



# Environment and Natural Resources Trust Fund

2027 Request for Proposal

## General Information

**Proposal ID:** 2027-335

**Proposal Title:** RENEW-MN Renewable Energy Workforce Network – Minnesota

## Project Manager Information

**Name:** Jacob Swanson

**Organization:** Minnesota State Colleges and Universities - Minnesota State University Mankato

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## Project Basic Information

**Project Summary:** RENEW-MN creates a statewide Renewable Energy Workforce Network that solicits real renewable energy projects from industry and educates undergraduate engineers through applied, experiential learning to accelerate Minnesota's clean energy future.

**ENRTF Funds Requested:** \$445,000

**Proposed Project Completion:** June 30, 2030

**LCCMR Funding Category:** 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.**

The Minnesota Climate Action Framework has established ambitious renewable energy and decarbonization goals, including a transition to carbon-free electricity by 2040, yet successful implementation depends on a local workforce capable of designing, integrating, optimizing, and evaluating clean renewable energy systems that protect Minnesota's natural resources. While renewable technologies continue to advance, workforce preparation has not kept pace with the multidisciplinary demands of successful implementation. Industry does not hire "solar students" or "wind power" graduates; it hires engineers and technologists who understand the complex interplay between systems and context who can design mechanical systems, integrate electrical infrastructure, assess environmental impacts, conduct economic analysis, and support implementation across agricultural, industrial, municipal, and tribal settings. At present, Minnesota utilities, manufacturers, agricultural producers, tribes, and local governments face renewable energy challenges that require applied engineering expertise but lack structured pathways to connect those needs with existing workforce training. As a result, renewable implementation capacity is constrained, projects are delayed or outsourced, and students graduate without direct experience solving real renewable energy problems tied to Minnesota's natural resource priorities. Recognizing these issues, there is an opportunity to create coordinated, statewide infrastructure that aligns renewable energy project needs with experiential engineering education

### **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.**

Minnesota's renewable energy transition requires engineers and technologists capable of designing, integrating, evaluating, and optimizing renewable energy systems that protect Minnesota's natural resources. While policy and technology continue to advance, workforce capacity remains a limiting factor in renewable energy deployment. Thus, RENEW-MN (Renewable Energy Workforce Network – Minnesota) will establish a statewide clearinghouse that solicits renewable energy challenges in the form of student projects from utilities, tribes, manufacturers, agricultural producers, and businesses. Special outreach will encourage participation from small and early-stage entities, rural companies, and businesses owned by underrepresented individuals to ensure that growing Minnesota businesses can access engineering expertise to support their renewable energy initiatives. Projects will be vetted by a faculty advisory board for technical rigor and environmental relevance, then distributed to multidisciplinary undergraduate teams across three engineering education hubs (Metro-Twin Cities Engineering, South-Mankato main campus, and North-Iron Range Engineering). Each project will receive seed funding to support prototyping, field validation, modeling, and/or performance evaluation depending on the nature of the project. Students in mechanical, electrical, manufacturing, environmental, automotive, and related disciplines will complete applied renewable energy projects during the academic year, producing real deliverables for industry partners. RENEW-MN will document project outcomes and track workforce placement

### **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?**

RENEW-MN will accelerate protection of Minnesota's natural resources by increasing the number of engineers prepared to implement renewable energy systems that reduce emissions, improve energy efficiency, and support resilient infrastructure. Over three years, the project will complete approximately 30 applied renewable energy projects addressing solar integration, energy storage, electrification, renewable fuels, and resource monitoring. These projects will generate validated technical solutions and trained graduates ready to support renewable deployment statewide. Further, by strengthening implementation capacity, RENEW-MN directly advances conservation of air quality, water resources, land use, and ecosystem health.

