



**auri**  
Agricultural  
Utilization  
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GROWING MINNESOTA'S ECONOMY  
**one commodity** and  
**one business** at a time.

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**Legislative Report for State Fiscal Year 2013**

*Reported as required by state statute*

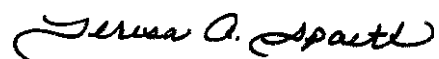
## ***The key to our future: Minnesota's agricultural roots***

Minnesota's future may well be found in our agricultural roots. The state's commodities, from corn to livestock and soybeans to sunflowers, present countless opportunities to create new and improved products and processes that feed the world, improve health, sustain our natural resources for the next generations, and much, much more.

AURI's mission is to help small- and medium-sized businesses and entrepreneurs find those unique ways to improve Minnesota's economy, one agricultural commodity at a time. Through our range of idea-to-commercialization services and leadership in identifying future opportunities, AURI is helping Minnesota be a global leader in the area of agriculture and agricultural processing.

The stories and information presented in this report will show you just a few of the ways AURI staff, along with countless partners across the state, work together to improve our economy using our agricultural roots. We are helping to connect new and old, traditional and modern, rural and urban—in order to create a stronger, more vibrant future for Minnesota.

Sincerely,



Teresa Spaeth  
AURI Executive Director

## **AURI Board of Directors for FY13**

**Julie Bleyhl**  
Minnesota Farmers Union

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Minnesota Wheat Research  
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## **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.

