

**IOWA ENERGY CENTER
COMPETITIVE GRANT PROGRAM**

PREVIOUSLY AWARDED IOWA ENERGY CENTER GRANT PROJECTS

Grant Title	Recipient Organization	Project Summary
Shared μ PMUs for Data-Driven, Real-Time Distribution Monitoring, Modeling and Analysis	Iowa State University, Ames	Demonstrate the usefulness of micro-phasor measurement units in MidAmerican Energy systems and provide big data tools for analysis.
Distributed Solar- and Wind-Power Generation Planning in Rural and Underserved Areas	Iowa State University, Ames	Plan for distributed rural solar and wind units with economics, efficiency and sustainability.
Tool Kit for Identification, Characterization and Energy Evaluation of Low-Efficiency Rural Housing	Iowa State University, Ames	Identify least energy-efficient homes and motivations for efficiency investments.
Utility Workforce Assessment and Strategy Planning	University of Northern Iowa, Cedar Falls	Identify issues and develop a plan to impact current and future talent pipeline.
Development of Low-Cost, Safe and High-Performance Sodium Batteries for Wind Energy Storage	Iowa State University, Ames	Develop sodium batteries to cheaply and safely store wind energy to reduce the cost and increase the reliability of electricity.
Wind Turbines in Cold Winter	Iowa State University, Ames	Study wind turbine icing physics and develop novel anti-/deicing strategies to protect Iowa wind turbines in cold winter.
Strategies for Building Soil Carbon and Generating Carbon-Negative Energy in Iowa Counties	Iowa State University, Ames	Advance renewable natural gas and power production using Iowa waste resources.
A New Paradigm to Solve Unit Commitment and Optimal-Power-Flow Problems	Iowa State University, Ames	Optimize dispatch schedules with realistic constraints to lower the cost of a reliable grid.
Wastewater Case Studies to Prove Ratepayer Benefits in Underserved Iowa Communities	Baldrige Environmental Services, West Branch	Prove the affordability of meeting the Department of Natural Resources' regulations with civil engineers' oversight while saving energy.
Smart Peak-Power Avoidance	Iowa State University, Ames	Optimize the operation and management of energy-intensive in-barn manure drying systems.
Iowa Rural Energy Planning	University of Northern Iowa, Cedar Falls	Create workforce development for 20 employees in various energy career fields.
Paired Electrolyzer for Conversion of Crude Glycerin and Waste CO ₂	Iowa State University, Ames	Create an electrolyzer powered by renewable electricity for conversion of glycerin and carbon dioxide to valuable chemicals.
Developing an Iowa Energy Curriculum for Secondary Classrooms	University of Northern Iowa, Cedar Falls	Develop and disseminate an energy curriculum (with career connections) for Iowa secondary students.
Low-Cost Biobased Composite Material for Ultra-Durable and Recyclable Wind-Turbine Blades	Iowa State University, Ames	Develop low-cost, biobased, recyclable turbine blade material with high durability.

