helping to raise the value of commodities they produce. As the third largest use of corn behind feed and exports, ethanol production utilizes nearly seven percent of the U.S. corn crop, or over 600 million bushels of corn, adding $4.5 billion in farm revenue annually. The U.S. Department of Agriculture (USDA) has determined that ethanol production adds 25 – 30¢ to every bushel of corn.

Ethanol production facilities provide much-needed economic stimulus and new capital investment to rural communities faced with record low commodity prices and shrinking export markets. There has not been an oil refinery built in this country in 25 years. But during that time there have been 56 ethanol refineries built, stimulating rural economies and creating jobs. USDA estimates that a 100 million gallon ethanol production facility will create 2,250 local jobs for a single community.

Industry growth offers enormous potential for overall economic growth and additional employment in local communities throughout the country. According to a Midwestern Governors' Conference report, the economic impact of the demand for ethanol:

- Adds $4.5 billion to farm revenue annually
- Boosts total employment by 195,200 jobs
- Increases state tax receipts by $450 million
- Improves the U.S. balance of trade by $2 billion
- Results in $3.6 billion in net savings to the federal Treasury

Continued progress is being made in the development of new enzymes and production processes that will allow for the cost-effective production of ethanol from cellulose. These feedstocks offer tremendous opportunities for new jobs and economic growth outside the traditional "grain belt," as well as additional environmental benefits through the reduction of greenhouse gases.

Environment & Public Health: Ethanol, a high-octane, high-value fuel, continues to be one of the best tools we have to fight pollution from vehicles. As an oxygenate, ethanol enables a more complete combustion of fuel. The use of ethanol reduces emissions of all the major pollutants regulated by the U.S. Environmental Protection Agency, including carbon monoxide, particulate matter, exhaust volatile organic compounds and hydrocarbons. Ethanol is also an effective tool for reducing air toxics in gasoline, many of which the EPA classifies as known or probable human carcinogens. As a renewable fuel, ethanol can dramatically reduce greenhouse gas emissions, such as carbon dioxide, a contributor to global warming.

Ethanol is a safe, biodegradable fuel that does not pose an environmental or public health threat to water or soil.

Consumers Benefit: The availability of ethanol expands our fuel supplies, increasing competition in the marketplace and reducing overall gasoline prices paid by the driving public. As noted by the consumer group, Citizen Action, "the use of ethanol, a domestically-produced, cleaner-burning renewable fuel helps American consumers use less polluting oil and reduces dependence on costly oil imports."

The federal ethanol program encourages gasoline marketers and blenders to use ethanol by providing a tax reduction of up to a 5.3 cent per gallon from the federal excise tax on gasoline of 18.3 cents/gallon. The incentive, in turn, has enabled smaller, independent gasoline marketers to compete with the major international petroleum companies and provide consumers with an exceptionally cost-competitive fuel. Consider this statement by the Society of Independent Gasoline Marketers of America:

> "The tax benefits afforded ethanol-blended fuels constitute an important means by which independent marketers reduce their costs of product… enhancing independent marketers' ability to price compete with their economically more powerful, integrated competitors. Such price competition has consistently restrained retail market prices and thereby generated substantial benefits for consumers of gasoline."

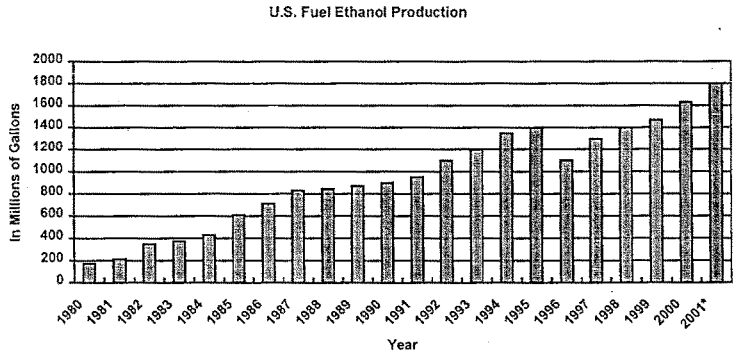
Consumers benefit further because reduced farm program costs and increased income tax revenue attributable to the federal ethanol program provides a net savings to the U.S. Treasury of $3.6 billion a year. Indeed, for every dollar invested by the federal government to stimulate ethanol production and use, approximately $7 is returned to the treasury in tax revenue and savings from reduced government outlays.

Energy Security: The need for domestically produced energy supplies has never been greater. Today we are more reliant than ever before on foreign nations to supply our insatiable and growing appetite for oil, importing 54% of our petroleum. At the same time, U.S. oil production has fallen to the lowest point in 30 years. Furthermore, the continued high price of crude oil and

lack of U.S. refining capacity exacerbate an already tight energy supply. The U.S. petroleum refining industry is operating at full capacity in an attempt to satisfy current demand, which continues to outpace supply. By importing more refined petroleum products than ever before, the U.S. is sending value-added refining jobs overseas. Meanwhile, demand for refined products will continue to grow.

According to the National Petrochemical & Refiners Association, "The U.S. is gravitating toward a situation in which demand for refined products is overtaking the capability of traditional supply sources.... With existing refining capacity essentially full, the U.S. will have to find additional sources to cover the incremental demand." As a domestic, renewable source of energy, ethanol can increase fuel supplies, reduce our dependence on foreign oil and increase the United States' ability to control its own security and economic future.

Ethanol can and should be a more consistent partner with domestic oil companies to provide the incremental additional supplies that are obviously needed. Ethanol is blended with gasoline after the refinery process. Therefore, blending ethanol adds additional volume to the transportation fuel market and helps ease the burden on a refinery sector that barely has the capacity to meet current demand and has no hope for quick expansion. The ethanol industry is producing at a record pace. In 2001 we will again shatter all previous production records. And the ethanol industry can double production within two years to meet new demand created by a phase out of MTBE. We are prepared to meet the challenge of providing increased fuel supplies -- today.