# GROWING MINNESOTA'S ECONOMY...

## ...ONE COMMODITY AT A TIME

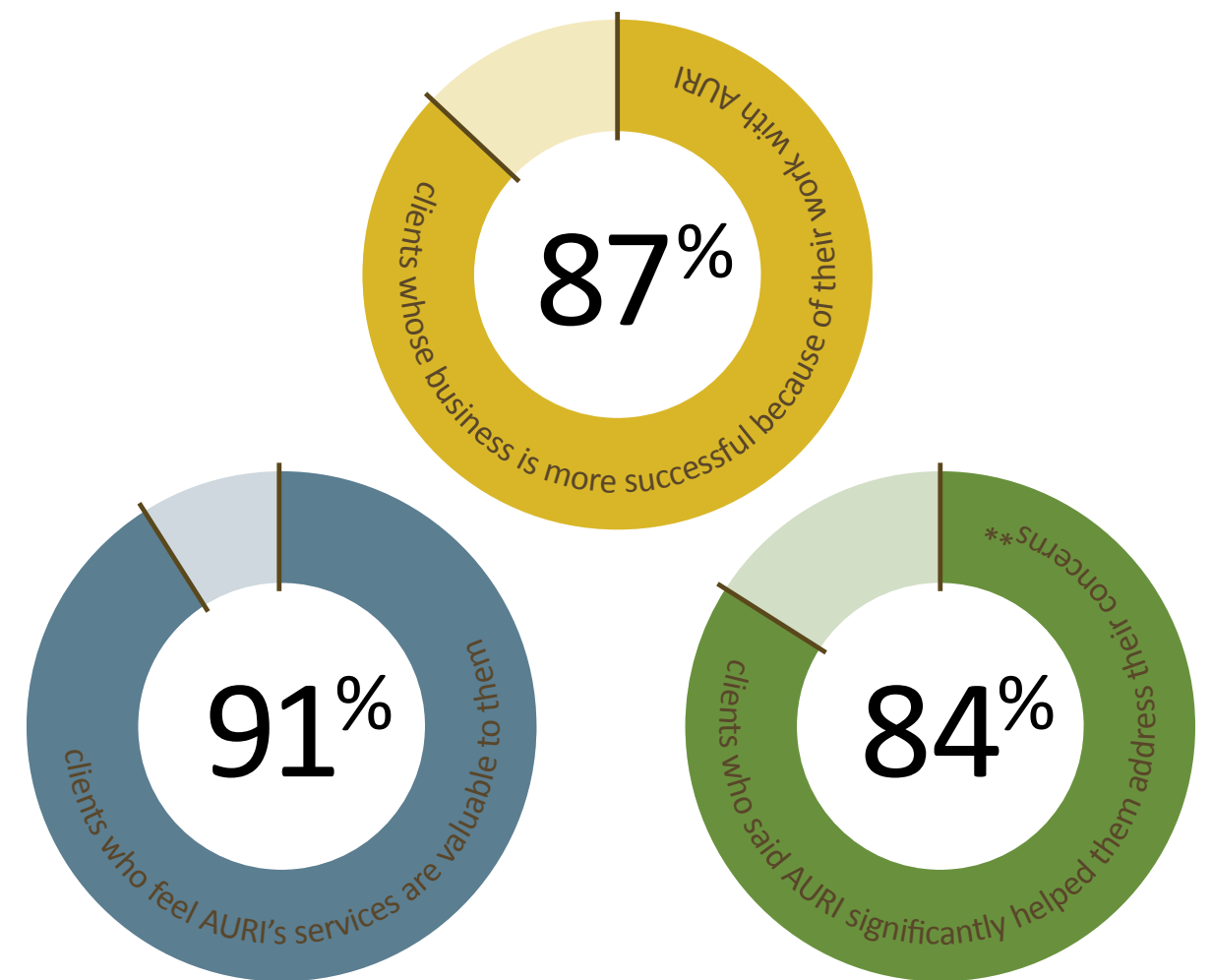
**\$414,055,000**

of capital investment  
in new plants or equipment

**281,320 tons**

of commodities used in  
new products or processes\*

## ...ONE BUSINESS AT A TIME



\*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 2012-13.

## Wild Rice: Health benefits create growth potential

**Idea to reality:** Wild rice, the high-protein, high-energy cereal grain long revered by native peoples as a sacred and life-giving food, may be a significant source of beneficial compounds that could grow the commodity's consumer base.

**AURI's role:** AURI commissioned a literature review to explore the research done thus far on wild rice's nutritional benefits and therefore identify future possible research and projects that may lead to commercialization.

**Outcomes:** The findings in this review could lead to further research and commercialization, spurring interest in developing new products to take to market. AURI continues to work with the Minnesota Cultivated Wild Rice Council, food processing companies and others to bring these ideas to the market.

**Partners:** Minnesota Wild Rice Council and the University of Minnesota.



## Soybeans: Klean & Green



**Idea to reality:** A Minnesota family company wanted to use recycled vegetable oil and glycerin from their small biodiesel plant to make green cleaning products. They needed help with glycerin purification and product formulation and testing.

**AURI's role:** AURI scientists helped purify the crude glycerin and perfect the product recipes and manufacturing process for Klean Soap.

**Outcomes:** Klean Soap now makes five all-natural cleaning products, which are being tested at the Minneapolis-St. Paul Airport. The company is also seeking green certification and setting up a distribution network.

## Turkey: Turkeystastic

**Idea to reality:** The Minnesota Turkey Growers wanted to create a flavorful turkey sandwich that would be popular with consumers, as well as identify the nutrition facts for various turkey recipes.

**AURI's role:** AURI scientists provided product development and nutritional analysis services.

**Outcomes:** Turkey To Go, owned by the Minnesota Turkey Growers, won the "Best Food or Beverage" award at the Minnesota State Fair; they also have many recipes available at the state fair and on their website.

**Partners:** Minnesota Turkey Growers



## Dairy: New milk meter

**Idea to reality:** Dairy processors needed a faster, cheaper way to determine the lactose content of milk.

**AURI's role:** AURI partnered with the Midwest Dairy Foods Research Center to develop a rapid lactose test using an inexpensive blood glucose meter.

**Outcomes:** The new test procedure will save dairy manufacturers time and money and will improve product quality and processing efficiency. It is now being used in commercial plants.

**Partners:** Midwest Dairy Foods Research Center, Midwest Dairy Association





## Corn and Swine: Swine liquid feed trials

**Idea to reality:** U.S. hog producers use large amounts of dried distillers grains with solubles (DDGS) in swine rations. There's interest in using liquid swine feeding systems, which would enable farmers to feed less-expensive wet or

liquid ethanol coproducts. Farmers needed to know if feeding liquid ethanol coproducts would affect pigs' growth or meat quality.

**AURI's role:** AURI sponsored feeding trials at the University of Minnesota Southern Research and Outreach Center in Waseca, Minn., which compared the performance of pigs fed liquid and those fed dry diets containing ethanol coproducts.

