

Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-236

Proposal Title: Demonstrating the Resiliency of a 40kW Solar Array

Project Manager Information

Name: Katy Chapman Organization: U of MN - Crookston Office Telephone: (218) 281-8262 Email: katys@crk.umn.edu

Project Basic Information

Project Summary: We seek to create a solar and pollinator garden in order to design a curriculum at the K-12 and post-secondary level to engage rural MN students in the STEM field.

Funds Requested: \$200,000

Proposed Project Completion: July 31, 2026

LCCMR Funding Category: Small Projects (H) Secondary Category: Environmental Education (C)

Project Location

What is the best scale for describing where your work will take place? Region(s): NW

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

When will the work impact occur?

In the Future

Narrative

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

With the new 100% clean energy bill being passed in Minnesota, this law requires 100% of the energy used in Minnesota to be carbon free by 2040. Additionally, the U of M has committed to climate neutrality by 2050. Thus, there will be a great energy transition in the state of Minnesota in the near future. Cities and organizations will need guidance as to how to make these transitions and we will need more trained professionals as the clean energy field will be growing. At present there is a dearth of curriculum in the rural k-12 system and post secondary education level.

We are seeking to use this project as both a demonstration project and to also create a unique collaborative between K-12 and higher education. This unique partnership with the RREAL will be enhanced through the UMC's Center for Rural Education in Science and Technology (CREST) program. The role of CREST is two fold: the first is to develop curriculum for k-12 science teachers; and the second is to provide both on and off-campus educational opportunities to train them into these emerging energy sources and high paying career fields.

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.

This project seeks to demonstrate that a solar field can be installed and the electricity savings can be used to generate a fund for the ongoing maintenance and decommissioning of those panels over their usable life for the purpose of creating a K-12 and post secondary education component to serve our community. In addition to demonstrating the feasibility of a solar garden, we also propose to demonstrate the land under ground mounted solar systems can be used as a pollinator habitat which would have community and educational benefits.

The formation of the unique partnership between RREAL and CREST will enable the k-12 programming to be expanded to other Minnesota schools. The clean energy and pollinator curriculum can also be incorporated into our MN concurrent enrollment schools.

The installation of a solar garden at the University of Minnesota Crookston (UMC) would allow creation of an account for the ongoing maintenance and decommissioning of the solar garden. Successful creation of this fund will demonstrate the financial feasibility of solar gardens in the Crookston community. Any funds that are not required for the maintenance and decommissioning will be placed into a fund to be used for student internships related to sustainability of UMC.

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?

The outcomes of the project are 1) design a curriculum for students to enter into these emerging and high paying career fields 2) reduce the carbon footprint of the UMC campus through installing a ground mounted 40kW solar arrays 3) create pollinator habitats within the ground mounted solar arrays that could be utilized as dual purpose educational tools (benefits of renewable energy, pollinator habitats and pollinators) for local schools and a resource for local beekeepers and 4) demonstrate savings from the solar garden can be used for maintenance and end of life decommissioning, and use remaining to continue sustainability efforts.

Activities and Milestones

Activity 1: Purchasing and Installing a 40kW Solar Array and pollinator garden to be located on the west side of the University Teaching

Activity Budget: \$184,000

Activity Description:

This installation will be achieved through a competitive bid process. The bidding process will follow University of Minnesota procurement guidelines, which includes but is not limited to purchasing from targeted minority and women owned businesses.

The outcome of installing a solar array and pollination garden at this location would be to lower the carbon footprint, and save money on energy that will then be put into the solar savings account for Activity 3 (see below). Additionally, the location is highly visible both by the local community and the traveling-through community. Another benefit of the proposed demonstration is that the site location makes it optimal to conduct k-12 and post secondary site visits, as the facility will be adjacent to the UMC campus (refer to Activity 2).

The solar and pollination garden is also meant to serve as a demonstration model to allow for a further collaboration between the city and public school district. This partnership could create a model for other communities as we all move towards a fully sustainable future.

Activity Milestones:

Description	Approximate
	Completion Date
Competed installation of 40kW array and pollinator garden	October 31, 2025

Activity 2: Provide education for students in K-12 and college to learn about solar (and clean) energy and pollinator habitats.

