Driving Minnesota's Innovation Economy

Agricultural Utilization Research Institute

2011 Legislative Report

AURI
AG INNOVATIONS
Agricultural Utilization Research Institute

Driving Minnesota's Innovation Economy

AURI Profile

As an innovative research organization, the Agricultural Utilization Research Institute (AURI) provides unique resources and services to Minnesota. AURI's hands-on, scientific technical assistance, one-of-a-kind facilities, expert staff and a targeted network of resources are accessible to Minnesota companies seeking to develop innovative new uses for farm commodities and agricultural coproducts. This assistance is particularly valuable during difficult economic times as it spurs economic activity and job creation.

AURI programs and services are designed to:

- Create and retain wealth in Minnesota through the promotion of agricultural innovation;
- Expand Minnesota's Ag Processing Industry;
- Advance Minnesota's Renewable Energy Industry;
- Provide seamless service from feasibility to implementation of innovations and process improvements for Minnesota agricultural products and co-products.

Created by the Minnesota state legislature as a nonprofit corporation, AURI provides a unique resource to the state's businesses, cooperatives, entrepreneurs and others. The support and assistance offered by AURI helps to further the development of ag-based opportunities that allow farmers and businesses to fully maximize the value chain.

Renewable energy, food, biobased products, and waste product or coproduct utilization are significant economic opportunities for agriculture and business. AURI positions companies to take advantage of these opportunities.

AURI strengthens the agricultural community by providing applied research on new uses and enhanced processes for making the most out of Minnesota commodities -- helping farmers, processors, and communities. Research undertaken at AURI is driven by industry, business, and stakeholder needs.

AURI is located in rural communities and works with clients throughout the state. AURI's unique lab space and professional staff are important components to Minnesota's innovation infrastructure.

AURI provides the Minnesota agri-processing industry with a competitive advantage by assisting in the development and feasibility analysis of new innovations and market advancements. Keeping the agri-processing industry competitive, creating and retaining jobs throughout Minnesota.

AURI is a good investment. State dollars get leveraged with federal dollars, commodity organizations dollars, and other private funding. In the last two years, this resourceful organization has:

- Assisted in the development of over **325 unique projects** and initiatives;
- Brought **143 new or improved ag based products** to the market;
- Leveraged **$2.478 million of outside funds** for projects; and
- Helped bring **$123.075 million in capital investment** to Minnesota.

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AURI Measures

GOAL: *Create and retain wealth in Minnesota through the promotion of agricultural innovation.*

During the last two years, **AURI leveraged $2.478 million** of outside funds for value-added agriculture projects. In the previous reporting period, AURI projects had leveraged $1.4 million.

AURI helped bring **$123.075 million in capital investment** to Minnesota in the most recent two year cycle.

Approximately **$52.9 million in wealth was retained** by clients not investing in projects deemed not currently viable. AURI provided complete and unbiased information to assist clients in making informed decisions, contributing greatly to retained wealth.

GOAL: *Advance Minnesota's Renewable Energy Industry*

The Minnesota Renewable Energy Roundtable has over **525 participants, representing over 217 organizations.** This represents an increase of 125 participants and 117 new organizations being represented during the past biennium.

AURI has provided scientific and technical assistance to **155 energy-related** projects in the past two years.

GOAL: *Expand Minnesota's Ag Processing Industry*

AURI assisted in the development of over **325 unique projects** and initiatives during the past two fiscal years.

AURI helped bring **143 new or improved ag-based products** to the market during the past two fiscal years.

AURI helped develop or **improve 117 new ag processes**. This is an area of growing interest as processors are seeking efficiency improvements to maximize existing or identify new revenue sources.

GOAL: *Provide seamless service from feasibility to implementation of innovations and process improvements for Minnesota agricultural products and co-products.*

98% of AURI clients indicate that AURI's technical expertise met their needs during their working relationship with the organization.

88% of AURI clients indicated that AURI's services were offered in a timely manner that met the needs of their project.

93% of clients categorized the services provided by AURI as valuable to their value-added project, with 61% of clients indicating that AURI services were vital to growing their business.