**Outcomes:** Feeding ethanol coproducts in liquid diets did not reduce swine growth or meat quality. The research will help hog producers make informed decisions on the use of liquid ethanol coproducts. It will also help the ethanol industry expand markets for wet products, thereby cutting energy use and feed drying costs.

**Partners:** University of Minnesota Southern Research and Outreach Center, Minnesota Corn Research & Promotion Council, Minnesota Pork Board, and Guardian Energy, Janesville, Minn.

## Livestock: Rivard's Quality Seeds

**Idea to reality:** Rivard's Seeds no longer had enough post-harvest leftovers (coproducts) to support pelleting at their plant and needed to find a way to stay in business.

**AURI's role:** AURI helped connect Rivard's with another business that had product for them to pellet.

**Outcomes:** Rivard's retained five jobs, sold the business to D&D Commodities, Ltd. and remains profitable with an eye to the continued growth opportunities.



## Wheat and Barley: Adding value

**Idea to reality:** The Minnesota Association of Wheat Growers and the Minnesota Barley Growers Association wanted to identify new or alternative uses for wheat and barley.

**AURI's role:** AURI revisited the 2002 National Association of Wheat Growers New and Improved Wheat Uses Audit, expanded that work, and identified the best potential new and value-added uses for Minnesota wheat and barley.

**Outcomes:** AURI staff is sharing the report findings through various media, with wheat and barley growers, industry, and the National Association of Wheat Growers in order to increase knowledge about these possible new uses and lead to new products and processes that add value to these commodities.



**Partners:** Minnesota Association of Wheat Growers, Minnesota Barley Growers Association, Neil Doty of N.C. Doty & Associates, and Praxis Strategy Group.

## Sunflowers: Smude Oil

**Idea to reality:** After the hot, dry summer of 2007 took a toll on Tom Smude's corn and soybean crops, he learned that hardy sunflower plants could thrive in such adverse conditions, and he began to explore the idea of producing sunflower oil. Now, Smude's Oil creates cold-pressed and filtered sunflower oil, available in a variety of flavors.

**AURI's role:** Nutritional analysis, product development, troubleshooting and innovation networking.

**Outcomes:** Today, Smude's is on shelves in major grocery chains, has a loyal customer base, is expanding its offerings to include granola and employs four part-time staff.

**Partners:** Smude Oil received a value-added producer grant from the USDA and also received assistance from the Community Development of Morrison County and the Small Business Development Center in Brainerd.



## THE MINNESOTA RENEWABLE ENERGY ROUNDTABLE: Agricultural commodities create economic, environmentally-friendly options

Since its inception in 2006, the Minnesota Renewable Energy Roundtable has been bringing together people from across the renewable energy industry to make Minnesota a national and global renewable energy leader. Networking and relationships 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 innovation by bringing people and ideas together to use Minnesota's agricultural commodities to create renewable energy options that are good for the economy and the planet.

Here are some of the ways the roundtable has been meeting its mission in the last year:

- **Identification of renewable energy workforce needs:** One of the roundtable meetings in 2013 brought together leaders from higher education, economic development, and industry to discuss education and workforce trends, challenges, and innovative programs. Over the years, roundtable participants have helped provide information to develop new courses in the Minnesota State Colleges and Universities System and conducted a workforce gap analysis and asset inventory.
- **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. A 2013 study and roundtable presentation looked to determine Minnesota corn producers interest in selling corn stover biomass, their knowledge of issues surrounding biomass harvest, factors that are likely to influence their opinions of biomass harvesting, and what further information producers need.
- **Biodiesel and ethanol:** Many roundtable participants have a continued hand in getting biodiesel and ethanol into the transportation infrastructure and supply chain, addressing challenges and growing opportunities for use of these fuels. Roundtable participants are working together to continue to advance renewable fuels and technology during this time of lower fossil fuels costs.
- **Utilization of biomass:** AURI has been serving as an informal liaison between the roundtable and Heating the Midwest—a six-state consortium that wants biomass to heat up the nation's heartland. AURI staff serve on a biomass action team focused on demographics, benefits and consequences, biomass combustion technology and policy.
- **Energy efficiency in processing plants:** Information shared through the roundtable is helping processing plants in the Midwest increase their energy efficiency.



