



auri

Agricultural
Utilization
Research
Institute

***Agricultural innovation
from idea to reality***

2012 Annual Report

Agriculture: Launching a stronger economic future in Minnesota

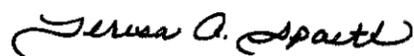
It's no secret that Minnesota is at a critical juncture in our economic story. The effects of the recession that began in 2008 are starting to wane, and there are positive signs of growth. At the Agricultural Utilization Research Institute (AURI) we have the opportunity every day to work with entrepreneurs and businessmen and women at the forefront of agricultural innovation. Their bright minds, enthusiasm, and hard work ethic confirm our belief that there's a bright future ahead for Minnesota.

As the second largest employer in the state, with a total annual economic impact of \$42 billion, agriculture has been, and will continue to be, integral to our economy. The agricultural industry is much broader than just our farmers; it includes food processing, biobased production, renewable energy, and much more. Success in agriculture benefits not just rural Minnesota, but the urban areas, too. With a large number of our agriculture innovation clients based in the Twin Cities metro area, we see more than ever the need to connect the success of our rural areas with the success of our urban areas.

The need for innovation is endless—it is the key to addressing the opportunities and challenges we face in keeping our food safe, producing renewable biobased products, bolstering an affordable energy supply, ensuring a sustainable environment, reducing waste and much more. We hope this report will give you a picture of the contributions AURI has made to Minnesota, and also inspire a vision for a future in which agriculture's strength and natural innovation spur Minnesota to even greater things.

AURI is proud to have contributed to the success story of Minnesota's agriculture economy thus far, one innovation at a time, and we believe agriculture innovation can launch Minnesota to even greater success.

Sincerely,



Teresa Spaeth
AURI Executive Director

AURI Board of Directors for FY12

Julie Bleyhl
Minnesota Farmers Union

Art Brandli
Minnesota Wheat Research
& Promotion Council

Roger Chamberlain,
Secretary/Treasurer
Agribusiness

Sen. Gary Dahms
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Agribusiness

Rep. Rod Hamilton
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Ron Obermoller, Chair
Minnesota Soybean
Research & Promotion
Council

Richard Peterson, Vice Chair
Minnesota Corn Research &
Promotion Council



AURI's Mission

AURI was created and funded by the Minnesota legislature to foster long-term economic benefit through increased business and employment opportunities in Minnesota through:

- Research and development of innovative uses or value improvements for Minnesota agricultural commodities and products, including the identification and expansion of new and existing markets;
- Implementation of basic and applied research to support innovation, technology and growth of the agricultural industry; and
- The development of renewable energy and biobased opportunities from Minnesota agricultural commodities and coproducts.

AURI by the numbers

Getting long-term results...

281,320 over **\$218**

tons of commodities used in new products or processes*

million in non-AURI dollars towards new projects*

217
jobs retained*

More than

275 new jobs created*

\$414,055,000

of capital investment in new plants or equipment*

Through a wise investment of time and resources...

\$5,680,046

of non-state funds leveraged over two years**

178

new or improved products**

90 new or improved processes**

*From an eight-year survey of clients with a 16% response rate of AURI's client base. It is likely these results would have been improved with higher response rates.

**For fiscal year 2011-12.

GROWING MINNESOTA'S ECONOMY...
one innovation at a time.

Vector Windows

Idea to reality: Vector Windows wanted to improve the overall energy efficiency as well as the “green aspects” of their windows. They were interested in developing windows that have renewable or biobased products in their construction.

AURI’s role: AURI staff introduced them to the concept of soy-based polyoil insulation, connected them to the manufacturer and equipment provider, and provided cost-share assistance for testing to ensure LEED (Leadership in Energy and Environmental Design) compliance for windows using PLA (polylactic acid) in their structure.

Outcomes: Vector can now claim its windows meet the new R-5 quality grade, allowing the company to market its product as meeting the newest energy efficiency standards. Vector staff are also looking to create a label that promotes their use of Minnesota farmers’ products.

Partners: The Fergus Falls Economic Improvement Commission connected Vector Windows with AURI.