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Innovation in Bio-Based Products

Bio-based products present a growing opportunity for Minnesota businesses. Real potential exists for using agricultural products as replacement ingredients in materials such as plastics, films, building materials, lubricants, sealants and more. With AURI's help, a number of Minnesota companies have already entered the bio-based product arena.

Not only does AURI work to help respond to opportunities, AURI initiatives help to identify them, giving businesses in the state access to valuable information they need to make informed decisions.

Bioplastic Solutions

Bio-Plastic Solutions, LLC is manufacturing durable furniture parts and building components from corn-based plastic. The company is one of the first in the nation to use renewable polymers in plastic profile extrusion, a process for making continuous plastic shapes.

The Blooming Prairie firm has produced traditional extruded plastic parts for doors, windows, office furniture and medical devices for a decade. In 2010 the company introduced three new products for the building industry made from its patent-pending renewable plastic material.

BioBest furniture edge trim, drywall corner bead, and interior wall guards are made from a blend of corn-starch-derived polylactic acid (PLA) and high-quality, petro-based polymers. With AURI's help, Noble's company is also developing extrudable PLA polymers that incorporate crop fibers, for use in building interiors.

Suntava

This Minnesota business extracts the natural color Sayela™ from Suntava™ Purple Corn bred by Red Rock Genetics of Lamberton, Minn.

Suntava's natural colorant is in a range of products, from sports drinks to tortilla chips. And company CEO Bill Petrich says they are tapping into emerging markets like cosmetics, nutraceuticals and even seed coatings. AURI has provided technical and business assistance and testing to Suntava since 2002.

Sayela colorant is close to the hue of red dye #40, which is the most prevalent synthetic dye used in U.S. foods and beverages. Since the purple corn handles similar to field corn, it can be dried and stored for extended periods, giving it an advantage over more perishable natural colorants made from black carrots or elderberries.

Food and beverage companies are also interested in a domestic source because dyes that come from international locations require refrigeration during shipment.

Value Added Opportunities Report

AURI recently released two reports that outline eight top value-added prospects for corn and soybeans, drawn from more than 200 possibilities. Prepared by Informa Economics, the reports are designed to help farmers and ag processors grasp the economic potential of advancing technology.

Among the possibilities identified are: value-added seed varieties, specialty feeds, green chemicals, second generation biofuels and value-added chemicals derived from crop extractions.

AURI is already working with Minnesota businesses on many of the top opportunities identified in the reports, but the development challenges are daunting, and success is not assured.

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Innovation in Food Product Development

While agricultural commodities have nearly endless uses, a primary use is still food. Food is not limited to providing nutrition to support our body and life. Today many consumers want foods that heal and prevent disease and aging. Manufacturers are responding to this trend.

Food businesses, including meat processrors, provide economic activity, business opportunities, new markets for agricultural commodities and jobs. AURI is there to provide assistance through nutritional assistance, product dvelopment and more.

State Fair Turkey Sandwich

Visitors to the Minnesota State Fair munch down tens of thousands of turkey sandwiches each year at the Minnesota Turkey Growers food stand. This year their taste buds were treated to a new hot turkey sandwich created with assistance from AURI. New formulations were created in AURI's Meat Lab in Marshall before being tested, tasted and given the thumbs up as the new sandwich for the State Fair.

Green Jobs in Food Production

"Green industry" trends — crop diversity, health-promoting foods, high-tech research, product development — were explored in an AURI report, "Minnesota Food Production Sector: Growing Green Jobs," was prepared at the request of the Minnesota Legislature. The study looks at green-job opportunities in Minnesota's diverse food industry. It laid out some of the challenges to job creation and suggests ways that Minnesota can support high-quality job growth and entrepreneurship in the food production sector.

AURI managed the report, coordinated dissemination of the information and brought industry representatives together to identify opportunities for moving the industry forward.

Food manufacturers support

Every year AURI staff assist dozens of food-based businesses that introduce new food products to the marketplace. This includes assisting entrepreneurs who are starting up new businesses as well as helping existing businesses that are working to expand their product offerings or to refine current items. AURI's assistance includes recipe scale up and formulation, nutritional assessment, nutritional labeling and more.