## STATE FY2013: PROJECT DISBURSEMENTS

Project Name	Disbursement Amount
Agbioscience Capacity Analysis .....	\$150,429.00
Value-Added Synthetic Gas Produced from Gasifier .....	\$75,000.00
Assessment of DDGS in Beef Cattle Rations .....	\$62,350.65
Higher Value Ethanol Products.....	\$53,640.86
Increased Utilization of Distillers Grains.....	\$41,964.85
Assessment of the Effects of Glycerin in Beef Carcass Quality .....	\$38,846.66
Relationship of Various DDGS Characteristics in Poultry Diets.....	\$38,724.26
Enhanced Utilization of Milk Coproducts .....	\$35,541.68
Development of Bioplastic Products .....	\$34,168.00
Potential Human Health Benefits from DDGS .....	\$31,884.68
Coproducts in Cattle Diets and E. coli .....	\$29,264.71
On-farm Anaerobic Co-Digester .....	\$25,935.00
Development of Neighborhood Farm Market and Food Cooperative.....	\$24,900.00
DDGS Diet and Relationship to Mulberry Heart Disease.....	\$24,467.51
Implications of Corn Stover Producer Participation Rates.....	\$24,433.41
Metabolism Effects of Low Soluble DDGS on Cattle Diets .....	\$24,088.66
Biological Activity of Antibiotics in Distillers Grains.....	\$23,988.64
Value-Added Ingredients from Milk .....	\$23,371.09
Minnesota Research & Promotion Council Forum .....	\$20,000.00
Low Sodium Cheese .....	\$19,992.50
Hydrous Ethanol-Dual Fuel Diesel Engine .....	\$19,028.87
Agricultural Residue Performance Evaluation in Denitrifying Bioreactors .....	\$18,671.75
Beef Metabolism Study .....	\$16,093.29
Feasibility Assessment of Glycerin Refining .....	\$15,000.00
Gasification Project .....	\$14,444.61
Energy Prediction Equations of DDGS .....	\$14,187.05
Energy Utilization of Oil Extracted DDGS in Poultry .....	\$12,217.55
Phase Feeding of DDGS and E. coli.....	\$12,186.24
Identification of Value-added Opportunities, Alternative Uses for Wheat and Barley .....	\$11,872.74
Pork Fat Quality from DDGS Diets .....	\$9,139.68
Peak Power Cost Containment Utilizing Biodiesel Study.....	\$8,726.00
Local Food Cooperative .....	\$7,890.08
AURI to Act as Technical Service Provider for MSRPC .....	\$7,550.27
Sodium Reduction in Blue Cheese.....	\$7,250.00
Development Assistance .....	\$6,746.72
Long-Term Impacts Survey .....	\$6,457.66
Alternative Feed Ingredients and Dietary Electrolyte Balance .....	\$6,284.42
Development of Food Cooperative .....	\$6,199.63
Beef Metabolism Study of DDGS and Soy Glycerin .....	\$5,991.02

## STATE FY2013: PROJECT DISBURSEMENTS (CONT.)

Project Name	Disbursement Amount
Biorefinery for DDGS in Biofuels and Value-Added Products .....	\$5,085.79
Peak Power Cost Containment Utilizing Biodiesel Study.....	\$4,331.15
Increasing Biomass Yield and Economic Efficiency of Herbaceous Energy Crops .....	\$3,500.00
Fungal Processing of Thin Stillage .....	\$3,383.00
Municipal Wastewater in Value-Added Agricultural Processing.....	\$3,080.67
Elderberry Cooperative Development.....	\$3,000.00
Frozen Appetizer from Enclosed Dough Shell.....	\$2,820.12
Gasification Feedstock Test .....	\$2,275.00
Calf Milk Replacer From Coproducts .....	\$2,086.50
Fungal Processing of Thin Stillage .....	\$1,973.00
Biomass Heating Feasibility Guide.....	\$1,231.56
Nut Substitute Snack .....	\$1,100.00
Farmfest Forum .....	\$1,000.00
Distiller Grains Sulfur Concentrations and Dietary Roughage .....	\$908.77
Development of Local Foods Cooperative.....	\$778.99
Total project expenditures less than \$100 per project.....	\$189.34
<b>Total: .....</b>	<b>\$1,071,391.51</b>