The outlook for the ethanol industry is indeed bright, and the industry is expanding rapidly to meet new market demand for clean, renewable fuels. In addition to the over 2 billion gallons of current production capacity, 34 existing ethanol plants are undergoing expansion and twelve new plants are under construction. As a result, the ethanol industry expects to have an additional 300 million gallons of production capacity on line by the end of this year alone. In fact, a total of 3.5 billion gallons of production capacity will be available by the end of 2003.

Current and Future Annual Ethanol Industry Capacity

Current Ethanol Production Capacity:	2.0 billion gallons (56 plants)
On-going Expansions to Existing Plants:	235 million gallons (34 plants)
Plants Currently Under Construction:	265 million gallons (12 plants)
Construction Scheduled for 2001/2002:	1.0 billion gallons (39 plants)
Total Projected Ethanol Production Capacity by end of 2003:	3.5 billion gallons

Such rapid expansion in ethanol is necessary to meet the growing demand for alternatives to MTBE, a petroleum-based oxygenate that is contaminating drinking water supplies in many parts of the country. Whether by legislation, litigation or consumer preference, it is increasingly apparent that the future use of MTBE will be significantly curtailed. The ethanol industry is preparing to meet that increased demand so that air quality will not suffer as communities address their water quality concerns.

Renewable Fuels Standard

As the Congress contemplates a comprehensive energy policy, renewable, domestically produced fuels can and should play a larger role in meeting our nation's energy needs. H.R. 2423, the Renewable Fuels for Energy Security Act of 2001, introduced by the Chairman, would create a national renewable fuel standard (RFS) providing for an increasing use of renewable fuels. The legislation would require in 2002 that 0.8 percent of the fuel supply (on a Btu basis) be derived from renewable fuels such as ethanol and biodiesel. The RFS would grow to 3 percent by 2011 and 5 percent by 2016, an eight-fold increase from today's use.

As the country attempts to grapple with rising fuel costs, a lack of refining capacity and increased reliance on imported oil, this bill provides a positive roadmap for reducing consumer fuel prices, increasing energy security, and stimulating rural economies by harnessing America's renewable energy potential.

A renewable fuels standard would also improve energy security. With crude oil prices soaring, domestic refining capacity shrinking, and U.S. energy demands outpacing available supplies, we need to develop domestic sources of energy. When fully implemented, the program would reduce the need for more than 600,000 barrels of oil per day, or roughly twice the energy we import each day from Iraq!

America has the resources to address our long-term energy needs without having to rely on the benevolence of OPEC. We should be investing here at home, not overseas, to build a sustainable energy future for our children. America's farmers are willing and able to help us with our energy crisis. The federal government should be willing to help them by promoting increased value-added market opportunities. It's a win-win situation.

The Renewable Fuels Association supports including a Renewable Fuel Standard similar to that contained in H.R. 2423 as part of a comprehensive national energy policy.

The Federal Ethanol Program is a Success and should be Extended: The importance of ethanol as an alternative fuel to the nation's economy has never been greater, and its value promises to grow even larger. Oil prices are again playing havoc with the American economy. The U.S. economy is facing the most significant period of sluggish growth in more than a decade and high oil prices are a major contributor to the current economic slowdown. Most major economic indicators have posted declines for at least three consecutive months; sales of autos and both new and existing houses are weakening; layoffs are mounting across a broad range of industries; corporate profit reports continue to disappoint the market; and many economic analysts are trimming their forecasts of real growth for 2001.

High oil prices increase the cost of doing business for virtually all firms and drain additional money from consumers' pocketbooks. The lack of a comprehensive energy policy in the U.S. has led to falling domestic production of petroleum and natural gas; near record levels of capacity utilization in refining; and increased dependency on imported oil, which has, in turn, placed American consumers more at risk to the arbitrary decisions of the world's oil exporters. Now is the time to re-double our efforts to promote the increased production and use of domestic, renewable fuels such as ethanol.

In recognition of ethanol's economic, environmental and energy security benefits, the national energy policy report released by the Administration last month included a recommendation to extend the ethanol tax incentive program. Senator Jean Carnahan (D-MO) has introduced S. 907 to extend the tax incentive program to 2015. As the U.S. ethanol industry continues to grow, many investors are looking for such a commitment on the part of the Congress before moving forward with certain projects. The incentive is currently set to expire in 2007. For a plant beginning construction next year, with production slated to begin in 2003, there will only be 4 years to recoup a sizeable investment. Now is absolutely the time for the Congress to extend the federal ethanol program, or make it permanent.

The Renewable Fuels Association supports extending the federal ethanol tax incentive program as part of a comprehensive national energy policy.

Small Producer Tax Credit

Under present law, a small ethanol producer (annual production capacity of 30,000,000 gallons or less) is eligible for an income tax credit of 10 cents per gallon on up to 15,000,000 gallons of alcohol production. While intended to stimulate expanded production, particularly by small farmer-owned facilities, the credit is not readily available to cooperatives or their patrons despite the fact that cooperatives are a major source of expansion of the smaller ethanol producers that the credit was designed to benefit. Furthermore, for all small producers, the credit is subject to a number of limitations that reduce its benefit or limit its availability.

H.R. 1636, introduced by the Chairman, would address the current limitations of the small producer credit and make it more usable for farmer-owned cooperatives. The provision has broad-bipartisan support in both the House and Senate. Indeed, this provision has been approved by the Senate on three separate occasions, but never included in a final bill.

The Renewable Fuels Association enthusiastically supports the effort to address the small producer credit, and encourages the Committee to include this provision in legislation to be enacted this year.

Conclusion

The federal ethanol program has been a tremendous success, providing economic stimulus to rural America, new jobs, reducing the United States' dependence on imported energy while improving our balance of trade, and lowered auto emissions in our nation's cities. As the Congress considers a comprehensive energy policy, renewable fuels should play a prominent role as an important means to further improve energy security, the environment and the economy. The Congress can do so by enacting a renewable fuels standard similar to that contained in H.R. 2423 and extending the federal ethanol program. But the program should also be altered to allow farmer-owned cooperatives to more effectively access the small producer incentives. By taking these modest steps, the Congress will provide a tremendous economic stimulus to small business across rural America, and take a major step toward a more sustainable energy future for all Americans.

Thank you.