In the past year AURI staff has assisted food entrepreneurs in the development of baby food, snack mixes, specialty baked items, meal replacement bars, healthy crackers, granola and much more.

Dairy Development

AURI and the Midwest Dairy Association are supporting research to help Minnesota's dairy industry grow and remain competitive. The research projects will help improve safety and quality and increase markets for cheese-processing coproducts.

Researchers are developing new technology to pasteurize whey beverages. Whey is a protein-rich coproduct of cheese processing. Researchers are testing manufacturing techniques for making extruded puffs and crisps from high-calcium nonfat dry milk. The nutritious "crunchies" would add a protein punch to cereal and energy bars.

Cheese processors are often forced to discard a low-value product of milk filtration called "low molecular weight milk whey protein." Researchers are evaluating the coproduct's nutritional value for treat ing heat stress.

Tests are being conducted on new ways to clean and maintain the membrane filters used in cheese processing. Researchers are testing natural antifungal substances to deter mold growth in shredded cheese. They are also testing a quick, inexpensive way to measure the lactose content of milk products.

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Innovation in Renewable Energy

The production of renewable energy from agricultural products remains an exciting opportunity for Minnesota. Whether for electrical generation, transportation fuels or thermal energy production, innovations continue to emerge that keep ag-based bioenergy a strong contributor to the state's economy.

CVEC Biochar

The challenge with biochar is holding it all together. The fine, black soot-like material is a byproduct of biomass gasification. Biochar could be used as a coal substitute if it could be compacted into granules or pellets for easy handling.

AURI is working with the Chippewa Valley Ethanol Company (CVEC) in Benson to solve this problem. CVEC, a 48-million-gallon corn dry mill, operates Minnesota's only commercial biomass gasifier. The flexible-fuel reactor is powered by wood, corn cobs and glycerin and will eventually supply most of the plant's energy.

Solving the handling problem would open up several new uses for biochar: as a soil amendment for weathered, low-organic-matter soils; as a tool to lock carbon in the soil, reducing greenhouse gases; as a renewable fuel.

CVEC biochar has an energy value of about 7,000 BTUs per pound, that's just a little less than wood or sub-bituminous coal. And it does not have impurities, such as sulfur and mercury, that produce harmful emissions.

Small Scale Dairy Digester

Anaerobic digesters are being used across the state as a mechanism to handle waste from livestock facilities and agriprocessors. More than just a waste handling tool, digesters also produce biogas that is used to generate electricity or heat.

Most anaerobic digesters are designed and built for large-scale operations, but that leaves a many smaller farms and enterprises unable to capitalize.

AURI and others are working with Jer-Lindy Dairy of Brooten to test the feasibility of small scale digesters. With an average dairy herd in Minnesota of 104 cows, most operations are too small to produce enough biogas from the digester to make it economically feasible.

So much digester technology is large scale, but developing what is needed for it to be feasible in smaller operations would spur new development and build a new economy. There will also be options in how the energy is delivered-whether as biogas or electricity. Unlike other renewable-energy sources, such as solar and wind power, anaerobic digesters can maintain power 24 hours a day. They also could use waste streams from dairy operations and local processors.

Renewable Energy Template

AURI has developed a one-of-a-kind tool to help Minnesota counties and regions to estimate their renewable energy potential and demand.

The AURI Renewable Energy Template is a tool devised to help answer questions that have been repeatedly asked of AURI during the last few years: How can various regions throughout Minnesota foster renewable energy development? Is there a way to determine regions' and counties' best resources for renewable energy? What is the most effective way to stimulate more renewable energy projects?

The template is designed to be an economical and more practical way to give organizations, businesses, and even individuals a well-researched tool that they could tailor to their own situation.

The template contains instructions and data for estimating the renewable energy and potential of a region or county. Its intent is not to generate a full-blown feasibility study, but to serve as a "how-to manual" for inventorying resources and determining local and regional markets for renewable energy.