Activity Budget: \$12,000

Activity Description:

UMC and the regional K-12 school system would benefit from the (K-8) renewable energy curriculum that has been developed by RREAL (https://www.rreal.org/knowledge-is-power). This could be incorporated into sustainability classes as well as general biology, economics, and chemistry courses. RREAL and UMC will also collaborate to expand the curriculum into the grades 9-12. UMC has a program called CREST in which we engage (K-12) students across northwest Minnesota with the STEM curriculum.

Biology and Entomology, at UMC, are just two courses that would incorporate additional pollinator curriculum, if there was a pollinator garden. Having these pollinator habitats in the Crookston community would not only offer opportunities for Crookston students, but also for students that travel to Crookston to participate in the CREST program.

The outcomes of this activity would be increased awareness of not only the benefits of solar arrays in providing energy, but also getting the community to understand that the land under the solar arrays is not wasted, and can be used not only for the benefit of our pollinator friends, but also can provide an economic benefit through the use of commercial bee keeping and the pollination services provided by pollinators.

Activity Milestones:

Description	Approximate Completion Date
Produce 9-12 Curriculum	July 31, 2025
Produce Higher Education Curriculum	July 31, 2025
Disseminate 9-12 and higher education curriculum through UMC	March 31, 2026

Activity 3: To create a solar savings account to use for maintenance, decommissioning, and future sustainability projects.

Activity Budget: \$4,000

Activity Description:

UMC will earmark savings from the installation of the solar garden for maintenance and decommissioning of the panels at the end of life along with creating a sustainability fund for ongoing sustainability projects on campus. This will take the form of projects and student internships to work on these projects (ex. Expanding composting program, sustainability through sports, GreenStep Cities Intern, education of the campus community, engagement of the campus and local community). This account will be jointly managed by UMC Facilities and Operations and the Center for Sustainability. This fund will be used to demonstrate to the local city and schools what can be done with savings from the installation of a solar garden.

Activity Milestones:

Description	Approximate
	Completion Date
Hire Interns	October 31, 2025
Documentation of Savings	July 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Shannon	NWRSDP	Collaborator	No
Stassen	University of		
	Minnesota		
John Vaughn	Rural	Collaborator	No
	Renewable		
	Energy		
	Alliance		

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?

All equipment will be used for the same program throughout its useful life. The savings provided by the solar panels will be used for the ongoing maintenance and implementation of ongoing sustainability projects. This new facility will continue to be used for educational purposes throughout the useful life of the panels. Findings and results will be disseminated through our project partners, particularly with Shannon Stassens' role in extension activities related to sustainability and clean energy.

RREAL has developed a K-8 solar curriculum and has agreed to create 9-12 and higher education solar education and workforce development component in Crookston.

Project Manager and Organization Qualifications

Project Manager Name: Katy Chapman

Job Title: Sustainability Director and Associate Professor

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

Dr. Katy Chapman has served as the Sustainability Director at the University of Minnesota Crookston (UMC) for 6 years and has been a Environmental Science faculty member at UMC for 15 years. She has worked closely with the UMC facilities and operations to design and implement a number of sustainability related projects. Because Dr. Chapman is a faculty member she is able to use projects that improve campus sustainability for educational purposes both in her classes and through outreach activities with k-12 schools. For example, she has hosted several student groups interested in learning about solar energy and brought them up to the roof of the Wellness Center where the only solar field at UMC is located. She worked with UMC to install a bee lawn on campus and has since brought classes out every Fall to monitor the development of that bee lawn and the species of pollinators attracted to campus as a result of installing that bee lawn.

Dr. Chapman holds a Ph.D. in Agronomy from Purdue University. Her Ph.D. is in the field of phytoremediation, which is utilizing plants to remove contaminants from the environment. Additionally, her post-doctoral work was focused on monitoring greenhouse gas emissions from agricultural soils. During her time at UMC Dr. Chapman has served as the principle investigator for a number of projects and has successfully navigated project management.

Shannon Stassen is the Northwest Regional Development Sustainability Partnership (RSDP) Director for the region. Shannon also served as the city administrator for the city of Crookston for a number of years and thus is well posited to create partnerships within the Crookston community. Shannon's role will be instrumental in disseminating the results of this demonstration project to the greater community including the Crookston Public Schools and the City of Crookston.