Statement of the American Farm Bureau Federation

TO THE
HOUSE COMMITTEE ON SMALL BUSINESS
SUBCOMMITTEE ON RURAL ENTERPRISES, AGRICULTURE AND TECHNOLOGY
REGARDING
RENEWABLE FUELS

Presented by

Guy Donaldson
President
Pennsylvania Farm Bureau

July 24, 2001

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As the national voice of agriculture, AFBF's mission is to work cooperatively with the member state Farm Bureaus to promote the image, political influence, quality of life and profitability of the nation's farm and ranch families.

FARM BUREAU represents more than 4,800,000 member families in 50 states and Puerto Rico with organizations in approximately 2,800 counties.

FARM BUREAU is an independent, non-governmental, voluntary organization of families united for the purpose of analyzing their problems and formulating action to achieve educational improvement, economic opportunity and social advancement and, thereby, to promote the national well-being.

FARM BUREAU is local, county, state, national and international in its scope and influence and works with both major political parties to achieve the policy objectives outlined by its members.

FARM BUREAU is people in action. Its activities are based on policies decided by voting delegates at the county, state and national levels. The American Farm Bureau Federation policies are decided each year by voting delegates at an annual meeting in January.

STATEMENT OF
THE AMERICAN FARM BUREAU FEDERATION
TO THE
HOUSE COMMITTEE ON SMALL BUSINESS
SUBCOMMITTEE ON RURAL ENTERPRISES, AGRICULTURE AND TECHNOLOGY
REGARDING
RENEWABLE FUELS

Presented by

Guy Donaldson
President
Pennsylvania Farm Bureau

July 24, 2001

Good morning, Mr. Chairman and members of the subcommittee. My name is Guy Donaldson. I am a fruit producer from Adams County, Pennsylvania. I am president of the Pennsylvania Farm Bureau Federation and I serve as a member of the Board of Directors and the Executive Committee of the American Farm Bureau Federation. I am pleased to be here today to testify on behalf of both the American and Pennsylvania Farm Bureaus.

Mr. Chairman, as you know, times are tough in farm country. Commodity prices across the board have been too low for too long. As an industry, we must expand the markets for the crops we grow. Congress needs to pass trade promotion authority legislation. American farmers and ranchers need open and fair access to foreign markets and to those consumers anxious for the safe, abundant and affordable food we produce in this country.

Farm Bureau also supports the use of commodities to produce goods other than food. Nothing has more potential in this area than the use of agriculture commodities to produce energy. The potential for our farmers, our consumers, our environment, our economy and our national security is staggering. We are close to realizing this potential. We simply cannot miss this opportunity.

Mr. Chairman, Farm Bureau strongly supports your legislation, H.R. 2423, the Renewable Fuels for Energy Security Act of 2001. This is the type of policy that must be implemented to bring prosperity back to rural America and energy security back to the United States.

According to a report from the Midwestern Governors' Conference, the economic impact of the demand for ethanol:

- Adds $4.5 billion to farm revenue every year
- Produces more than 195,000 jobs, mostly in rural areas
- Replaces $2 billion of imported oil, thus improving our balance of trade

- Saves the federal government $3.6 billion

But the point most important to our membership is that the current use of 600 million bushels of corn for ethanol production adds 25-30 cents to the price a farmer receives for a bushel of corn. With the low price of corn, this market is vital and it is important that it expands.

H.R. 2423 requires that by 2016, five per cent of the nation's fuel contain renewable energy. It will provide an income to our corn farmers from the marketplace, not the federal government – and both farmers and the government should work toward that goal.

But it is not only corn producers who benefit. The use of soybean based biodiesel will receive a tremendous boost as an important part of our energy mix.

Other commodities will find opportunities under H.R. 2423. Currently, there are 26 different feedstocks used in this country to produce ethanol. With the exponential growth in technology in the ethanol industry, we can anticipate the increased use of those feedstocks and the use of cellulose feedstocks, such as corn stover, rice straw and waste from processing of agricultural products. We all gain when we better utilize all of the production from our farms and ranches. The technology to use these sources is now in the research lab. With a new demand created for bio-based energy, that technology continues to develop and to become economically viable.

We should also look at other energy production that can occur on farms and ranches. There is a great deal of interest among our members in siting of wind and solar generators. Some are weighing the economic return on micro-hydro generation. One area that holds promise as a source of energy and a solution to a problem is the capture of methane from manure. Our livestock producers are increasingly concerned as to how they will be able to comply with restrictions on the storage and disposal of animal waste. We need research into the development of farm-sized facilities that can store manure and capture the methane. And beyond that, we should look at taking that manure, after the methane is captured and using it as a fuel in the generation of electricity or to provide heat.

Mr. Chairman, farmers and ranchers have long provided safe and affordable food to this nation. We will continue to do so. But as we have produced such an abundance of food, agriculture needs to provide energy as well. We can. But it will take time to build this industry to the point where that production becomes a major component of our energy mix. Some in Congress question a mandate for renewable fuels. They believe that this is "just another subsidy for farmers." Mr. Chairman, we spend billions of dollars every year to protect our petroleum sources in the Middle East. American servicemen and women lost their lives in a war against Iraq and we, today, import more energy from Iraq than we produce in this country from ethanol. Our servicemen and women are still risking their lives in an area where we must have a military presence. Let's put our faith not in the benevolence of Saddam Hussein, but in America's farmers and ranchers. We stand ready to work with you to build a domestically based, renewable energy industry in America. We should and we must.

TESTIMONY BY RON HECK
AMERICAN SOYBEAN ASSOCIATION
SMALL BUSINESS COMMITTEE

JULY 24, 2001

Good morning. Thank you Mr. Chairman and members of the Subcommittee. I am Ron Heck, a soybean and corn farmer from Perry, Iowa.

I appreciate the opportunity to come here today and talk with you regarding the need for a national comprehensive energy policy that includes a meaningful renewable fuels component for biodiesel and ethanol. Farmers are small business owners and much of current biodiesel production is by small businesses and cooperatives. In fact, two farmer cooperatives in Iowa are producers of biodiesel.

These are times when the prices for our commodities are very low and energy and other input costs are very high. This causes great concern across the countryside and producers are reviewing both options for reducing input costs and opportunities for increasing prices of what we grow.

