Environment and Natural Resources Trust Fund

2023 Request for Proposal

General Information

Proposal ID: 2023-193

Proposal Title: The Distributed Energy Resource Innovation Initiative

Project Manager Information

Name: Gabriel Chan

Organization: U of MN - Humphrey School of Public Affairs

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Project Basic Information

Project Summary: A research-informed collaborative technology accelerator where iterative piloting, researching, and learning feeds into the decarbonization, electrification, and distributed energy goals of Great River Energy's 28 member utilities.

Funds Requested: $408,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Air Quality, Climate Change, and Renewable Energy (E)

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Building a carbon-neutral Minnesota will require rapidly scaling clean, affordable, and reliable energy across all sectors of the state. It will mean transitioning sectors historically reliant on fossil fuels to electricity and other clean energy sources. New electric end uses and distributed energy resources (DERs), like solar, storage, heat pumps, and electric vehicles, open up new possibilities for creating added value for GRE's member-owner consumers. But new technologies also present challenges for managing the distributional equities of decarbonization between benefits to the energy system, benefits to the utility, and benefits to both adopting and non-adopting consumers. Even as wholesale markets begin to make rules to integrate DERs, the implementation and governance gap leaves utilities like the GRE co-ops struggling to establish the organizational management strategies to integrate DERs with monitoring, controls, equity, and administrative capacities, all the while remaining accountable to their members across Minnesota. Additionally, as legacy technologies like centralized power plants, transmission lines, and fossil-fuel heating and transportation still serve vital needs to members, there remain serious questions about how to scale, steer, target, and pace the transition of DER technologies over time in the GRE family.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

We propose to develop the Distributed Energy Resource Innovation Initiative (DERII), a first-of-its-kind research platform for electric utility-university engagement. DERII seeks to drive utility business-model innovation and clean energy deployment through a research-informed collaborative technology accelerator with Minnesota's second-largest utility, Great River Energy (GRE), and its network of 28 member electric cooperatives that together serve 720,000 energy consumers across the majority of rural Minnesota. Specifically, our proposal will help build the requisite management and organizational capacity within GRE and its member co-ops through partnership with researchers and extension professionals that can support the rapid integration of new DER technologies.

DERII's engaged research approach will build iterative analysis and peer learning into new clean-energy deployment pilots that will support the equitable decarbonization of the power, heating, and transportation sectors in GRE's system. DERs create significant needs for broad coordination and could have the potential for disproportionate impact on rural communities. DERII will develop the organizational practices and technology-integration and management approaches that will position rural electric utilities to be at the heart of Minnesota's path to an equitable, carbon-neutral future. Rural electric utilities are key organizations that can determine whether decarbonization happens *with* Minnesota communities instead of *to* Minnesota communities.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

This project seeks to 1) increase the deployment of DERs and associated technologies across the GRE system, 2) find scalable knowledge and business models, and 3) foster new cooperative pathways for innovation. These outcomes relate to how DERs like electric vehicles and electric heating through heat pumps will be essential to emissions reduction efforts. DERs in efficiency help decrease the waste of the energy system. Load control of other DERs like energy storage and water heaters help balance the variability of increasing amounts of renewable energy. DERs also reduce land resource requirements as compared to larger-scale generation and grid resources.

Activities and Milestones

Activity 1: Develop accelerator program, learning platform, and outreach materials

Activity Budget: $204,000

Activity Description:
DERII itself will begin in 2023 as a novel, non-standard utility business model and technology accelerator for the 28 co-ops of GRE. Testing out new rules, technologies, and ideas for implementation, the platform will result in annual innovations in DER technologies.

For DERII, this funding will enable three essential activities. First, it will help fund a DER potential study for the GRE co-ops, creating a baseline and maximum achievable DER penetration levels across the GRE system. Second, after the DERII platform has run pilots, it will fund evaluation of the early pilots after the first and third years of the program. From these evaluations, the Clean Energy Resource Teams (CERTs) will work with GRE to create educational materials for other co-ops and their members to learn from the pilots. Finally, after the platform has run for two cycles, DERII can be evaluated on a program wide basis by a third party, in order that the program should evolve over time.