## Activities and Milestones

### Activity 1: Activity 1: Establish RENEW-MN Renewable Energy Project Clearinghouse and Intake Portal

**Activity Budget:** \$80,000

**Activity Description:**

RENEW-MN will establish a centralized Renewable Energy Workforce Network housed at the Twin Cities campus to solicit, vet, and distribute renewable energy projects statewide. A public intake portal will be developed to receive project proposals from utilities, tribes, municipalities, manufacturers, agricultural producers, and community partners. Projects will be screened for renewable energy relevance, technical rigor, and measurable environmental benefit such as emissions reduction, efficiency improvement, renewable integration, resource protection. A multidisciplinary faculty advisory panel will review submissions as often as needed and select projects for seed funding and distribution to participating campuses. Standardized project criteria, reporting templates, and environmental impact documentation requirements will be created to ensure consistency. This activity establishes durable statewide infrastructure that aligns renewable energy challenges with undergraduate engineering expertise, creating a coordinated system for workforce development and renewable deployment support.

**Activity Milestones:**

Description	Approximate Completion Date
Intake portal operational and publicly launched (soft start to get a few projects quickly)	August 31, 2027
Advisory panel formed and project review criteria finalized	August 31, 2027
First statewide call for renewable projects issued	August 31, 2027
Project solicitation materials prepared with support of marketing agency	August 31, 2027
First cohort of up to 10 projects selected and assigned	December 31, 2027

### Activity 2: Activity 2: Execute Seeded Renewable Energy Projects with Engineering Workforce Teams Distributed Across Minnesota

**Activity Budget:** \$309,000

**Activity Description:**

Each year, RENEW-MN will fund and implement up to 10 multidisciplinary renewable energy projects across three Minnesota engineering hubs. Projects may address solar integration, energy storage, renewable fuels, electrification, efficiency optimization, or renewable system performance evaluation. Student teams will complete modeling, design, prototyping, testing, field validation, and economic analysis during the academic year. Each project will receive approximately \$4,000 in seed funding to support materials, testing, travel, and documentation. External partners will receive technical reports, validated analyses, or prototype solutions. All projects will document environmental relevance and anticipated natural resource benefits. Public project summaries will be published annually. This activity produces both applied renewable solutions and graduates prepared to design and implement renewable systems statewide.

**Activity Milestones:**

Description	Approximate Completion Date
First cohort of projects initiated across campuses	January 31, 2028
Up to 10 renewable projects completed in Year 1	May 31, 2028
Public release of Year 1 project summaries and environmental documentation	May 31, 2028
Completion of up to 30 total projects over three years	May 31, 2030

### Activity 3: Activity 3: Workforce Tracking, Evaluation, and Dissemination

**Activity Budget:** \$56,000

**Activity Description:**

RENEW-MN will measure workforce outcomes and projected environmental impact to demonstrate public benefit and long-term impact. Graduate placement in renewable energy or related sectors will be tracked annually through follow-up surveys and institutional data. Environmental metrics addressed by completed projects (e.g., modeled emissions reductions, projected changes in natural resource consumption, efficiency gains, renewable capacity enabled) will be compiled and summarized. An annual Renewable Energy Workforce Impact Report will be published detailing projects completed, students trained, industry partnerships, environmental relevance, and workforce outcomes. One or more public Renewable Project Showcases will convene partners, students, and stakeholders to disseminate results and strengthen industry collaboration. This activity ensures accountability, transparency, and long-term implementation by documenting how experiential learning translates into renewable energy deployment capacity in Minnesota.

**Activity Milestones:**

Description	Approximate Completion Date
First annual Renewable Energy Workforce Impact Report published	August 31, 2028
Workforce and environmental tracking framework finalized	December 31, 2028
Renewable Project Showcase hosted annually (at least 3 events total)	May 31, 2030
Final three-year workforce placement and environmental impact report completed	June 30, 2030

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Prof. Ellen Thompson	IRON RANGE ENGINEERING "north" (Minnesota State University, Mankato)	Faculty support - Environmental engineering projects	Yes
Prof. Jack Elliot	IRON RANGE ENGINEERING "north" (Minnesota State University, Mankato)	Faculty support - Mechanical engineering projects	Yes
Prof. Gary Mead	AUTOMOTIVE ENGINEERING "main campus" (Minnesota State University Mankato)	Faculty support - Automotive engineering projects	Yes
Prof. Kuldeep Agarwal	MANUFACTURING ENGINEERING "main campus" (Minnesota State University Mankato)	Faculty support - Manufacturing engineering projects	Yes
Prof. Jacob Swanson	TWIN CITIES ENGINEERING "metro" (Minnesota State University Mankato)	Faculty support - Mechanical engineering projects	Yes
TBD	Minnesota State University Mankato	Faculty support - other faculty with specific engineering expertise (such as electrical) that may support projects in lieu of other named faculty, depending on the needs of the projects that are solicited.	Yes

## Dissemination

**Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.**

RENEW-MN will ensure broad participation, transparency, and practical application of project results across Minnesota's renewable energy and natural resource sectors by engaging in a breadth of targeted dissemination activities.

