Nebraska Renewable Energy Systems
708 N. Davis
Oakland, NE 68045
www.nerenew.com
Office Phone:
402.685.4333
Cell Phone:
402.307.0280

Congress of the United States
US House of Representatives
Committee on Small Business
2361 Rayburn House Office Building
Washington, DC 20515-6315

09 June 2008

Subject: Testimony On Second Generation Biofuels and Small Business

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

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

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

US Current Situation:

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

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

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

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

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

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

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

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

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

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

Outlook for the Future:

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

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

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

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

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

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

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

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

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

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

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

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

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

Robert M Byrnes
Owner, NRES

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

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

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

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

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