Activity Milestones:

Description	Completion Date
Create DER potential study	December 31, 2023
Evaluate initial DERII pilots and create initial cross co-op outreach	May 31, 2024
Evaluate additional DERII pilots and create initial cross co-op outreach	May 31, 2025
Evaluate DERII programs and create initial external outreach	May 31, 2026

Activity 2: Conduct research

Activity Budget: $204,000

Activity Description:
Research at the University of Minnesota will detail the processes and models that dictate DER growth and maintenance in GRE's electric cooperative system. First, the research will continue at the outset as a real-time sequence analysis of important events across the GRE family of 28 co-ops, relating how a system of actors can coordinate in the wake of new DER technologies and form an energy transition. Initial results from the sequence analysis will be available in 2026, and will be used for the life of the partnership with GRE. Second, the researchers will begin detailing DER business model opportunities and examples across the GRE system of cooperatives, supplementing with outstanding outside sources of cooperative business models across the nation. Third, in conducting the sequence analysis, the research team will begin to estimate the costs of different processes associated with DER diffusion and dissemination. Concluding in its initial stages in 2025, this third stream of analysis will help provide per customer, kilowatt, and kilowatt-hour estimates that the co-ops within GRE can help pool to create and maintain a vibrant pool of DER resources.

Activity Milestones:

Description	Completion Date
Create business model database of DERs among GRE member co-ops, outside sources	May 31, 2024
Create initial estimates for costs of diffusion, dissemination of different DER classes and business models	May 31, 2025
Develop initial sequence analysis of DER policymaking and installation across GRE system	May 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Lissa Pawlisch	Clean Energy Resource Teams	staff support for expertise, consulting, facilitation, project direction	Yes
Jeff Haase	Great River Energy	point of contact for Great River Energy (GRE), internal champion at GRE, utility coordinator	No

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

The Distributed Energy Resource Innovation Initiative (DERII) will involve deep collaboration between utility staff at Great River Energy, researchers at the University of Minnesota, and extension professionals at the Clean Energy Resource Teams. Through the three-year project, our three organizations will build the DERII platform to support continued innovation within GRE and its member cooperatives. The outcomes of DERII will support GRE's long-term implementation of clean energy technologies through the development of new management and organizational strategies to deploy social, technical, and financial resources to support distributed clean energy technologies.

Project Manager and Organization Qualifications

Project Manager Name: Gabriel Chan

Job Title: Associate Professor

Provide description of the project manager's qualifications to manage the proposed project.

Gabriel Chan is an Associate Professor at the Humphrey School of Public Affairs with over 10 years of experience researching energy and climate policy. Professor Chan's research focuses on consumer-owned utilities, state and national renewable energy policies, community solar programs, energy innovation, and international climate and sustainable development policy. His writing has appeared in publications such as The Electricity Journal, Nature, The Proceedings of the National Academies of Science, and The Energy Journal.

Professor Chan is the Co-Director of the Center for Science, Technology, and Environmental Policy (CSTEP) at the University of Minnesota. CSTEP is a nationally recognized academic research center that fosters interdisciplinary and community-engaged research on human well-being, environmental sustainability, and social justice in a complex and diverse world. CSTEP conducts public engagement with external partners, develops environmental leadership, and facilitates solutions-oriented projects at the nexus of science, technology, and environmental policy.

Professor Chan is also the Co-Director of the Electric Cooperative Innovation Center (ECIC). ECIC is an engaged research center based at the University of Minnesota and University of California-Davis. ECIC builds strategic partnerships between electric cooperatives and universities to develop actionable research grounded in the realities of cooperatives that is independent, rigorous, and transparent. ECIC has partnered with rural electric cooperative utilities in Minnesota, South Dakota, South Carolina, and other regions of the country. It is the premier university-based research center for rigorous analysis to support energy transition with rural communities.

Chan is also an Affiliate Faculty member at the Law School at the University of Minnesota-Twin Cities and a Faculty Associate at the Institute on the Environment (IonE) at the University of Minnesota. Chan has a PhD in Public Policy from Harvard University and a B.S. in Political Science and in Earth, Atmospheric, and Planetary Science from M.I.T.

Organization: U of MN - Humphrey School of Public Affairs

Organization Description:
The Humphrey School of Public Affairs at the University of Minnesota ranks among the country's top 10 professional public policy and planning schools, widely recognized for its success in advancing the common good through a comprehensive, world-class program. The School offers six distinctive master's degrees, a doctoral degree, and six certificate programs that match students' passion with the knowledge, skills, and experience needed to solve real-world challenges.