EarthClean

Idea to reality: EarthClean wanted to further develop TetraKO, a corn- and soy-based fire retardant. They also needed help to gain certification from the U.S. Forest Service as well as develop a mix-on-the-go product and a product that fights oil and gas fires.

AURI’s role: AURI staff are providing product development and testing assistance.

Outcomes: EarthClean received EPA’s Friend of the Earth award, and commercial quantities of TetraKO will be available for the 2013 wildfire season.

Partners: Minnesota Corn Research & Promotion Council, Minnesota Soybean Research & Promotion Council



Nots!

Idea to reality: Entrepreneur Rob Fuglie, who has a son with peanut allergies, wanted to create a non-nut snack that would appeal to those with nut allergies and their families.

AURI’s role: AURI scientist Charan Wadhawan helped with product development and created a nutritional label with minimum ingredients, and AURI offered cost-share assistance to help procure a UPC label; evaluate market research and product placement strategies; and guide product scale-up.

Outcomes: “Nots!” owner Rob Fuglie produces approximately 100 cases a month and is also building an allergen-free commercial kitchen that can also be used by other entrepreneurs creating products for those with allergies.

Partners: The Fergus Falls Economic Improvement Commission was critical in connecting Fuglie with AURI as well as many other resources.



Omega Maiden

Idea to reality: Minnesota farmer Phil Batalden heard about the oilseed crop camelina at an organic growers conference. He said to his daughter, “If I grow it, can you sell it?” That was the birth of Omega Maiden Camelina Oil.

AURI’s role: AURI scientists helped analyze nutritional information and created supplement facts for the product label.

Outcomes: Omega Maiden oil is now on shelves; the specialty oil is aimed at health-conscious consumers who want local, sustainably-grown farm products. “We’re working to revive chemical-free, sustainable agriculture that strengthens rural economies and piques people’s interest in traditional foods,” says Kathleen Batalden-Smith.

Partners: A small grant from the USDA’s Sustainable Agriculture Research and Education program paid for start-up costs.



Photo by Rolf Hagberg

Biomass heating

Idea to reality: As consumers look for alternative, renewable energy, AURI is examining the feasibility of biomass as a heating source, especially for greenhouse operators and turkey growers that rely on propane for their energy. Biomass refers to any product from agriculture or forestry that can be fed into a combustor and burned to generate heat.

AURI's role: AURI worked with DLF Consulting to create the Biomass Heating Feasibility Guide and disseminated the information to turkey growers and greenhouse operators through industry forums and the Minnesota Renewable Energy Roundtable. In addition, AURI is continuing to look at ways to make biomass use more feasible, including affordable ways to remove water from biomass to make it more usable.

Outcomes: Helping the turkey and greenhouse industries reduce their heating costs will improve their competitiveness and profitability, hopefully leading to further growth and economic activity.

Partners: Minnesota Power, Southwest Clean Energy Resource Team, Southern Minnesota Initiative Foundation, Southwest Minnesota Initiative Foundation, Heating the Midwest



Photo by Rolf Hagberg

Biodiesel as a preservative



Photo by Rolf Hagberg

Idea to reality: A national utility pole manufacturer is using biodiesel as the base ingredient for wood preservation in order to address odor problems caused by the traditional, petroleum base. Because the biodiesel-based treatment hadn't been thoroughly tested, they faced questions in the industry about the quality of the product.

AURI's role: AURI worked with the fuel consulting company MEG Corp and Michigan Technological University to test the wood treated with the biodiesel-based product and also investigate

claims that biodiesel would cause chemicals to leach into the environment, affecting water quality.

Outcomes: The performance of the bio substitute was comparable to the petroleum-based preservative system; there was no apparent disadvantage in substituting biodiesel. AURI and Minnesota Soybean plan to evaluate replacing the whole spectrum of petroleum-based products with plant-based products like biodiesel, which are environmentally friendly, renewable and come from our own farm economy.

Partners: Minnesota Soybean Research & Promotion Council



Feeding trials

Idea to reality: Farmers need more information about new livestock feed alternatives to make the most economical and nutritional choices available.