While in the short term there is little we can do to completely alleviate this situation, ASA believes the development of a comprehensive national energy plan would help avoid these crisis situations in the future. We also feel strongly that a national energy plan should include a renewable fuels component that includes both biodiesel and ethanol and that is why we strongly support the renewable energy legislation you, Chairman Thune introduced last month, H.R. 2423.

We believe this legislation provides achievable goals for both biodiesel and ethanol while helping to decrease our dependency on imported petroleum. As I understand the bill, it requires a small percentage of renewable fuels, biodiesel and ethanol to be incorporated into motor fuels. We believe this is a program that is flexible and user friendly.

While some may consider the objectives of the proposal ambitious, we feel they are achievable and reasonable. Our organization, as well as the National Biodiesel Board, believes these goals will create a significant market for biodiesel. We commend you, Mr. Thune, for this bold and innovative step in moving our country to "homegrown" energy sources.

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As you know Mr. Chairman, for the last 8-10 years U.S. soybean growers have invested in the research, development and commercialization of biodiesel. Biodiesel is a cleaner burning fuel produced from renewable resources such as soybean oil. It contains no petroleum but can easily be blended with petroleum. Biodiesel is typically blended at the 20% level with diesel or at the 2% or lower levels. It can be used in compression-ignition, diesel engines with little or no major modifications. Biodiesel in its neat or pure form is biodegradable and nontoxic, and is the first and only alternative fuel to meet EPA's Tier I and II health effects testing standards. Biodiesel has the highest BTU content of any alternative fuel, similar to Number 1 diesel.

This year, EPA finalized regulations that require a reduction in sulfur content of highway diesel fuel of over 97% from its current level of 500 parts per million. Current industry methods to decrease sulfur in diesel also negatively impact the fuel's lubricity. Biodiesel has no sulfur or aromatics and tests have documented its ability to increase fuel lubricity significantly when blended with petroleum diesel fuel even at one percent or lower.

According to Department of Energy tests, biodiesel has an 80% lifecycle reduction of CO_2 compared to petroleum diesel. This means that it offers the best opportunity for greenhouse gas reduction of any heavy-duty vehicle and equipment application. Biodiesel has the highest energy balance of any alternative fuel, which means that it offers some of the most promising benefits for conservation efforts. Additionally, biodiesel offers significant reductions in virtually all regulated emissions, and a 90% reduction in EPA-targeted air toxics. With the Chairman's permission, I will include additional information regarding the environmental benefits of biodiesel for the record.

Soybean growers began to invest in biodiesel almost a decade ago not because we wanted "our own" ethanol. Instead we were driven by the economics in the soybean industry. Soybeans are widely produced for the protein source in soybean meal. It is the plant protein of choice in the pork and poultry industries, leaving soybean oil as a valuable but abundant co-product. Because of large supplies of vegetable oils in the world market, we have a surplus of soybean oil, which depresses the price of the oil and the whole soybean.

Several years ago, ASA recognized that the traditional means of riding out a depressed market by storing surplus soybean oil until better times was not going to work during this situation. The industry had to do more. It needed to be proactive and aggressive in market development. Soybean growers through our state and national check off programs began investing in the development of new uses of soybean oil. Several of the products are widely accepted in the marketplace, such as soy ink, and others are just receiving acceptance such as biodiesel, solvents, lubricants and other fluids.

While biodiesel offers environmental, energy security, and economic development benefits, it is not yet competitive in the U.S. on a pure cost comparison. Public support will be necessary to help the industry develop. Our culture and policies are focused on petroleum products, most of which are imported. I do not want to imply that soybean growers are opposed in anyway to the use of petroleum products. In fact, agriculture is a

major user of petroleum-based products. However, I would make the challenge that our country needs to have an aggressive energy policy that includes clean renewable fuels as well as significant domestic production of both oil and gas.

The current biodiesel market is relatively small, but is growing rapidly. Based on a recent NBB industry survey, approximately five million gallons of biodiesel were produced in fiscal year 2000, up from approximately 500,000 the year before. Twenty to twenty-five million gallons are expected for fiscal year 2001.

Just last week, the U.S. Department of Agriculture released a study that shows biodiesel production can have significant economic benefits for producer income, rural communities and the overall U.S. trade balance.

The study showed an increase of 200 million gallons of biodiesel per year would boost total crop cash receipts by $5.2 billion cumulative by 2010, resulting in an average net farm income increase of $300 million per year. The price for a bushel of soybeans would rise by as much as 17 cents annually during the 10-year period.

The study was based on the effect of increasing soybean oil demand by 1.5 billion pounds per year between 2001 and 2010. That is the equivalent of 200 million gallons of biodiesel production a year. The 1.5 billion pound annual average increase in soybean oil demand is projected to induce an increase of over 13,000 jobs. New jobs are created in the farm sector, food processing, manufacturing, and in the service sectors.

And, just this weekend our industry along with the ethanol industry learned the results of economic analysis conducted by John Urbanchuk of AUS consultants.

This report shows that if your bill, Mr. Chairman, is enacted, soybean prices and farm income will increase and result in direct benefits to American consumers. The report shows significant positive economic effects on increasing agriculture inputs, consumer savings and capital investment.

We are just getting the details of this study. I know my friend from RFA Mr. Dinneen will address this interesting and positive report in his testimony. I will be happy to share more details with you once they are available.

Mr. Chairman, we think the timing is right for these major proposals to promote the use of biodiesel. We look forward to working with you on this agenda and other issues of mutual interest.

I will be happy to answer questions at the appropriate time. Thank you.

Geothermal Heat Pump Consortium Funding

Testimony of Conn Abnee
Executive Director, Geothermal Heat Pump Consortium

Small Business Committee
Subcommittee on Rural Enterprises, Agriculture and Technology

July 24, 2001

Mr. Chairman, and members of the Subcommittee, thank you for the opportunity to present my testimony to you today.

My name is Conn Abnee and I am the executive director of the Geothermal Heat Pump Consortium (GHPC).

The Geothermal Heat Pump Consortium, based in Washington, D.C., is a nonprofit organization created in 1994 by the Department of Energy and the Environmental Protection Agency to promote the growth of energy-efficient, environmentally friendly heating and cooling technology.