The mission of the Humphrey School of Public Affairs is to inspire, educate, and support innovative leaders to advance the common good in a diverse world.

Long noted for equipping students to play key roles in public life at the local, state, national, and global levels, the Humphrey School is respected for its role in shaping public policy, its focus on social justice and human rights, and its expertise in planning, leadership, and management.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Gabe Chan		PI			33.5%	0.24		$52,218
Matthew Grimley		Researcher			33.5%	0.75		$60,282
To Be Named		Grad Research Assistant - Academic Year			116.2%	0.57		$58,172
To Be Named		Graduate Research Assistant -Summer Session			23.6%	0.18		$10,932
Lissa Pawlisch		Co-PI			33.5%	0.21		$28,434
Joel Haskard		Education Program Specialist			33%	0.09		$7,738
Alexis Troshcinetz		Researcher			33%	0.24		$22,230
Maggie Kozek		Exec Ofc & Adm Specialist			28.7%	0.03		$2,610
Shaylyn Bernhardt		Comm Relations/OR Specialist			33.5%	0.03		$1,679
To Be Named		Rural Energy Dev Manager			33.5%	18		$16,227
							Sub Total	**$260,522**
Contracts and Services								
Northeast	Professional or Technical Service Contract	Northeast, cost estimated at $2,400 per year for three years. Salary support for professional extension/outreach staff based in Northeast Minnesota to support on-the-ground outreach and engagement with rural utilities and member-consumers in Northeast Minnesota				0		$7,200
Great Plains Institute	Professional or Technical Service Contract	Great Plains Institute, cost estimated at $4,800 per year for three years. Salary support for professional extension/outreach staff based in the Twin Cities Metro area to support on-the-ground outreach and engagement with rural utilities and member-consumers in the Twin Cities Metro area				0		$14,400

West Central	Professional or Technical Service Contract	West Central, cost estimated at $2,400 per year for three years. Salary support for professional extension/outreach staff based in the West Central Minnesota to support on-the-ground outreach and engagement with rural utilities and member-consumers in West Central Minnesota				0		$7,200
Distributed Energy Resource Potential Study	Professional or Technical Service Contract	Distributed Energy Resource Potential Study, cost estimated at $50,000 in year one and two. Contracted support for a consultant with expertise in energy-system modelling to conduct a technical potential study of distributed energy resources in Great River Energy's system				0		$100,000
							Sub Total	**$128,800**
Equipment, Tools, and Supplies								
	Tools and Supplies	Food: Light refreshments for forums and convenings $800 per year for 3 years. total costs $2,400	Meetings with rural utility staff and member-consumers to build input and reflection on distributed energy resources					$2,400
							Sub Total	**$2,400**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Mileage @ $.585/mile to meetings. Cost estimated at $1,000 each year for three years. Total cost $3,000	Meetings with utilities and community events for CERTs staff.					$3,000
							Sub Total	**$3,000**

Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	Conference travel for PI, Co-PI and/or Researcher at a major conference pertinent for rural utility innovation idea sharing, cost estimated at ~$1,050 per traveler for three travelers each year for three years. Total cost $9,484	To exchange ideas and learn from other rural utility networks in the country to support innovation practices in the Great River Energy system.					$9,378
							Sub Total	**$9,378**
Printing and Publication								
	Printing	Printing of outreach materials, energy data handouts, event & campaign related materials $300 per year for three years. Total costs $900	Development of communication and outreach materials related to findings on distributed energy resource innovation					$900
							Sub Total	**$900**
Other Expenses								
		Stipends for focus group participants estimated at $1,000 per year for three years. Total costs $3,000	To compensate rural utility member-consumers for their participation in focus groups related to distributed energy resource innovation.					$3,000
							Sub Total	**$3,000**
							Grand Total	**$408,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**-**

Attachments

Required Attachments

Visual Component

File: d7242a8e-3a3.pdf

Alternate Text for Visual Component

Visual Component: The Distributed Energy Resource Innovation Initiative (DERII) integrates "doing," "research," and "learning" across Great River Energy's member network that serves the majority of rural Minnesota. As GRE transitions its power supply mix, DERII will help explore how distributed energy resources can create value for GRE's member-consumers....