## STATE FY2013: PROJECTS RECEIVING ASSISTANCE\*

Project Name	Hours Served	Project Name	Hours Served
Project Management 2013.....	9,524.25	Shelf Stability and Nutritional Analysis of Jerky .....	37.5
Project Management 2012.....	3,226.50	Survey of Small Meat Processing in MN.....	37.25
Discovery 2013 .....	788.25	Meat Chip Market Assessment.....	34.5
MN Research & Promotion Councils .....	662	Gluten-Free Dog Treats.....	34
RCDG Discovery Time .....	480	Debottleneck Distillation .....	32.75
United Soybean Board.....	478	Miscanthus Densification .....	32
Battelle Core Capacity Analysis .....	403.25	Biomass Heating Feasibility Guide.....	32
Minnesota Renewable Energy Roundtable .....	338.5	Performance Assessment of Specific Proteins in	
Discovery 2012 .....	272.25	Livestock Production .....	30.5
Alternative Uses for Wheat and Barley .....	235.75	Development of Bioplastic Products .....	28.5
Corn Fractionation for Value-Added Materials.....	209	Black Carbon Analysis.....	28
Heating the Midwest with Renewable Biomass .....	202.25	Sausage Process Teaching .....	28
Fungal Processing of Thin Stillage .....	188.5	Development of a Fiber Pellet for Feed.....	27.75
Industry Value Chains.....	177.25	Development of Biobased Fire Retardant .....	27.5
Gasification Testing.....	167	Fiber Growth Media Identification.....	26.5
Torrefied Biomass Pellets .....	142.5	Nut Snack Substitute .....	25.75
Biobased Covering Development .....	128	Sensory Analysis Laboratory.....	25.5
Alternative Uses for Corn Stover and Ash .....	116.5	Science Behind Flavor Presentation .....	24.75
Soy-Based Building Materials .....	115.5	Juice Development .....	24
Densification of Wheat Straw for Torrefaction .....	112.25	BBQ Sauce .....	24
Value-Added Flax Straw.....	109.25	Biobased Growth Product Due Diligence .....	23
Biodiesel Troubleshooting .....	100	Biomass Research and Development .....	22.5
PEER2PEER Food Network Facilitation .....	99.75	Litter Shelf Stability .....	22.5
HACCP 2013 Workshops.....	99.5	Health Benefits of Biomass Heat in Turkey Barns.....	22
2013 Meat Lab HACCP.....	99	Adding Value to Corn and Agricultural Bioproducts.....	22
Improved Pellet Processing .....	93.5	Densification of Prairie Grasses.....	22
Sheep Milk Product Development.....	92	Food Hub Resource Assessment .....	21
Performance Assessments of Feed in Livestock Production.....	91.75	Fruit and Vegetable Juice .....	20.5
Fungal Processing of Thin Stillage .....	90.5	Dewatering of Cannery Coproducts .....	20
Litter Reformulation/Evaluation .....	83	Assessment of Proteins .....	20
Biofuels in Minnesota.....	80.5	Healthy Granola Bars.....	19.5
ID of Priority Activities for Low O Development in Minnesota.....	79	Frozen Appetizer.....	19
Mechanical Dewatering Technologies .....	77.25	Identifying Greater Value for Acid Whey Lactose Permeate .....	19
Food Safety Forums.....	77	Dryer Technology Evaluation .....	19
Analysis of Oilseed Meals .....	77	Food Coop Development.....	18.5
Biodiesel Troubleshooting FY13 .....	77	Biobased Pest Deterrents.....	18
Gasification Project .....	68.5	Assessment of the Value of Using Corn Solubles in	
Product Consistency and Shelf Life for Wholesale Process .....	55.75	Swine Feeding .....	18
Ag Residue Performance Evaluation in		Biomass Gasification.....	18
Denitrifying Bioreactors .....	53.25	Corn Protein Plastic for Agricultural Products .....	18
Bakery Assistance .....	51.5	Impact of Reduced-Oil DDGS in Pig Diets .....	18
Value Added Syn-Gas.....	50	All-Purpose Ethnic Sauce.....	17.5
Isolating Galactomannan.....	49.75	Improvement of Colorant of Purple Corn.....	16
Analysis of Pickled Vegetables.....	48	Specialty Milling of Grains .....	16
Dessert Toppings and Sauce .....	46.5	Biodegradable Mat Testing.....	16
Oat Hulls .....	46.5	2013 MN Association of Meat Processors Preparation .....	15
Meat Chip Product Development.....	42.25	Condiment Sauces.....	14.75
Densification of Biochar .....	41.5	Manure Solids/Soil Amendment .....	14.5
Biodiesel Processing Technology .....	40.75	Development of a Corn Starch Fire Retardant.....	14.5
Glycerin Refining .....	40.75	Pet Food Processing .....	14.25
State Specialty Meat Map .....	40	Food Safety Intervention .....	14.25
Coproduct Fertilizer/Feed Opportunity.....	39.5	Compost Expansion Feasibility .....	14
Stone Ground Whole Wheat Flour .....	37.5		

