



# Resources for innovation

## Analytical Chemistry Lab (Marshall, MN)

The focus of the analytical laboratory is to provide quality analytical and compositional data to promote value-added products from Minnesota agriculture commodities and coproducts. The analytical laboratory evaluates many sample types including foods, meats, coproducts and renewable fuels. **Capabilities include:**

- Chromatography
- Spectroscopy
- Wet chemical analysis
- Physical characterization

## Bioproducts Lab (Marshall, MN)

This facility is focused on one to 10 kilograms scale processing of agriculture commodities and coproducts. Processes are developed and demonstrated for producing increased value materials by fractionation, chemical conversion and purification. **Capabilities include:**

- Chemical processing of straw, stover and other biomass materials
- Extraction and characterization of oils and high-value components from oilseed meal and other feedstocks
- Transesterification and esterification reactions for demonstration of biodiesel processing
- Small-scale fermentation and digestion processes for production of fuels
- Distillation and evaporation for process development

## Microbiology Lab (Crookston, MN)

AURI's microbiology lab is used for the research and analysis of industrial products and to support projects that have the potential to introduce agricultural commodities as ingredients for industrial products. **Capabilities include:**

- Microbiological analysis
- Gas analysis

## Coproducts Utilization Pilot Lab (Waseca, MN)

This facility is the only value-added lab of its kind in the Midwest. It is used for the development of new uses for plant and animal coproducts that present environmental and economic opportunities. **Capabilities include:**

- Grinding
- Milling
- Size reduction
- Blending
- Pelleting
- Drying
- Product characterization
- Particle size analysis

## Renewable energy

**The production of renewable energy from agricultural products continues to be an exciting opportunity.**

From transportation fuels to heat to electricity, AURI is working on ways to keep ag-based bioenergy a strong contributor to the Midwest's economy and our nation's energy future.



# Idea to reality:

## Success stories

### Alternative Energy Solution

#### Idea:

The Kriedermacher family needed a more cost-efficient way to heat their 65,000 square-foot greenhouse, Pork and Plants. Brothers Eric and Paul decided to make biomass pellets that could be burned in boilers to heat the greenhouses.

#### AURI's role:

Scientists worked with the Kreidermachers in AURI's Coproducts Lab in Waseca to develop biomass pellet blends using crop residue and grasses.

#### Outcomes:

The Kreidermachers now use about 20,000 bushels of corn or 500 to 600 tons of pellets to heat the greenhouse. Kreidermachers' two pellet mills also can produce significantly more fuel than Pork and Plants will use and can be used for commercial boilers and residential burners.



### Riverview, LLP

#### Idea:

Convert manure into renewable electricity, livestock bedding and fertilizer.

#### AURI's role:

In AURI's coproducts lab, scientists assisted with the densification of dairy digester solids into a pellet form for value-added opportunities.

#### Outcomes:

The company's three anaerobic manure digesters capture methane. The digesters, which represent millions of dollars of public and private investment in renewable energy technology, "have exceeded our expectations for gas and electricity production," says Adam Zeltwanger, Riverview business developer.



# Services that nurture growth



### Applied Research

Through practical, applied research AURI identifies emerging opportunities to add value to agriculture products. This information is publicly available in order to help entrepreneurs and businesses generate ideas for new products and processes. More information is available at: [auri.org/focus-areas/renewable-energy](http://auri.org/focus-areas/renewable-energy)

#### Tools

- Minnesota biomass heating feasibility guide
- Midwest biomass inventory assessment
- Template for estimating county level energy use and renewable energy potential
- Biomass pellet plant feasibility guide
- Biomass burner initiative

#### Research

- Biomass cooling feasibility study
- Implications of corn producer participation in stover biomass markets and availability
- Biodiesel as a carrier agent for preservative applications
- Biofuels needs assessment
- Small-scale ethanol feasibility study
- Community wind study



### Hands-on Scientific Assistance

Scientists are available to provide consulting and technical services in the areas of:

- Product and process development
- Product evaluation and testing
- Sourcing materials, equipment and services



### Innovation Networks

When deciding the feasibility of a new product or process, it is critical to have access to industry experts and a science-based network of people. With a broad range of networks, AURI can help bring together the right people at the right time to help bring new products and processes to market.



### Minnesota Renewable Energy Roundtable

The Minnesota Renewable Energy Roundtable brings together people to take action on the challenges and opportunities in the area of renewable energy.

The participants of the Roundtable represent more than 217 Minnesota organizations. Participants have identified challenges and priorities for advancing Minnesota's renewable energy industry. Partner organizations include:

- University of Minnesota
- Minnesota Department of Commerce
- Minnesota State Colleges and Universities
- Minnesota Department of Agriculture

### What is the Agricultural Utilization Research Institute?

AURI was created by the Minnesota legislature to foster long-term economic benefit for the state through value-added agricultural products. Its work encompasses the research and development of Minnesota agricultural commodities and products. AURI also supports product innovations or enhancements, helping entrepreneurs identify and expand new and existing markets.