The Consortium represents a broad and unprecedented partnership, including several hundred electric utilities, energy services companies, equipment manufacturers, contractors, architects, engineers, drillers and national environmental organizations. Our mission is to provide training, education, and information on the economic and environmental benefits of geothermal heat pump technology.

Geothermal heat pumps (GHPs) are not standard heat pumps, nor do they use geothermal steam from deep underground reservoirs. Rather, GHPs take advantage of the constant temperature of the subsurface earth to provide an energy-efficient and environmentally clean means to heat and cool buildings and homes. GHP technology relies on the fact that the Earth remains at a relatively constant temperature throughout the year - - warmer than the outside air during the winter, and cooler in the summer, like a cave.

A geothermal heat pump system uses three principal components: an earth connection subsystem; a heat pump subsystem; and a heat distribution subsystem.

A series of polyethylene pipes, commonly called a "loop," is buried in the ground near the building to be conditioned. The loop can be buried either vertically or horizontally.

The loop circulates fluid (water, or a mixture of water and environmentally sound antifreeze) that absorbs heat from, or relinquishes heat to, the soil, depending on whether the ambient air is colder or warmer than the soil. The piping is completely sealed and there is no threat of leakage.

For heating, a geothermal heat pump removes the heat from the fluid in the Earth connection, concentrates it, and then transfers it to the building. For cooling, the process is reversed. Conventional ductwork is generally used to distribute heated or cooled air from the geothermal heat pump throughout the building.

The only external energy needed for GHPs is the small amount of electricity needed to operate the pumps and the fans to circulate air through the ductwork. GHP systems can operate in virtually all climates and soils -- tapping a resource that is right under our feet in our own backyards and parking lots.

The energy efficiency and energy cost savings are tremendous. According to the U.S. Environmental Protection Agency, GHPs are the most energy-efficient, environmentally clean, and cost-effective space conditioning system available. GHPs have the lowest emissions among all heating and cooling technologies. They burn no fossil fuels and are pollution free at the point of use. They do not deplete groundwater resources and can operate in all climates and soils.

GHPs lower electricity demand by 1 kilowatt hour per ton of capacity. If 100,000 homes began using geothermal heat pumps, the United States would reduce annual electricity consumption by 799 million kilowatt hours and reduced carbon dioxide emissions by 588,000 metric tons. Those numbers are equal to converting 129,000 cars to zero-emission vehicles or planting 38.4million trees.

Mr. Chairman, I'd like to take a moment to talk about how geothermal heat pumps have benefited people in South Dakota.

At St. Thomas Catholic Church in DeSmet, for example, energy costs before the installation of a geothermal heat pump system rose as high as $13,900 a year. Since the installation of a geothermal heat pump, however, energy bills have dropped to $2,000 year.

A school in Wilmot, South Dakota is another interesting example. Half of the school is a newly constructed addition which uses geothermal heat pumps. The old part of the school - - the other half of the building - - is still heated with fuel oil. Last year, the electric bill for the older half of the school was more than $18,000 - - and that was just for heating. The electric bill for the newer half of the building, however, was only $3,100 - - and that is heating and cooling and hot water.

There are many similar examples throughout the country. Hagerstown, Maryland, is home to a polyethylene pipe manufacturing plant (the pipe used in geothermal heat pump systems) owned and operated by Chevron Phillips. The plant operates 24 hours a day, seven days a week and employs 60 people. The U.S. Postal Service has installed geothermal heat pump systems in ten buildings throughout the state. And, according to the State of Maryland's Interagency Committee on School Construction, geothermal heat pump systems are already being used or are planned for nine schools.

In New York, Governor Pataki awarded a $250,000 grant to support the efforts of the Geothermal Heat Pump Consortium to expand the use of GHP throughout the state. The New York State Energy Research and Development Authority is working with schools, health care facilities, churches and business to install these systems.

In Indiana, WaterFurnace International, in Fort Wayne, is one of North America's leading manufacturers of geothermal heat pump systems. In Oklahoma, the State Capitol building is equipped with a geothermal heat pump system. And Oklahoma State University is home to the International Ground Source Heat Pump Association, which bridges the latest technological developments in geothermal heat pumps with the people who benefit.

Even President Bush has a geothermal heat pump system installed at his family ranch in Crawford, Texas.

Mr. Chairman, despite these examples, geothermal heat pumps are still virtually unknown to most Americans. According to the General Accounting Office report (RCED-94-84), greater use of GHP technology is constrained both by the public's unfamiliarity with the technology, and an insufficient number of trained system designers and installers. The GAO report concluded that the federal government has the responsibility - - and the authority - - to promote GHP technology as a tool to meet national energy policy goals.

The Consortium, with federal assistance, has been working to jumpstart the technology into the marketplace:

- We have supported short-term research and development to ensure more successful and cost-effective installations.

- We have co-funded demonstration programs to help utilities and their subsidiaries learn how to deploy the technology during a period of rapid electric industry restructuring.

- We have funded cost-shared training and technology transfer program to ensure a growing infrastructure of trained designers and installers.

- We have implemented a design assistance program to help customers, particularly schools and owners of commercial facilities, understand that geothermal heat pump systems are the most cost-effective pollution prevention technology for their facilities.

As you know, in recent months, several pressing energy issues have become part of the national agenda, such as the electricity crisis in California, heating oil costs in New England, and the upward trend in natural gas prices. While a number of policy actions are under consideration to address these issues, one important option is to increase public knowledge on an important heating and cooling technology for homes and buildings: geothermal heat pumps.

I appreciate the opportunity to share this technology with the subcommittee today and look forward to your questions.