**Participation and Awareness:** A public RENEW-MN project intake portal will invite submissions from utilities, tribes, municipalities, agricultural producers, manufacturers, and community organizations statewide. Annual outreach will ensure rural, regional, and metro participation.

**Sharing Results with Resource Managers and Practitioners:** All completed projects will produce partner-ready private technical reports and public summaries documenting renewable energy performance, modeled environmental benefits, and implementation recommendations. Public summaries will be made accessible to submitting entities and relevant state agencies, including those responsible for energy planning, natural resource management, and environmental protection.

Longevity of Products and Data: A publicly available online archive will house project summaries, selected documentation, and environmental impact analyses where applicable.

Promoting Behavioral Change: By demonstrating applied renewable solutions and publishing environmental performance findings, RENEW-MN will support broader adoption of renewable systems and energy efficiency practices that protect air, water, land, and ecosystems.

Public Communication: An annual Renewable Energy Workforce Impact Report and statewide project showcase will communicate outcomes to Minnesotans, highlighting how ENRTF support advances renewable deployment and natural resource protection.

## 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?**

RENEW-MN establishes a durable workforce network that continues beyond ENRTF support. During the project period, the clearinghouse will formalize industry partnerships, develop a renewable project intake portal, and publish annual impact reports demonstrating workforce and environmental outcomes. By Year 3, external industry sponsors will co-fund selected projects, and participating campuses will incorporate renewable project coordination into existing experiential-learning infrastructure. Continued funding will be supported through industry sponsorship, institutional support, and competitive workforce and energy grants. Project results and technical documentation will remain publicly accessible to support ongoing renewable energy deployment statewide.

## Project Manager and Organization Qualifications

**Project Manager Name:** Jacob Swanson

**Job Title:** Department Chair & Professor

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

Dr. Jacob Swanson is Department Chair and Professor of Engineering in the Department of Integrated Engineering at Minnesota State University, Mankato, where he leads the Twin Cities Engineering (TCE) and Iron Range Engineering (IRE) programs. In this role, he oversees distributed, multi-campus experiential engineering programs operating across Minnesota and coordinates faculty, industry partners, institutional leadership, and external stakeholders.

Dr. Swanson's professional work centers on the environment, instrumentation in many contexts, automotive technologies, and renewable and distributed energy systems. Over more than a decade at Minnesota State, he has developed and sustained externally funded engineering initiatives that integrate renewable energy system development, applied design, environmental performance evaluation, and undergraduate workforce preparation. As Principal Investigator on a \$560,000 Xcel Energy Renewable Development Fund grant, Dr. Swanson directed a multi-year renewable energy systems project that required coordinated management of multidisciplinary engineering teams, laboratory infrastructure development, equipment procurement, financial oversight, regulatory compliance, technical milestones, and formal reporting. The project advanced distributed renewable energy technologies while training undergraduate engineers in system integration, instrumentation, performance evaluation, and applied energy analysis. It demonstrated his ability to manage complex renewable energy initiatives that combine technical execution, workforce development, public communication, and accountability to external sponsors. Under his leadership, TCE and IRE received the 2017 ABET Innovation Award recognizing their nationally distinctive, industry-integrated experiential

engineering model. These programs emphasize systems integration, economic evaluation, implementation, and stakeholder engagement—core competencies essential to Minnesota’s renewable energy transition.

Dr. Swanson’s experience managing renewable energy projects, coordinating multi-campus engineering operations, and delivering measurable technical and workforce outcomes uniquely positions him to lead RENEW-MN and establish a durable statewide renewable energy workforce network.