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Innovation in Coproduct Utilization

Nearly every agricultural processor generates waste or coproducts. Many of these materials are considered of low value--but that doesn't mean they have no value. There is strong demand for AURI's coproduct utilization expertise because of the potential revenue streams these products have the potential to create. Utilization of coproducts can also help processors avoid costs such as disposal or transportation fees, turning what was once a cost into a potential revenue source.

Dairy digester solids

A number of large Minnesota dairies utilize anaerobic digesters to handle animal waste and to generate biogas. The process stabilizes the manure, but doesn't reduce it.

AURI is working on several projects involving the use of dairy digester solids. These solids can be used as soil amendments, fertilizer, in greenhouses and potentially as a fuel. The solids are a good source of nitrogen, potassium and phosphorous. The nitrogen in the solids has high plant availability and tends not to leach.

North American Fertilizer

The phosphate, potash and sulfur in NAFmicro fertilizer aren't mined overseas — they're Minnesota grown. North American Fertilizer LLC sells 110,000 tons a year of ash fertilizer derived from incinerated poultry manure. The ashes come from Fibrominn in Benson, Minn., a 55-megawatt electricity plant fired by a halfmillion tons of turkey and chicken litter. The leftover ash is a good source of essentialcrop nutrients.

The $5 million NAF facility was built in 2007 by a group of Minnesota farmers and entrepreneurs. AURI helped the group test ash fertilizer in field trials.

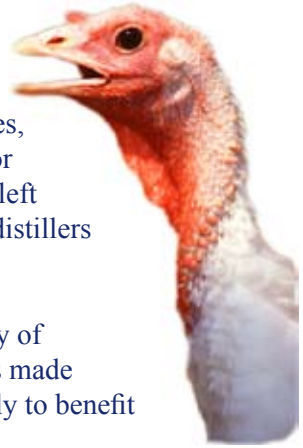
At a time when U.S. fertilizer imports are on the rise, NAFmicro represents more than $10 million in retail sales of locally-grown, renewable fertilizer.

This past fall, more than 75,000 tons of NAFmicro fertilizer were spread on central Minnesota farm fields to feed next season's corn, soybeans, alfalfa, wheat and sugar beets. Another 30,000 to 40,000 tons will be applied in the spring. In total, roughly 150,000 acres of central Minnesota cropland will benefit from NAF's renewable fertilizer.

NAFmicro is distributed by nine farmsupply retailers in Minnesota, Iowa and South Dakota. The retailers pick up the ash from the warehouse and deliver it directly to fields, where it is applied with GPSguided spinner spreader rigs and later incorporated into the soil through cultivation.

Alternative Feed Rations

One promising use for agricultural processing coproducts is as feed ingredients. Many of these coproducts contain nutritional value that makes them perfect for use in livestock feed. Particularly when grain prices are high, many livestock producers are looking for ways to reduce their input costs. In some cases, using ag coproducts in feed rations can reduce those costs without sacrificing animal performance.



AURI has collaborated on a wide range of feeding trials evaluating the use of agricultural coproducts. These trials have taken place on poultry, dairy calves, hogs and more. Coproducts that have been tested for their efficacy as a feed ingredient include glycerin, left over from biodiesel manufactuing as well as dried distillers grains, derived from the ethanol making process.

Tests are conducted in collaboration with University of Minnesota animal research facilities. Information is made available to those in the industry who are most likely to benefit from this information.

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AURI Mission

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

- The identification and expansion of existing markets for new or existing commodities, ingredients and products;
- The development of new uses or value improvements for Minnesota agricultural commodities; and
- The development of renewable energy opportunities from Minnesota agricultural commodities and co-products.