AURI's role: AURI does many feed trials, working with the University of Minnesota and state grower groups and then disseminates the information to producers through commodity groups, industry forums, its website and more.

Outcomes: Improving livestock feed with the coproducts left over during agricultural processing is a win-win for Minnesota's agricultural industry. Livestock farmers find new nutritional, lower cost feed options. The agricultural processing industry finds ways to add value to the products left over during processing.

Partners: University of Minnesota, Minnesota Soybean Research & Promotion Council, Minnesota Corn Research & Promotion Council, Minnesota Turkey Growers, Minnesota Pork Producers, and others



Protecting our waters with ag filters

Idea to reality: Bioreactors, also known as biofilters, help reduce fertilizer run-off and soil erosion. These filters have historically been made from wood chips or straw, which have high costs, so AURI is exploring the effectiveness of using agricultural residues such as stover, straw and cobs.

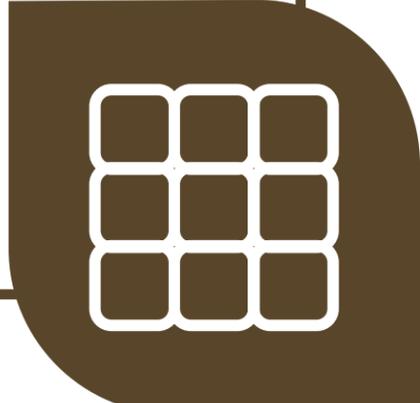
AURI's role: AURI is conducting a 15-month study in partnership with the USDA-ARS lab in St. Paul, testing the ability of crop residues to clean up water drained from agricultural lands.

Outcomes: If agricultural fibers can be used in place of wood chips, it will save money for producers, encourage participation in this conservation practice, and make use of products such as stover, straw and cobs, which are often unused waste.

Partners: Minnesota Corn Research & Promotion Council, USDA-ARS Lab



Photo by Rolf Hagberg



THE MINNESOTA RENEWABLE ENERGY ROUNDTABLE: Spurring Innovation in Minnesota

Since its inception in 2006, the Minnesota Renewable Energy Roundtable has been bringing together people from across the renewable energy industry—all with the goal of spurring innovation to make Minnesota a national and global renewable energy leader. Partnerships are essential to the roundtable, which is led by a planning team of representatives from the Minnesota Department of Agriculture, Minnesota Department of Commerce, University of Minnesota, the Minnesota State Colleges and Universities System, and AURI.



After its initial success, the state legislature adopted the idea into state statute in 2007. Today, the roundtable continues to foster new renewable energy innovation by bringing people and ideas together to create outstanding outcomes that impact the lives of Minnesotans. From education to economic development, the following are several impacts that have been generated by organizations across the state as a result of roundtable participation.

- **Implementation of gasification energy production in Minnesota:** Today, there are two large-scale gasification facilities that use biomass as a feedstock, and five small-scale gasification projects are in various stages of development.
- **Identification of renewable energy workforce needs:** From new courses developed by the Minnesota State Colleges and Universities System to a workforce gap analysis and asset inventory, roundtable participants are helping to address this industry's workforce needs.
- **Increased biomass use:** Multiple organizations have worked together to increase the understanding of factors that may lead to increased use of biomass in the state, educate those who stand to benefit from biomass heat, and share information that is leading to commercialization.
- **Minnesota GreenStep Cities:** Initial discussions of sustainability at the roundtable were the impetus for this assistance and recognition program administered by the Minnesota Pollution Control Agency.
- **Increased utilization of coproducts:** Research and development in the use of coproducts have led to expanded use of DDGS, glycerin, and other byproducts of agricultural processing.
- **Biofuels in gas turbines:** As the result of work by several Minnesota organizations, Xcel Energy is in the process of implementing the use of bio-oils as a replacement for petroleum fuels in gas turbines for electrical generation.
- **Increased biodiesel use:** Many roundtable participants have had a hand in getting biodiesel into the transportation infrastructure and supply chain. Efforts to bring Renewable Identification Numbers (RIN) to Minnesota's biodiesel industry have increased the value of biodiesel to Minnesota producers by an additional \$1 per gallon.





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