## STATE FY2013: PROJECTS RECEIVING ASSISTANCE (CONT.)

Project Name	Hours Served	Project Name	Hours Served
Comparing Distillers Solubles to Distillers Grains in		Chocolate Macarons.....	8
Pig Liquid Feeding Diets .....	14	Java Soil Amendment Development.....	8
Development of Port-Injected Hydrous.....	14	Phase Feeding of DDGS .....	8
Food Coop Peer-to-Peer Forums .....	13.5	Recovering Valuable Biobased Products .....	8
Development of Instant Breakfast.....	13.5	Micro Carriers Fiber.....	8
Meat Processing Industry Presentations .....	13	Organic Tofu Manufacturing.....	7.25
E85 Promotion.....	13	Local Foods and Cafe .....	7
Vegetarian Burgers .....	12.5	Sensory Evaluation Lab.....	7
Turkey Diets Through Use of Amino Acids.....	12	Biomass Pellet Binder Proof of Concept.....	7
Feasibility Assessment/Glycerin .....	12	Bread Labeling.....	6.5
Implications of Corn Stover Producer Participation Rates.....	11.5	Bison Meat Snack Product Development .....	6.5
Canola Processing Technology.....	11	Allergen Baked Goods .....	6.5
Straw Processing for Value-Added Applications.....	11	Spicy Juice Blend .....	6.5
Peak Power Cost Containment Utilizing Biodiesel Study.....	11	State of Small Meat Processing in MN .....	6.5
Elderberry Coop Development.....	11	Biorefinery for DDGS in Biofuels and Products.....	6.25
HACCP Workshop .....	10.75	Energy from Navy Bean Culls.....	6
Utilization of Turkey Manure to Produce Heat .....	10	Nutritional Facts of Baking Mixes .....	6
Higher Value Uses for Ag Fibers .....	10	Granola Development .....	6
Pet Treat Development.....	10	Gluten-Free Lefse .....	6
DDGS in Dairy Heifer Production.....	10	Validate EC40 Claims for Densification .....	6
Neighborhood Farm .....	10	Beef Metabolism Study .....	6
Nutritional Analysis of Spice Blends .....	9.5	Ethanol Plant Zero Liquid Discharge .....	6
Ginger Beer .....	9.5	Granola Development .....	5.5
Fertilizer/Sugar Coproduct .....	9.5	Increase Biomass Yield .....	5.5
Peak Power Cost Containment Utilizing Biodiesel.....	9	Meats Brochure Updating .....	5.25
Dairy New Product Development.....	9	Wild Rice Pasta Products .....	5.25
Assessment of DDGS in Beef Cattle Rations .....	9	Gluten-Free Frozen Meals .....	5
DDGS Diet and Manure Pit Foam .....	9	Artisanal Vinegary .....	5
Clean Label Alternatives Report .....	8.75	Gluten-Free Baked Products.....	5
Calf Milk Replacer from coproducts .....	8.5	Biobased Dermal Filler .....	5
Ag Fiber/Mushroom Production .....	8.5	Anaerobic Codigestion and Genset Upgrade.....	5
Artisan Breads .....	8.5	Development of Biobased Materials Profile.....	5
Sunflower Oil.....	8.5	Pork Fat Quality .....	5

\*Projects receiving fewer than five hours of assistance are not included in this list.





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