AURI Capabilities and Expertise

In addition to project management expertise, innovation management experience, and in-depth industry knowledge offered by AURI's professional staff, our organization provides businesses access and assistance through the following specialized laboratories and pilot plants:

Food
Shelf-Life, Sensory Evaluation, Nutritional Assessment, Regulatory Assistance, Packaging Assistance, Recipe Formulation

Analytics
Microbial, Gas Analysis and Chemical Analyses

Fats and Oils
Fat / Oil Analysis; Biomass Analysis; Food, Feed, Meat Analysis

Meats
Smoking, Packing, Processing, And More

Co-Product Utilization
Fertilizers, Sorbents, Renewable Fuels, Energy, Animal Feeds, Soil Amendments, Biodegradables

Pilot Lab
Grinding, Milling, Size Reduction, Blending, Pelleting, Drying

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AURI Information

Offices:

AURI Crookston Office, (218) 281-7600
AURI Marshall Office (507) 537-7440
AURI Waseca Office (507) 835-8990

Website:

www.auri.org

AURI: Leading Agricultural Innovation from Idea to Reality

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Appendix A

Projects Receiving Assistance in FY 2010

Project Title	Hours expended
Innovation Launching Pads	454.50
Innovation in Food Production	250.25
AgriPreneur Program	226.25
Biogas/Electricity Generation	226.00
Biomass Pellet Binder	225.50
Biodiesel Storage Study	223.50
Soybean Expeller Processing	200.50
Product Development	184.25
Drying Post Digester Solids	180.75
Food Product Sector Opportunities	180.25
Micro-Carriers Fiber	178.25
Poultry Production & Process Development	170.00
Roseau Gasification	160.50
Sustainable Switchgrass	148.50
Turkey Sausage Development	144.50
Digester GenSet Technology	133.00
Char Ash Densification	122.75
Grass Screen Gasification Phase 2	122.25
Wheat Litter Refinement	117.00
Ag Biomass Product Development	116.00
Ag Coproduct Extractions	116.00
NW Region Renewable Energy	113.25
Meal Replacement Bar	112.00
Digester Feedstock Evaluation	107.75
Multi-faceted network	105.00
Membrane Separation Assessment	104.00
Biodiesel Check Sample	101.50
RBOG Proposal	97.25
Biobased Product Opportunities	97.00
Biomass Crop Establishment	90.50
HACCP-2010	90.25
Biobased Stakeholder Workshop	86.50
Cellulose to Liquid Fuels	86.00
Cheese Analysis	85.50
Providence Coffee, LLC	85.00
Potato Flaking	82.00
Pellet Blends/Fuel	80.50
ASTM Biodiesel Check Sample	79.50
Ag Biomass Pellet Fuel	79.00
Roseau Gasification	78.00
Dill Aparagus/Fruit Salsa	75.00
Assess Value Using Corn Solubles	74.50
Biobased Coverings	74.25
Assess DDGS in Beef Cattle	73.50
Identify Emerging Technologies	72.00
Nutritional Analysis	70.50
Latino Meats Workshop	65.75
Densification of Prairie Grasses	65.50
Smude Enterprises, LLC	65.50
Processing Specialty Grains	65.00
Biogas Advisory Group	64.00
Biomass Air Emission	63.50
Anaerobic Digester Feedstocks	59.50
SSTI Excellence Application	59.00
Anaerobic Digester Use of Novel Bacteria	58.00
Potent Human Health uses of DDGS	58.00
Sprouted Flaxseed Cracker	56.50
Sustainable Switchgrass	56.50
Biomass Pellet Binder	54.75
Burritos & Tamales	53.00
Corn Stover Collection	52.25
Heat/Energy Delivery Evaluation	51.50
Warroad Co-Generation	51.00
Oat Fiber Densification	51.00
Pillar Candles	51.00
Renewable Energy Template	51.00
Pasta Filata Cheese Development	50.50
Low Carbon Fuel Standard	50.50
Co-Digestion Enhancement	49.75
Sorbent Densification and Crumbling	49.50
Nutritional Analysis	49.25
Goat Milk Kefir	48.00
Chisago County EDA	47.50
Straw Utilization	47.00
Food Safety Urban Outreach	46.00
Micro Carriers Fiber	46.00
Locust Lane Vineyard & Nursery	44.50
Goat Gouda	44.50
Algae Feasibility Demonstration	44.50
Digester Solids	44.00
Molasses Fertilizer	43.50
Challenge Grant	42.50
Biogass Research	42.00
Biomass Pellet Development	41.00
Algae Feasibility	41.00
Membrane Biofilms	40.00