Organization: U of MN - Crookston

Organization Description:

The University of Minnesota Crookston (UMC) is one of the campuses of the University of Minnesota (UM) system. The UM system recently included sustainability as part of it's MPact 2025 strategic plan in which all of the campuses are charged with reaching climate neutrality by 2050 along with increasing sustainability related education of our graduates. As the land grant University for the state of Minnesota, we also have the responsibility to provide expertise to our communities in ways that are beneficial. Increasing energy resiliency for the state is an urgent issue as nonrenewable resources of energy are not only not an asset of our state, but it is known that fossil fuel reserves have a limited lifespan and contribute to urgent climate change issues. Thus, providing information to communities in Minnesota as to how they can navigate the energy transition is a critical role for the University. UMC is a four-year, public university with an enrollment of more than 1,400 students (approximately 600 on campus and 900 online), UMN Crookston proudly carries on a tradition of over a century of educational service to Northwestern Minnesota.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineli	% Bene	# FTE	Class ified	\$ Amount
				gible	fits		Staff?	
Personnel								
Project Manager/Principal Investigator		Project Manager			37%	0.18		\$18,000
Student Interns		Solar Education and Workforce Training			0%	0.26		\$4,000
							Sub Total	\$22,000
Contracts and Services								
TBD	Professional or Technical Service Contract	Installation of Solar Array				0		\$40,000
Installation of Pollinator Gardens	Professional or Technical Service Contract	Site Prep and Installation of Pollinator Garden under the solar aray				0		\$3,000
							Sub Total	\$43,000
Equipment, Tools, and Supplies								
	Tools and Supplies	Mulch and Seeds	To install Pollinator Garden					\$4,000
							Sub Total	\$4,000
Capital Expenditures								
		Solar Array System 40 kW and Grid tie	To have solar panels and tie into grid	Х				\$42,000
		Mounting System	Ground Mounted Solar System	Х				\$26,000
		 (2) Schneider Conext Mppt 100a-60V solar charge contoller; (2) 20kW fronius symo advanced 20.0-3 480V 3-phase string inventer grid tie; including breaker, copper PV 	Electrical equipment and tie in system	X				\$20,000
		(18) EG4 LL Lithium Battery 48v 1090AH 3 stacks three wheel cart	To store energy (Optional)	X				\$43,000
							Sub Total	\$131,000

Acquisitions and					
Stewardship					
				Sub	-
				Total	
Travel In					
Minnesota					
				Sub	-
				Total	
Travel Outside					
Minnesota					
				Sub	-
				Total	
Printing and					
Publication					
				Sub	-
				Total	
Other Expenses					
				Sub	-
				Total	
				Grand	\$200,000
				Total	

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Capital Expenditures		Solar Array System 40 kW and Grid tie	Will be used for demonstration and education on the resiliency of solar arrays Additional Explanation : All equipment will be used for the same program throughout its useful life.
Capital Expenditures		Mounting System	Will be used for demonstration and education on the resiliency of solar arrays Additional Explanation : All equipment will be used for the same program throughout its useful life.
Capital Expenditures		 (2) Schneider Conext Mppt 100a-60V solar charge contoller; (2) 20kW fronius symo advanced 20.0-3 480V 3-phase string inventer grid tie; including breaker, copper PV 	Will be used for demonstration and education on the resiliency of solar arrays Additional Explanation : All equipment will be used for the same program throughout its useful life.
Capital Expenditures		(18) EG4 LL Lithium Battery 48v 1090AH 3 stacks three wheel cart	Will be used for demonstration and education on the resiliency of solar arrays Additional Explanation : All equipment will be used for the same program throughout its useful life.

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: <u>be4f0dd8-951.docx</u>

Alternate Text for Visual Component map of site...

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Letter of Support	<u>a0489135-da4.docx</u>
Letter of Intent	7200d729-5e4.docx
Approved Proposal	<u>2a72a93f-9cb.docx</u>

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? $$\rm N/A$$
- 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?

No

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

Does your project include the design, construction, or renovation of a building, trail, campground, or other capital asset costing \$10,000 or more?

Yes

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services, as defined in Minnesota Statutes section 299C.61 Subd.7?

Yes

Do you certify that background checks are performed for background check crimes, as defined in Minnesota Statutes, section 299C.61, Subd. 2, on all employees, contractors, and volunteers who have or may have access to a child to whom children's services are provided by your organization?

Yes