**Organization:** Minnesota State Colleges and Universities - Minnesota State University Mankato

**Organization Description:**

Minnesota State University, Mankato is a comprehensive regional public university serving approximately 15,000 students, with a main campus in southern Minnesota and satellite engineering locations in the Twin Cities (Normandale Community College and Saint Paul College – Twin Cities Engineering (TCE)) and in Virginia, Minnesota (MN North Mesabi Campus – Iron Range Engineering (IRE)). As a public regional institution, Minnesota State Mankato is mission-driven to expand access, affordability, and opportunity for students across urban, rural, and economically diverse communities throughout the state.

TCE and IRE are upper-division, transfer-focused programs within the Department of Integrated Engineering intentionally structured to reduce barriers to engineering education. By embedding programs at community college campuses, they provide place-based pathways for first-generation students, veterans, working adults, rural learners, and others historically underrepresented in engineering. The transfer-only model lowers cost, minimizes relocation requirements, and broadens participation in high-demand technical fields. The Bachelor of Science in Engineering program emphasizes inclusive, team-based experiential learning, competency-based assessment, and industry-sponsored multidisciplinary projects. Students develop practical engineering expertise in authentic contexts. This distributed, inclusive model directly supports RENEW-MN by building a skilled and diverse renewable energy workforce drawn from all regions of Minnesota, ensuring equitable participation in the state’s clean energy transition.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Project manager / lead scientist		Manage project, supervise undergraduate students for 3 summers of work, and over the course of 3 academic years. Be responsible for submission of documents and reports due to LCCMR. Be responsible for all technical aspects of sensor design, deployment and data analysis.			36%	0.54		\$120,000
Undergraduate research assistant		Conceive, design, build, maintain website to solicit projects and achieve project reports.			8%	0.3		\$5,000
Faculty advisor 1 - engineering support		Faculty mentor/advisor for 2 renewable energy projects per year in that faculty's discipline. Support students, interface between industry and students, provide engineering guidance, report results to PM for summary and inclusion in reports.			36%	0.18		\$24,000
Faculty advisor 2 - engineering support		Faculty mentor/advisor for 2 renewable energy projects per year in that faculty's discipline. Support students, interface between industry and students, provide engineering guidance, report results to PM for summary and inclusion in reports.			36%	0.18		\$24,000
Faculty advisor 3 - engineering support		Faculty mentor/advisor for 2 renewable energy projects per year in that faculty's discipline. Support students, interface between industry and students, provide engineering guidance, report results to PM for summary and inclusion in reports.			36%	0.18		\$24,000
Faculty advisor 4 - engineering support		Faculty mentor/advisor for 2 renewable energy projects per year in that faculty's discipline. Support students, interface between industry and students, provide engineering guidance, report results to PM for summary and inclusion in reports.			36%	0.18		\$24,000
Faculty advisor 5 - engineering support		Faculty mentor/advisor for 2 renewable energy projects per year in that faculty's discipline. Support students, interface between industry and students, provide engineering guidance, report results to PM for summary and inclusion in reports.			36%	0.18		\$24,000
Clearinghouse project		A group of approximately 5 experts will review and vet projects. Vetting is expected to cost			36%	0.18		\$15,000

advisory board members		\$500/expert/semester = 5 x 2 x 500 x 3 = \$15,000. These may or may not be the faculty planning on supporting projects, depending on the technical nature of the projects offered and required expertise to review them.						
Industry relations facilitator		Interface with industry sponsors to support the development of the scope of work (SOW) for each project that is vetted by the advisory board. Estimated to be equivalent of 1 full time day per project. 1 day x 30 projects = 30 days (30 days x \$1,000 day = \$30,000)			36%	0.12		\$30,000
							<b>Sub Total</b>	<b>\$290,000</b>
<b>Contracts and Services</b>								
Marketing agency	Service Contract	Agency will work with PM to generate a small marketing campaign that advertise the opportunity to have a renewable energy project completed as described in this project. It is important this campaign reaches as many potential applicants as possible and that the opportunity is meaningfully communicated statewide.				0.1		\$15,000
							<b>Sub Total</b>	<b>\$15,000</b>
<b>Equipment, Tools, and Supplies</b>								
	Tools and Supplies	Supplies and consumables for up to 10 projects for year 1 (average \$4,000/project)	Each project solicited will come with a budget of \$5,000 from these ENTRF funds. This will support supplies and consumables required to conduct engineering at the "prototype" of proof of concept level. Examples of supplies include 3D printer filament, machining bits and tooling, replacement batteries, consumable electronics (capacitors, resistors), controllers, power supplies, parts manufactured elsewhere (~\$250/part), strain gages, Arduino (and other microprocessors), fittings, tubing, etc. Significantly more expensive projects will be supported from funds					\$40,000