Biologic Activity/Antibio	40.00
Biomass Densification for Local Heating	40.00
Utilizing Biodiesel as Preservative	39.00
C5 Molasses	39.00
Organic Fertilizer Formulation	38.50
Flat Die Pellet Mill Evaluation	38.00
Development of Red Corn Products	38.00
Prairie Agra Fuels, LLC	37.50
Energy Prediction Equation	37.00
Biobased Development	37.00
Gelatin and Jellies	36.00
Clearbrook Elevator	35.00
Turkey Sandwich Recipe	34.00
Labeling of Gluten-Free Products	33.50
Alternative Cutting for Steak	33.00
Enhance Utilization of Milk Co-Products	32.50
Elite Truffles	32.50
Glycerol as Feed	32.50
AgriPreneur Program	31.50
Densification of Prairie Grasses	31.50
Wheat and Barley as Nutraceuticals	31.00
Dry Digestion	30.75
BioChar Assessment	30.50
Utilization of Wheat Straw	30.25
Integrated Biorefinery	30.00
Local Foods Marketing	29.50
Municipal Wastewater Reuse in Ag	29.50
Famous BBQ Sauce	29.00
Local Foods Market Development	29.00
American Ag Energy	28.50
Fish Cheese Spreads	28.00
Fiber Board Development	27.75
Ash Densification	27.25
Women's Environmental Institute	27.00
Dairy Omega 3 & CLA	27.00
Utilizing Fish Processing Waste	26.50
Lucky's Popcorn Dressing	26.50
Assessing Corn Solubles for Swine	26.25
Organic Fertilzer Formulation	26.00
BioEnergy Park	24.50
Oligosaccharide Free Soybean Meal	24.00
Corn Cob Collection	24.00
Poultry Coproduct Feasibility	23.50
HACCP-Meat Lab	23.25
Small Scale Pellet Production	23.25
Utilizing Creamery Coproducts	23.00

Rural Prosperity Summit	22.50
Peak Power Cost Using Biodiesel	22.00
Healthy Granola Bars	22.00
Epitome Energy, LLC	22.00
Viscosity and Density Improvements	22.00
Food Process CoproductAssessment	22.00
Nutrition Labeling	21.25
Novel Dryer Technology Evaluation	20.00
Thermophilc Stillage Digestion	20.00
On-Farm Pellet Feasibility	19.50
Combustion Ash Opportunity	19.50
Wheat Straw Screening Applicattions	19.00
Potato Waste Utilization	19.00
Crude Glycerin Uses	19.00
Bioplastic Products Development	19.00
Stover Torrefaction	18.50
Soy Lubicants	18.50
Rinse and Chill Process	18.00
Low Oligosaccharide Meal for Swine II	17.50
Improving Biodiesel Emissions	17.00
Vegan Honey Substitute	16.50
Bread Shelf Life Testing	16.50
Energy & Handling Evaluation	16.50
Crop Residue Value Template	16.50
Manure Digestion System	16.00
Value Added Ag Impact Study	15.50
Potato Chip Development	15.50
Oligosacchardes in Swine Diets	15.50
Organic Frozen Baby Food	15.00
Biomas Evaluation	15.00
Process Development	15.00
Culinology Students	15.00
Co-Product Drying & Pelleting	15.00
Co-Prod Opportunities for MN Biofuels	14.75
Compost-A-Mat Sorbency	14.50
Dairy Industry Collaborations	14.00
Novel Apple Cider	14.00
Bioplastic Product Development	14.00
By-Pass Protein & Soyoil	14.00
Biodiesel Quality Assurance and Taskforce	14.00
Increased Utilization and Distillers	14.00
Pellet Fuel Blends	13.75
Hydro Seeding Compost	13.50
Meat Balls Production	13.50
Fertilizer and Feed Opportunities	13.50