Optional Attachments

Support Letter or Other

Title	File
Letter of Institutional Endorsement	9a06f949-12e.pdf
UMN Financial Statement	346b0ae9-99e.pdf
Letter of Support - Clean Energy Resource Teams	eca228a7-333.pdf
Letter of Support - Great River Energy	ce66f71c-74c.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

Yes

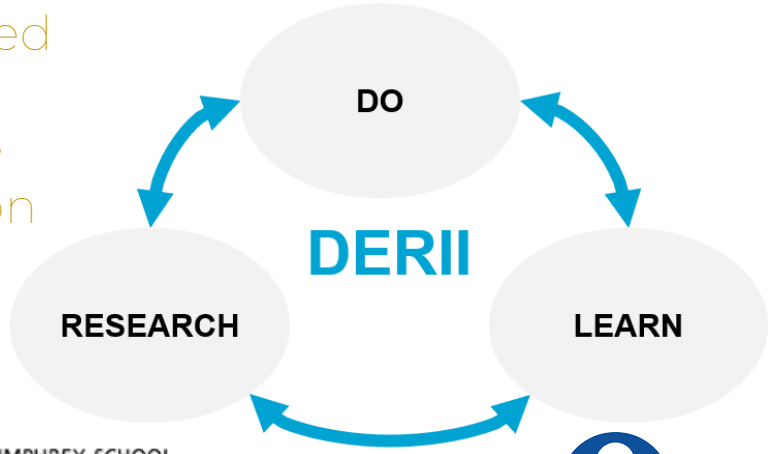
Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

DERII

Distributed Energy Resource Innovation Initiative

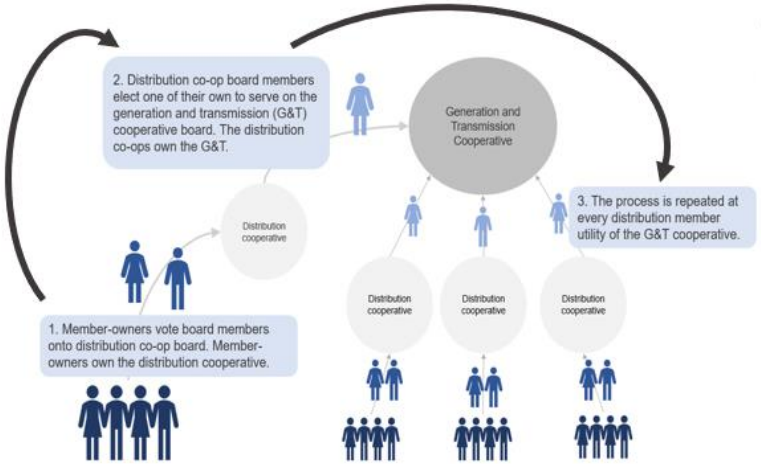
GREAT RIVER ENERGY™

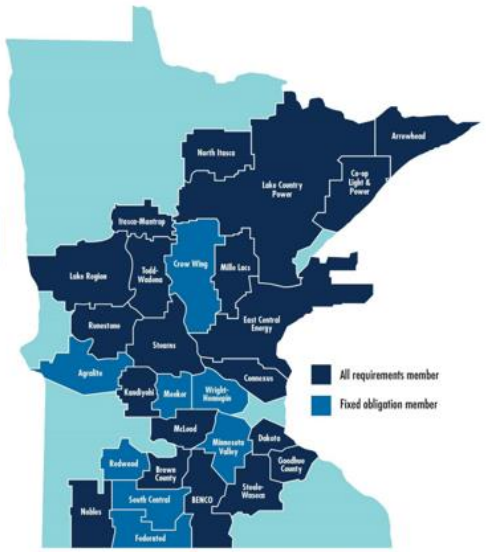


HUMPHREY SCHOOL OF PUBLIC AFFAIRS
UNIVERSITY OF MINNESOTA

CERTs
CLEAN ENERGY RESOURCE TEAMS

A majority of rural Minnesota is served by GRE's 28 member cooperatives. Distributed energy resources can create value across the levels of GRE.





Great River Energy's power supply mix is projected to transition rapidly from majority coal-based generation in 2020 to majority renewable generation by 2025.

But what role can distributed energy resources play in supporting this transition and creating value for GRE's member-consumers?

Great River Energy's Power Supply Mix: 2020 - 2025