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Crookston, MN

Senate Agriculture Subcommittee

Subcommittee on Energy and Rural Development

Renewable Energy Growth and Opportunities in Rural America

June 22, 2021

Thank you for the invitation to speak about Minnesota's renewable energy and the Agricultural Utilization Research Institute's (AURI) role in supporting the industry in Minnesota and the surrounding states. From transportation fuels to heating to electricity, AURI is working on ways to keep ag-based bioenergy as a strong contributor to the state's economy. We strongly believe in the importance of fostering the renewable energy sector to create new revenue streams and jobs for rural economies. Supporters of the industry need to play an active role in determining its future.

My name is Shannon Schlecht. I am the executive director of AURI which is based in greater Minnesota. I have been with the organization for over five years and am amazed at the ideation and innovative spirit in the food and agricultural industry, especially in the state's rural areas. I grew up on a grain and cattle farm in southeast North Dakota and prior to AURI spent nearly 15 years with U.S. Wheat Associates working on behalf of producers to promote U.S. grown wheat around the world.

AURI is a unique organization that accelerates economic development, through its technical assistance, business development, as well as its convening and connecting role to spur greater utilization of commodities and agricultural products.

AURI is governed by a board of directors made up of representatives of the state's commodity groups, currently wheat, soybeans and beef industries are represented, both general farm organizations, the Minnesota Farmers Union and Minnesota Farm Bureau, agribusiness and members of the Minnesota House and Senate Agriculture committees.

AURI was created by the Minnesota Legislature in the late 1980s during the farm crisis in hopes of mitigating its effects on farmers throughout the state. Over these 30 years, AURI has worked with producers, small businesses, cooperatives, as well as small and large ag and food manufacturers to

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advance innovations to benefit the local and regional economies along with the agriculture and food sectors.

We focus on developing impactful outcomes for rural economies and business which includes home-grown fuels. Between FY16 and FY20, AURI clients reported the following impacts to the economy:

- an estimated new annual gross sales figure of $322 million
- new capital investment of $128 million
- 606 new or retained jobs

I am proud to say that the work we have conducted in recent years with food and agricultural businesses to help develop new opportunity areas and de-risk innovative ideas has been reported by them to generate over $320 million in new ag and food sales each year (an over 80 to 1 return on the state's investment in AURI), much of which occurs in rural areas. Notably, roughly 70 percent of AURI's client project work today occurs in rural areas.

AURI focuses on the post-harvest side of the value-chain – exploring new uses – from harvested grains to livestock processing. During the last fiscal year, AURI worked on more than 180 projects to advance its mission of creating economic benefit through value-added agricultural products.

AURI provides food and ag businesses with one-on-one technical assistance to commercialize ideas, conducts public initiatives to create awareness around new opportunities, such as our "Creating an Industrial Hemp Industry" framework, convenes and connects industry and stakeholders to accelerate ideas, and provides access to its rural laboratories to entities for the purpose of accessing equipment and bench space for proof of concept testing, a resource that doesn't often exist in rural locations.

AURI focuses on four areas – renewable energy, food, coproducts, and biobased products. All of these areas drive opportunities for rural economies, but biofuels production has undoubtedly had an outsized impact over the last couple decades.

AURI has a biobased and renewable fuels laboratory at its Marshall, Minnesota location on the campus of Southwest Minnesota State University to do small scale trials and support bench-top applied research and development for companies exploring new opportunities.

Fostering the renewable energy sector, including biofuels production in rural areas, and creating revenue streams from the clean energy transition to help improve rural economies.

Maintaining the integrity of the Renewable Fuels Standard is of utmost importance to our industry partners, the ethanol and biodiesel producers. That stability provides the necessary floor to develop new products and new processes.

AURI has conducted an annual Renewable Energy Roundtable since September 2006 to bring together renewable energy industry leaders and businesses to explore new concepts and accelerate collaborations to benefit the industry. Through this framework, AURI has worked with numerous

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ethanol and biodiesel businesses. AURI's role is as a trusted third-party technical assistant and business development advisor on innovative ideas in this renewable energy focus area.

AURI has supported multiple approaches in renewable energy and market development for renewable energy products and coproducts from feedstock commodities such as soybeans and corn. However, AURI's renewable energy work goes beyond ethanol and biodiesel, including efforts to advance renewable natural gas opportunities and the utilization of biomass from agricultural residues as a renewable energy source.