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An Origami Structural Design for Natural Gas Pipeline Rehabilitation	Iowa State University, Ames	Prevent future pipeline leakages using a novel origami design of the liners.
Iowa Rural Health Care Micro-Grid Feasibility Analysis	The Energy Group, Des Moines	Analyze islandable technologies to determine the cost effectiveness of distributed generation.
Grow Energy Workforce Development Program for Rural Iowa Communities	Energy Association of Iowa Schools, Urbandale	Offer workforce energy training and certification for students and building operators in rural southwest Iowa.
Storing Excess Solar/Wind Electricity as Biorenewable Fuels by Electrocatalytic Biomass Conversion	Iowa State University, Ames	Develop a technology to store the intermittent solar/wind electricity as biofuels.
Predicting Battery Lifetime with Early-Life Data for Grid Applications	Iowa State University, Ames	Develop and teach a software tool for improving prediction of battery lifetime.
Improve Battery Energy Efficiency via Structural Design and 3D Printing for Electric Vehicles	Iowa State University, Ames	Create a novel structure of all-solid-state electric vehicle battery and apply 3D printing to manufacture it.
Mobile Power for Rural Wastewater Treatment and Community Resiliency	Baldrige Environmental Services, West Branch	Create a mobile power trailer/unit for innovative small-town wastewater treatment, powered by solar/battery storage to increase resilience.
Building Enclosure Council of Iowa Educational Programs	Building Enclosure Council of Iowa, Des Moines	Plan five Building Science educational events per year, including one large event that has multiple subjects.
Developing a Pilot-Scale Business Model for Monetizing Carbon Capture on Solar-Energy Farms	Impact7G, Johnston	Create a business model for monetizing carbon capture on utility-scale solar energy farms on reclaimed land.
GIS Tool to Plan Mitigation and Recovery of Gridlines Under Natural Hazards to Improve Resiliency	Iowa State University, Ames	Develop a geographic information system mapping tool for planning mitigation and enhancing situational awareness of power utilities.
Artificial Intelligence-Assisted Robotic Mapping of Underground Infrastructure	Iowa State University, Ames	Develop an artificial-intelligence robot platform to automate mapping of underground infrastructure.
From the Landfill to the Grid: Repurposing Used Batteries for Resilient Grid Storage	Iowa State University, Ames	Refurbish spent lithium-ion batteries for second-life applications on the electric power grid.
Control and Coordination of Solar+Storage for Enhanced Resiliency	Iowa State University, Ames	Enhance grid resiliency by control of solar plants/devices with storage.
Micro-DERMS: DERMS for Real-Time Monitoring and Control of Mobile Microgrids and DER Distribution Grid	Iowa State University, Ames	Develop a cost-effective technology to integrate renewables into utility data systems.
Advanced 3D Optical Sensing and Peening Technologies for Crack Mitigation in Natural Gas Pipelines	Iowa State University, Ames	Develop a preservice inspection and crack mitigation solution for gas pipelines.
Electrical Energy from Ethanol	University of Iowa, Iowa City	Create electricity from ethanol by creating low-cost, scalable ethanol fuel cell systems.
Modeling Solar Radiation Potential and Urban Heat Utilizing Mobile Sensors and Topographic Data	University of Northern Iowa, Cedar Falls	Create detailed solar radiation and urban temperature maps across Iowa with web-based dissemination.

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Driving Electric in Rural NE Iowa: An Analysis, Planning, Workforce and Major-Employer Partnership	Winneshiek Energy District, Decorah	Create an electric vehicle prosperity collaborative for communities, employers, workers and individuals in northeast Iowa.
Recycling of Used and End-of-Life Li-Ion Batteries to Extract Lithium, Anode and Cathode Materials	Iowa State University, Ames	Develop a scalable recycling process for sustainable recovery of critical materials from lithium-ion batteries.
Mining Smart Meter Data for Modeling and Mitigating EV Charging Impacts to Distribution Grids	Iowa State University, Ames	Study model electric vehicle charging impacts on distribution systems for better infrastructure planning and operation.
Continuous Thermal-to-Electrical Harvesting from Industrial and Residential Waste Heat	Legov Systems Group, Nevada	Scale up an energy harvester for continuous operation and pilot scale testing.
Laser Surface Engineering of Natural Gas Pipelines for Extended Service Life	Iowa State University, Ames	Develop laser surface engineering technologies to extend pipeline service life.
AI-guided Lignin Valorization to Make Biobased Batteries Through Interfacial Engineering for Waste-to-Wealth Conversion	Iowa State University, Ames	Create an artificial intelligence-guided biobattery to replace Nafion, widely used as a proton conductor for fuel cells.
Modernization of Protection and Stability Techniques for 100% Clean Electricity	Iowa State University, Ames	Develop new protection and stability advances for reliable operation of a 100%-clean Iowa grid.
Resilient Iowa Communities Rural Support	University of Northern Iowa, Cedar Falls	Engage 10 to 12 rural Iowa towns in an energy assessment and implementation project.
Development of Functionalized Nanocomposite Membranes for the Selective, High-Capacity Recovery of Critical Materials for a Clean-Energy Transition	University of Iowa, Iowa City	Create new materials for the recovery of lithium, a critical resource for renewable energy.
A Low-Cost, Bioinspired Hydroelectric System for Utilizing Untapped Riverine Hydropower in Iowa	Iowa State University, Ames	Develop a low-cost hydroelectric system for utilizing Iowa's untapped riverine power.
3D Bioprinting of Microbial Biofilms for Gas Pipeline Corrosion Prevention	Iowa State University, Ames	Develop a 3D-printed anticorrosion biofilm coating for underground pipelines.