			from the company associated with the project.					
	Tools and Supplies	Supplies and consumables for up to 10 projects for year 2 (average \$4,000/project)	Each project solicited will come with a budget of \$5,000 from these ENTRF funds. This will support supplies and consumables required to conduct engineering at the "prototype" of proof of concept level. Examples of supplies include 3D printer filament, machining bits and tooling, replacement batteries, consumable electronics (capacitors, resistors), controllers, power supplies, parts manufactured elsewhere (~\$250/part), strain gages, Arduino (and other microprocessors), fittings, tubing, etc. Significantly more expensive projects will be supported from funds from the company associated with the project.					\$40,000
	Tools and Supplies	Supplies and consumables for up to 10 projects for year 3 (average \$4,000/project)	Each project solicited will come with a budget of \$5,000 from these ENTRF funds. This will support supplies and consumables required to conduct engineering at the "prototype" of proof of concept level. Examples of supplies include 3D printer filament, machining bits and tooling, replacement batteries, consumable electronics (capacitors, resistors), controllers, power supplies, parts manufactured elsewhere (~\$250/part), strain gages, Arduino (and other microprocessors), fittings, tubing, etc. Significantly more expensive projects will be supported from funds from the company associated with the project.					\$40,000
	Tools and Supplies	Website hosting - 3 years	To support soliciting of the projects, explain and showcase results, and to archive public project summaries.					\$3,000
							<b>Sub Total</b>	<b>\$123,000</b>

<b>Capital Equipment</b>									
								<b>Sub Total</b>	-
<b>Acquisitions and Stewardship</b>									
								<b>Sub Total</b>	-
<b>Travel In Minnesota</b>									
	Miles/ Meals/ Lodging	We have a goal to have some projects supported by multiple locations (e.g. mechanical engineering in Metro and manufacturing engineering on the main campus or up North location). This will require faculty travel between engineering sites. Assume 3 trip per faculty per year, 200 mile average travel distance = 9,000 miles total x 0.725/mile = \$6,525. Longer trips (North -> main campus) can not be completed in a day and require 1 night of hotel stay. Assume 10 nights/year x 200/night = \$2,000/year = \$6,000. To account for contingencies (more shared projects, locations are further away, etc), we rounded \$12,525 up to \$13,000.	Planning meetings, review projects, support solicitation of projects, etc						\$13,000
								<b>Sub Total</b>	<b>\$13,000</b>
<b>Travel Outside Minnesota</b>									
								<b>Sub Total</b>	-
<b>Printing and Publication</b>									
	Printing	Mailing, printing	Some projects may be solicited by directly printing and mailing solicitation materials to target companies/groups/areas.						\$4,000
								<b>Sub Total</b>	<b>\$4,000</b>
<b>Other Expenses</b>									

							<b>Sub Total</b>	-
							<b>Grand Total</b>	<b>\$445,000</b>

Classified Staff or Generally Ineligible Expenses

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

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

Total Project Cost: \$445,000

This amount accurately reflects total project cost?

Yes

## Attachments

### Required Attachments

#### *Visual Component*

File: [962212ce-22f.pdf](#)

#### *Alternate Text for Visual Component*

The graphic shows a map of Minnesota with three engineering hubs—Iron Range Engineering (Virginia), Twin Cities Engineering, and MSU Main Campus—marked by nodes. Arrows from across the state indicate renewable energy projects being solicited statewide and distributed to these hubs for multidisciplinary, industry-connected experiential learning and workforce development....

## Administrative Use

**Does your project include restoration or acquisition of land rights?**

No

**Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?**

Yes, I understand the Commissioner's Plan applies.

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

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?**

No

**Does the organization have a fiscal agent for this project?**

No

**Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?**

No

**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 as "the provision of care, treatment, education, training, instruction, or recreation to children")?**

No

**Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:**

No one not already listed.

**Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements**

Yes, I understand