One partnership example that stands out to advance rural economic opportunities is Chippewa Valley Ethanol Company (CVEC). In 2017, CVEC was named AURI's Ag Innovator of the Year for its innovative approach and contribution to the rural economy. The partnership between our organizations has been ongoing for nearly 20 years and its forward-looking approach for over 975 cooperative owners is notable.

While it produces more than 50 million gallons of ethanol each year and DDGS byproducts in Benson, Minnesota, it also has diversified into other opportunities including industrial alcohol for personal care products, hand sanitizer, beverage alcohol for organic spirits through its Glacial Grain Spirits enterprise, organic protein products, biodiesel from corn oil, and other industrial and pharmaceutical application areas. Additionally, it is involved in a gasification technology company headquartered in Ames, Iowa.

One unique project AURI worked with CVEC on many years ago was a gasification system to reduce reliance on natural gas and utilize locally produced biomass to produce an alternative renewable fuel. The system was a success from a technical feasibility standpoint, but low-priced natural gas shortly after implementation impacted its economic feasibility.

AURI has worked with the biodiesel industry and companies to help solve technical challenges, identify value stream options for coproducts and assist in new technology development. AURI is also a member of the Minnesota Biodiesel Task Force, which advises the Minnesota Department of Agriculture on methods to increase the production and use of biodiesel in Minnesota.

AURI has regularly provided technical input to companies as they started or expanded their business to troubleshoot operations to advance their business. Most recently, AURI assisted Epitome Energy with feasibility efforts to construct a new oilseed crush plant and biodiesel facility in rural Minnesota.

Another interest area in the biodiesel sector is the Plasma Blue technology. Although AURI has not been heavily involved in Plasma Blue's efforts, it is exciting to see innovative lower cost catalyst technologies advance that could provide a new competitive method for biodiesel production.

Additionally, AURI has been involved in numerous projects that utilize the glycerin byproduct from biodiesel production in applications to advance its value and help make these rural biodiesel businesses more profitable.

One forward looking area that AURI is engaged in today around biofuels is to develop new uses for cash cover crops, such as pennycress, camelina, perennial flax, etc.

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This partnership with the University of Minnesota Forever Green Partnership and other regional players is exploring both food uses and industrial uses, such as for renewable energy, to advance win-win opportunities. The objectives are for cover crops to improve soil health, protect water, and benefit wildlife, while also creating another revenue stream for farmers and rural businesses to add value to these crops through products like biodiesel. Being able to add a win-win solution like this for producers and rural businesses would be a huge boost to rural economies.

AURI is also actively engaged in the Ag Innovation Campus effort, which will be constructed in Crookston, Minnesota. The site would include an oilseed crush operation and serve as an incubation site to spur new innovations focused on current and new oilseeds and agricultural products, which will undoubtedly include exploring innovative renewable fuel technologies and applications.

Utilizing biomass for renewable energy is another area AURI works to advance.

For example, AURI worked with the University of Minnesota's Clean Energy Resource Team to investigate burning woody biomass versus liquid propane to heat poultry barns. The study explored not just energy costs, but profitability from a holistic standpoint of bird health, weight gain, flock growth, mortality, and other factors that affect the bottom line of poultry producers.

AURI has also collaborated with Koda Energy LLC in Shakopee, Minnesota, to showcase its renewable biomass system for heat and energy that utilizes agricultural residues in its operations.

Another innovative study conducted in recent years explored utilizing biomass for cooling systems. While we often think of biomass for heating, technologies and systems exist today to use biomass year-round in facilities and this study explored the viability of these combined systems.

This study was done in partnership with the University of Minnesota – Center for Urban and Regional Affairs, University of Minnesota, the Northwest Regional Sustainable Development Partnership, Western Illinois University – Illinois Institute for Rural Affairs, Northwest Minnesota Multi-County Housing and Redevelopment Authority, Greater Minnesota Management, the former Northwest Manufacturing, Inc. / WoodMaster, Pinecrest Medical Care Facility in Michigan, and Heating the Midwest Biomass Resources and Demographics Action Team.

Further, AURI has actively participated in the Heating the Midwest Initiative since 2011 to support and expand opportunities in promoting the use and adoption of biomass fueled heat and energy systems in the Midwest region of the United States.