Sausage Development	12.75
Microturbine Durability Test	12.50
Local Foods Marketing-II	12.00
Sweet Hot Mustard Development	12.00
New Dairy Product Development	12.00
Premium BBQ Sauces	11.75
Starch Product Refinement	11.50
Sauce Development	11.50
MNRER Portal Development Phase II	11.50
PLA Window Testing	11.00
Turkey Sausage Development	11.00
Poultry Bedding	10.50
Coproduct Densification Assessment	10.50
Antimicrobial Assistance	9.75
Healthy Bakery Products	9.50
Stimulation Economic Progress	9.50
BQ-9000 Certification of Biodiesel Lab	9.50
Corn Based Textile Testing	9.00
Special T's Gourmet	8.80
Biomass Densification	8.50
Small Scale Gasifier	8.25
Dry Bean Utilization	8.00
Confection Development	8.00
Food Process Casebook	8.00
Metabolism Effects of DDGS	8.00
Miscibility of Biodiesel	8.00
Commercialize Niche Food Product	7.50
Coproducts for Dust Suppression	7.50
Swine Manure Analysis	7.00
Commercial Bread Soup Mix	7.00
Morris DOE/USDA Grant	7.00
Renewable Energy Co-Products Use	7.00
Omega 3 Guide	6.75
Wild Rice Utilization	6.50
Breakfast Cookie Development	6.50
County Biobased Procurement	6.00
Organic & Natural Feed Markets	6.00
Bioenerby Emissions Testing	6.00
Biodiesel Testing	6.00
Hot Sauce for Seafood	5.75
Compost Bed Blend Media	5.50
Nutraceuticals in Milk	5.50
Specialty Confection Development	5.50
Biofilters for Drainage Water	5.25
Product Development	5.00
Sweet and Spicy Sauce	5.00
Red Lake Biodiesel	5.00
USDA- Grant application	5.00
Aitkin Area Producers	5.00
Conversion of Glycerin to Methane	5.00
ASTM Biodiesel Testing	5.00
Small Scale Ethanol	5.00
Discovery 2010	5,852.00
Energy Discovery 2010	185.00
Discovery 2009	1,296.75
Energy Discovery 2009	172.50

Staff Hours Dedicated to Projects **18.935.05***

***This report reflects only projects receiving more than 5 hours of assistance. Numerous businesses and entrepreneurs received assistance of less than 5 hours. Also, initial client meetings that don't lead to formal projects are captured in Discovery.**

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Appendix B

Projects funded during FY 2010

Project Title	Funds Expended
Utilization of Renewable Energy Co-Products	$31,165.00
Bongard's Creamery Coop	$60,000.00
Grass Screen Gasification Phase 2	$35,833.72
Distributed Power Through Gasification	$243,600.00
DDGS in Beef Diets	$90,988.06
Corn Cob Collection	$95,316.19
Glycerol as Calf Feed	$15,400.00
DDGS in Beef Cattle Rations	$42,179.00
Emerging Technology Identification	$100,000.00
Microturbine Durability Test	$16,124.02
Soybean Bypass Proteing	$7,000.00
Aitkin Area Producers	$19,000.00
Municipal Wastewater Reuse	$3,195.00
Algae Feasibilitiy	$75,000.00
Low Oil DDGS Assessment	$13,568.82
Integrated Biorefinery	$1,410.00
Drying Technology Post Digester	$3,807.06
Sustainable Switchgrass	$1,900.00
Biodiesel Generation Assessment	$5,559.00
Minnesota's Renewable Energy Roundtable	$2,500.00
Local Foods Marketing II	$282.75
Oligosaccharide Free Meal	$35,788.25
Assessment of Oligosaccharide Meal in Swine Diets	$40,000.00
Development of Red Corn Products	$17,141.80
Utilization of Wild Rice Hulls	$760.82
Rinse and Chill Process	$10,800.00
Food Product Sector Opportunities	$74,350.20
Local Foods Marketing	$25,000.00
Wheat Straw Utilization	$19,250.00
Enhanced Utilization of Milk Co-Products	$35,541.66
Midwest Dairy Association	$2,000.00
Membrane Biofilms	$13,333.33
AgriPreneur Program	$879.20
Ag Biomass Utilization	$7,562.50
Client Survey	$1,460.00
Poultry Production and Process Development	$2,386.72
Regional Innovation Systems	$200.00
Rural Business Enterprise Development	$3,500.00
Total	**$1,153,783.10**