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TESTIMONY

OF

MEGAN SMITH

CO-DIRECTOR

OF

THE AMERICAN BIOENERGY ASSOCIATION

BEFORE

THE HOUSE SMALL BUSINESS SUBCOMMITTEE

ON RURAL ENTERPRISES, AGRICULTURE AND TECHNOLOGY

July 24, 2001

CELLULOSIC BIOMASS
FOR RENEWABLE ENERGY AND CHEMICALS PRODUCTION

Introduction

Mr. Chairman and distinguished members of the subcommittee, thank you for allowing me this opportunity to testify on behalf of the members of the American BioEnergy Association, of which I am Co-Director. The United States is at a critical time for the development of alternative energy sources, both for transportation and electricity. At the same time, our dependence on foreign oil has put our economy and national security at great risk. These two issues – increased energy demand and the need for reducing our dependency on foreign oil – has put us at a crossroads today where creating a win-win situation is more than just possible. Low-value/high-quantity cellulosic biomass is widely available throughout the U.S., mostly in the form of agriculture and forest residues and the cellulosic component of municipal solid waste, and is found in every state of our nation. However, any plan regarding the use of cellulosic biomass for conversion to a renewable fuel such as ethanol is going to take a large commitment on the part of our nation. At the same time, an increase use of corn for ethanol production will also require a large amount of support from key decision makers in the U.S., especially for reaching the production goals contained in various legislation now being considered by Congress.

Background

What is biomass? Biomass is any matter composed of three components: cellulose (a 6-carbon sugar chain, or polymer), hemicellulose (a polymer of mostly 5-carbon sugars) and lignin (the "glue" holding these sugar chains together). Roughly speaking, biomass is composed of 50% cellulose, 25%hemicellulose, and 25% lignin, which is the precursor to coal. The lignin component has the same energy content as a medium- to high-BTU grade coal, but without the ensuing pollutants of sulfur and nitrogen, and is capable of supplying a biomass power plant with additional energy feedstock, or an entire biomass ethanol plant with all of its electricity needs. Examples of biomass include wood waste, agriculture residues, fast-growing grasses and trees, and the cellulosic component (mostly in the form of paper and yard trimmings) of municipal solid waste.

The U.S.' ever-increasing dependency on petroleum (or hydrocarbons) has put us in a precarious position both with respect to our economy and national security, as energy is the lifeblood of this great country. If we could begin to phase-down our hydrocarbon use and phase-in our biomass, or carbohydrate, use, the impact would be tremendous. We would start down a critical path of true energy security, while helping to stabilize our economy overall, increasing jobs around the U.S. for many put out of work in rural areas where the majority of biomass is grown.

Low-value biomass can be converted to several high-value products, such as electricity, ethanol for transportation, and chemicals. Markets will determine which of these three is the highest-value in that particular situation, and industry will adapt these" bio-refineries" accordingly. Below is a brief review of each technology.

Biomass Ethanol

The current corn-based ethanol industry converts to ethanol only part of the available sugar in the corn plant, i.e., the starch inside the corn kernel itself. The remainder of the kernel is converted to products such as animal feed, corn oil and syrup. While the USDA has determined that today's ethanol plants have increased production efficiencies to reflect a net energy gain of 25%, the new highly efficient technology for biomass conversion to ethanol (or bioethanol) could increase efficiencies for corn ethanol plants even further, through conversion of corn fiber and stover. Predicted efficiency improvements from these additional conversions would allow some of these corn ethanol plants in increase their outputs on the upwards of 15% from the current capacity. Using inexpensive waste feedstock such as forest and agriculture residues helps to make these first bioethanol plants that more profitable, while aiding smaller rural communities some economic stability through conversion of burdensome waste and creation of jobs.

Conservative estimates for energy efficiencies for a stand-alone biomass ethanol plant is 4:1, that is, four energy units in output compared to energy used during production. One of the predominant reasons for this difference between starch and cellulose conversion to ethanol is use of the lignin contained in the biomass itself. The high-energy content of lignin allows a stand-alone biomass ethanol plant to be self-sufficient, that is, to not require an outside energy source, instead combusting the lignin in a standard boiler for energy use. In addition, some circumstances may even allow these bioethanol plants to sell excess power to the electrical grid. In locations needing additional electricity capacity, this would be another obvious benefit. Because of its efficiencies, bioethanol will only require the ethanol incentive for a relatively short period of time, with goals to compete effectively with the cost of gasoline by 2010 or sooner.

Biomass ethanol plants under development include:

Jennings, Louisiana -- The world's first biomass ethanol plant will be located in Jennings, Louisiana, and will use sugar cane bagasse as its feedstock. BC International (BCI) has a patented technology that it hopes to use in the future on wood waste and rice hulls at this plant as well. BCI is currently coming to financial closure on its plant, with expected start-up by the end of 2002.

City of Gridley – In California, BCI will use its technology on waste from rice in the form of rice straw, alleviating open-field burning. This plant may use forest residues as well, possibly co-locating with an existing biomass power facility.

Collins Pine - The Collins Pine Companies, a family-owned private timber firm out of Portland, Oregon, with a facility in Chester, California, is planning to build a plant fed by small-diameter forest thinnings, which are helping to feed U.S. catastrophic forest fires reaching historic proportions. The plant will be sited by an existing sawmill operation, also using mill residues. This project is well into a feasibility study showing very positive results, and will use biomass from both private and public lands, deriving some feedstock from the Quincy Library Group's project.

Masada Resources Group - In Middletown, NY, Masada will use its technology to convert the cellulose stream of municipal solid waste to ethanol, garnering a tipping fee to help make the plant more profitable.

Biomass Power

Biomass is currently being used for conversion to electric power through conventional combustion technology. The current biomass power industry is composed of approximately 350 plants with combined capacity of approximately 7,800 megawatts (MW), employing 66,000 people. Of those plants, 45 recently lay idle for various reasons, with 655 MW of unrealized capacity going to waste. The dormancy of these plants is largely due to the past low-cost of competing energy sources. However, with recent escalation of electricity prices, some plant are coming back on-line. But more of these biopower plants could be built throughout the U.S., particularly the West, where biomass is abundant as a forest residue and electricity is badly needed.

Currently, there are a small number of utility-size biomass gasification plants at different phases of construction which will act as test facilities and pilot plants for the future industry. The major pilot plants include:

- *Burlington, Vermont, Gasifier Project*—Burlington Electric Department's McNeil Generating Plant has been producing wood-fired biomass power at its 50 MW per year plant, but has recently integrated a new gasification technology to add more capacity. DOE, along with the technology licensee Future Energy Resource Corporation (FERCO), has added a 15 MW per year gasifier as a pilot plant, and successfully attained full operation in August 2000 using FERCO's SilvaGas™ technology, producing electric power directly from biomass in a conventional gas turbine.