Among other biomass-related initiatives, AURI most recently partnered with Heating the Midwest, Inc., the Michigan Department of Natural Resources, the Wisconsin Department of Natural Resources, and the Minnesota Department of Natural Resources to repurpose an internet marketplace with a focus on biomass for fuel to connect buyers and sellers of woody and agricultural biomass in the Midwestern area of the United States and Canada. The Midwest Biomass Exchange (MBioEX) database provides a platform to more easily explore available resources within a specific area for conducting feasibilities, finding suppliers or buyers, etc. which can further develop business interactions between companies.

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Minnesota's renewable energy future is full of opportunity.

New opportunities are being examined across the region for their financial and logistical viability as well as for their sustainability footprints. AURI's Renewable Energy Team spent FY20 making a strategic commitment to expand efforts in renewable natural gas using anaerobic digestion, as well as exploring green ammonia and hydrogen opportunities.

The team worked on two unique projects and initiatives to advance the new programming focus. Both were newly initiated with a coalition working group.

AURI implemented a new industry thought leader initiative to support and foster the development of anaerobic digestion systems in the state. These systems allow producers of organic waste sources to divert them away from landfills and convert them into renewable energy. The resulting biogas can replace fossil fuel derived natural gas when burned or added to an existing natural gas pipeline.

The new industry thought leader group aims to identify potential anerobic digestion projects in the state and connect them with resources. One new way to accomplish this is by developing a digital project decision tool that will aid project teams, policy makers and others with a GIS based techno-economic tool for evaluating a catalogue of waste streams, economic data, physiochemical data, supporting infrastructure and existing sites around the state. The project goal is to assist and accelerate the timeline for those working towards establishing new anaerobic digestor production sites and processing capacity for biogas.

Collaborative systems exist successfully in the state already and being able to link smaller agricultural producers with a municipality or agricultural processing facility to create a consistent feedstock to justify this type of system is a goal of this effort. Ideally, this collaborative approach will allow smaller livestock farmers to participate in this opportunity area without having to own and operate digestors. This collective approach could include agricultural processing residue streams, municipal waste, and livestock products, to provide a greater volume and more consistent feedstock supply to help create the critical mass to justify the investment in generating electricity or injecting biogas into a natural gas pipeline.

A flexible approach in anaerobic digestion policies and incentives that allows for producer participation versus ownership in these types of systems could create additional renewable gas opportunities for livestock producers and rural communities. One could even envision rural communities utilizing this renewable gas locally to power a small city fleet of cars, pickups, or trucks.

AURI also houses a portable anaerobic digestor semi-trailer to conduct beyond bench scale analysis on output streams and valuations to help de-risk and advance anaerobic digestion investment.

Looking forward, another area of interest to advance rural economies is the green hydrogen and ammonia opportunity.

Green ammonia is intriguing as both an energy source that is easily convertible to hydrogen and for agricultural applications such as grain drying, utilization in agricultural equipment, as well as for a low-carbon fertilizer.

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The University of Minnesota Western Central Research and Outreach Center pilot facility in Morris, Minnesota has been at the front edge of innovation in this area and AURI is excited to collaborate with them on agricultural market opportunities for green hydrogen and ammonia.

One could imagine a model similar to cooperative ethanol facilities, where farmer owned businesses produce their own green ammonia energy and fertilizer locally via this renewable process. Green ammonia utilization would reduce the carbon intensity of their crops that could then command premiums in products such as grains, meat, dairy, and biofuels, while also providing a renewable energy product that can be sold, stored, and/or utilized in farming operations. The cycles for energy demand for agriculture (spring and fall) and the public (summer, winter) are also offset, which adds to the intrigue of a consistent demand state for green ammonia.

Conclusion

In closing, the renewable energy sector represents many innovative prospects that can create new rural economic opportunities.

Applied technical assistance and research programs, such as those operated by AURI, have proven to show a positive return on investment. Continued public and private investment into research and development programs along with the stability that the RFS provides will support and foster new renewable energy opportunities that will generate value to producers, rural businesses and rural communities while also meeting a growing consumer demand for more sustainable products.

I appreciate your time and opportunity to share some perspectives today on the role agriculture can and does play in the renewable energy area to support rural economies.

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