- *Chariton Valley Resource Conservation and Development (RC&D) Project*—This Iowa project encompasses a public/private partnership between U.S. Department of Energy, U.S. Department of Agriculture, and the Chariton Valley RC&D Area, under DOE/USDA's Biomass Power for Rural Development initiative. Approximately 500 local farmers and landowners are aligned with the combined research and investment power of 14 organizations. The project will be growing switchgrass on 30,000 to 40,000 acres of underutilized, marginal cropland.

In addition to the above technologies, there is growing interest amongst the coal industry and utilities to co-fire biomass with coal, reducing some pollutants such as sulfur and nitrogen oxide. The TVA and the Northern Indiana Public Service Company (NIPSCO) are just a few that are investigating biomass co-firing with coal

Biomass Chemicals

A rapidly expanding area in biomass utilization which may provide the largest market potential in the future, is the area of biomass conversion to chemicals. Large companies such as Dow Chemical and Dupont are currently looking at high-value chemicals from biomass. One such chemical is polylactic acid, or PLA. Cargill Dow LLC is currently constructing such a plant in Blair, Nebraska, with start-up operation slated for November of this year. From PLA "beads", Cargill Dow and its business associates will be able to produce such products as carpets, clothing, and plastic cups which are all biodegradable and renewable. The significance of this technology in decreasing our dependency on imported oil is great, as many products now used in the U.S. are derived from petroleum-based feedstocks. Using biomass instead of petroleum for such products would allow us to save our precious oil for higher-value markets, stretching out our dwindling supply of oil. While the Cargill Dow plant will use corn starch short-term, it will soon use cellulosic biomass as well.

The Bio-Refinery Concept

The bio-refinery is a relatively new concept developed largely by the U.S. Department of Energy. It essentially mimics a petroleum refinery in that it would produce many different products from one plant. For instance, many oil refineries produce multiple products, such as gasoline, natural gas and chemicals. At a bio-refinery, industry could produce ethanol, electricity and chemicals as well. In the end, the highest valued product would most likely be produced in the largest amounts, through a simple "flip of a switch" in these flexible plants.

Benefits

The benefits of biomass conversion are numerous and great. Of most interest to this subcommittee, the job multiplier for a biomass ethanol plant is sizeable. *The job multiplier for direct jobs for processing biomass (collecting and hauling) in addition to the jobs at the ethanol plant itself is 1.5. In addition, multiplying the direct job figure by 2 would be the conservative estimate of indirect jobs, with some estimates going as high as 3 or 4 times this figure. For example, the Gridley plant (see above) will employ approximately 65 at the plant itself x 1.5 = 98 jobs for the biomass processing (65 + 98) = 163 direct jobs; multiply this by 2 for the number of indirect jobs (2 x 163 = 326), and the total conservative employment figure would be 163 direct jobs + 326 indirect jobs = 489 jobs for a 20-25 million gallon per year biomass ethanol plant*. From here the circle continues to grow, with more jobs

expanding out into the community to support small, mostly rural U.S. towns adjacent to these new plants.

Cellulosic feedstocks such as agricultural/forestry residue and municipal solid waste, many of which are troublesome to the environment and communities nationwide, can be used for ethanol production. For example, many areas of the United States have become extremely burdened with solid waste disposal, causing landfills to turn away waste only to find there are few other disposal options. In California, even simple refuse such as yard trimmings is piling up at a high rate of speed; this debris could also be converted into energy or chemicals. And one extreme example: New York state has an enormous pile of old wooden pallets just outside of Manhattan which could supply enough feedstock to support a 100 million gallons per year ethanol plant. This is a tremendous figure, considering the total ethanol production of the U.S. currently stands at approximately 1.6 billion gallons a year.

Agriculture residues have also increased the burden on landfill sites. For example, in 1990, California's legislature mandated the phase-out of rice straw burning by farmers at a rate of 10% reduction per year with the phase-down now complete, leaving the farmers no choice but to plow the straw under. This is costly and greatly increases the risk of disease while reducing rice yields. California also has legislation in place disallowing 50% of municipalities' solid waste going to landfill sites. As a result, the rice farmers have been forced to find an alternative disposal system for their crop residue that is being turned away from landfills. The California legislature appointed a Committee on Alternatives to Rice Straw Burning which determined conversion of rice straw to ethanol as one of the few viable options. Other agriculture residues such as orchard trimmings and pecan shells are being turned away from landfill sites as well. Although this refuse is a detriment today, it may in the future actually acquire value, increasing farm income.

Forest fires stemming from immense fuel loading have severely threatened human life and property, particularly in the Western U.S. The Department of Energy's National Renewable Energy Laboratory (NREL), located in Golden, Colorado, has been working closely with the timber industry and local communities to investigate the potential for conversion of sawmill and forest residues to biomass ethanol and power; results from the composition analysis of mill samples sent to NREL from different locations around the U.S. are very promising. Co-locating a biomass ethanol plant to an existing lumber/saw mill or biomass power plant makes the economics of the bioethanol that much more attractive through shared capital expenses, such as boilers and wastewater treatment facilities. In addition, not only does this technology have the potential to create jobs in rural communities, but it will also help keep our forests safe and healthy by creating a market for the small-diameter trees and brush which are fueling these fires.

Congress will begin deliberating agriculture issues this year in preparation of Farm Bill reauthorization. Diversification of farm crops is critical for latter year production on farms. Eventually, crops like fast growing trees (e.g., poplars) and tall grasses (e.g., switchgrass)

will encourage both sustainable agriculture and clean energy production for the United States. There is also significant effect on global warming. For example, production of dedicated energy crops and use of bioethanol reduces the net release of carbon dioxide by 90% or more, helping to reduce greenhouse gas emissions significantly. Few other options are available to the transportation sector to achieve this reduction.

Recommendations to Congress

Department of Energy Biomass Authorization -- The ABA applauds the Lugar/Udall "Biomass Research and Development Act of 2000", which did much to promote the concept of biomass in the Congress and within the USDA and DOE. We appreciate the efforts of its sponsors and hope to continue working with Congress to advance the use of biomass in the U.S. The ABA would like to recommend two areas to help carry out what we believe is the true intention of this statute:

1) the USDA's requests for proposals (RFPs) that were used to fulfill the biomass authorization directive only allowed for starch-based crops and long-term cellulosic crops, therefore no short-term cellulosic biomass plants, such as those using agriculture or forestry residues, were recipients of the allocation; **we would like to recommend an expansion of the biomass definition to include these residues in any future solicitations at the USDA.**

2) the DOE biomass programs were not authorized under this bill, which includes research and development allocations for power, fuels and chemicals. If the United States' goal is to achieve a tripling of biomass utilization by 2010 as has been suggested, this will require significant increases to these DOE biomass budgets, which totaled approximately $110 million in FY01. **An increase of at least 20% per year is recommended for DOE biomass programs**. It is imperative that both research and commercialization efforts be funded to the greatest possible level to avoid the technological "Valley of Death", an end many government-funded technologies have met in the past. ABA fully supports Congressman Bartlett's H.R.2358, which authorize these types of increases to DOE's R&D budget; this bill was recently approved by the full House Science Committee, and is contained in the larger energy package now waiting floor action by the House.

Long-Term Feedstock Contracts -- There is a dire need for reliable, long-term biomass feedstock contracts for biomass energy plants, particularly ones using forest thinnings. While long-term contracts have had a tumultuous history, there has been no greater need for these contracts than today. To be succinct, **if long-term, reliable feedstock contracts (at least five to ten years) are not put in place, biomass energy plants will not multiply anytime in the near future in great numbers, that is, enough to make a difference in a forest fire abatement plan**. Financial institutions are very unlikely to back a project, particularly a new technology such as bioethanol, unless there is a guarantee for long-term feedstock contracts. While ABA understands that this is a lot to ask of a Congress that works on a year-to-year basis on many issues, it is imperative in helping support a robust fledgling biomass industry.

Tax Incentives -- There are several types of tax incentives which would help support both existing and new biomass facilities:

1) Open-Loop Biomass Tax Credit -- Tax incentives for biopower plants are essential for their existence under the current restructuring of electricity markets. Currently, existing biomass power plants cannot capture the 1.5 c/kWh production tax incentive because the biomass must be dedicated for the use of producing energy, or "closed-loop" biomass plants; no such plants exist today. **ABA recommends that the definition of allowable biomass for this tax credit be opened up to include "open-loop" biomass plants, such as ones using wood and agriculture residues throughout the U.S.**

2) Biomass Co-Firing with Coal Tax Credit -- Many coal plants as well as utilities in the U.S. are becoming more interested in co-firing biomass with coal to help back out their pollutants. States having both coal plants and excess biomass find this idea particularly attractive. **ABA recommends that co-firing biomass with coal be given a 1.0 c/kWh production tax credit for that portion of electricity generation which is derived from biomass.** Most co-firing facilities will co-fire between 5% and 15%of biomass with coal.

3) Incentive for Pro-active Fuels Reduction - **Private forest landowners should receive incentives for pro-actively thinning their forest stands for biomass use in a biopower or bioethanol plant.** This tactic would also help aid overall forest fire abatement. While most of the timber controversy surrounds public lands, these forests should not be overlooked. For example, a California state law provides a $10 per ton incentive directly to the biomass energy plants for material coming from fuels reduction projects. Any incentive that would help off-set the very expensive practice of mechanical thinning of biomass and transportation to a biomass facility would greatly help the biomass industry.

Comments on Specific Bills before Congress

H.R.1636, "Small Ethanol Producer Tax Credit" - ABA supports the premise of this bill; it is possible that small biomass ethanol producers may eventually benefit from such a law, such as the Gridley rice straw ethanol plant that has already formulated a farmers' cooperative to support its plant.

H.R.2358, "Bioenergy Act of 2001" - ABA fully supports this bill that would double the authorization of the Department of Energy's research budget over a period of 5 years. In addition, it would authorize $49 million per year for 5 years to support the concept of a biorefinery.

H.R.2423, "Renewable Fuels for Energy Security Act of 2001" - While ABA agrees with the premise of this bill, that is, to displace imported oil used in transportation in the form of gasoline with the renewable fuel ethanol, we feel that the goal of increasing the ethanol market by almost 10-fold may be out of reach and possibly even detrimental to the commodity market of corn. While the USDA has studied up to a 3-fold increase in ethanol production from today's market, a 10-fold increase from the current market has not been studied extensively;

therefore, this increase may be pre-mature for now. It also does not include any special provision for biomass ethanol production, such as the one contained in S.670.

S.670, "Renewable Fuels Act of 2001" – ABA fully supports this bill that would triple the size of the ethanol market by 2011. This is a responsible increase that has been studied by the USDA. It also would allow for a leveraging of 1.5 to 1 for cellulosic biomass ethanol over starch-based ethanol, an incentive that is warranted for this fledgling industry.

Conclusion

As you can see, conversion of biomass to energy and chemicals is a win-win situation all around, having both short- and long-term implications. Here are just a few examples of the benefits:

- creates new bio-based industries which are environmentally sound.
- produces new energy for the electrical grid for our current and future energy needs, helping abate future energy crises.
- helps stabilize the U.S. economy, creating jobs in both the forestry and agricultural communities.
- helps energy security by decreasing our dependency on foreign oil.
- rids of burdensome waste materials normally going to overstocked landfills.
- helps clean up our air through reduction of emissions.
- helps the farmer through sustainable agriculture and energy crop production, providing an alternative to reliance on agriculture subsidies.
- helps initiate a carbohydrate-based (versus hydrocarbon) economy with major economic and job creating multipliers.
- helps control forest fires and improve forest health by alleviating fuel loading in our forests.

And most importantly:

- helps wean the United States from its foreign oil dependency and strengthen our nation's competitive edge by producing a domestic fuel from our own resources.

Thank you, Mr. Chairman and members of this subcommittee, for allowing me to speak on the many benefits of biomass conversion to energy and chemicals for a cleaner and stronger nation for future generations to come.