Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-551

Proposal Title: Agriculture–Energy Innovation Talent Development Camp (Morris, MN)

Project Manager Information

Name: Clement Loo

Organization: U of MN - Morris

Office Telephone: (320) 589-6204

Email: cloo@morris.umn.edu

Project Basic Information

Project Summary: Development of a weeklong summer residential educational experience for high school students on the campus of UMN Morris where students will learn about rural and agricultural energy innovation.

ENRTF Funds Requested: $416,000

Proposed Project Completion: August 31, 2030

LCCMR Funding Category: Education and Outdoor Recreation (C)

Project Location

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

Region(s): SW

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.

Minnesota's agricultural economy and clean energy transition are increasingly interdependent. Electrified farm equipment, agrivoltaics, on-farm energy storage, green hydrogen applications, and ammonia-based fuels represent emerging innovation pathways that require interdisciplinary expertise. Yet most high school students lack structured exposure to how renewable energy systems integrate with agricultural operations. Developing early technical literacy at this nexus strengthens Minnesota's long-term capacity to reduce agricultural emissions, improve energy resilience in rural communities, and advance climate-smart production systems.

This project will expand students' and educational community knowledge of the growing area of agricultural and clean economy-aligned jobs, and demonstrate a way to engage and interest students in family-supporting career jobs that are necessary for Minnesota to reach its workforce goals and clean economy ambitions.

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 will design and implement a weeklong residential Agriculture–Energy Innovation Talent Development Camp for Minnesotan high school students at the University of Minnesota Morris and the West Central Research and Outreach Center. Over three summers, 40 students per cohort will engage in applied learning at the intersection of renewable energy systems and climate-smart agriculture.

Participants will be led by near-peer UMN undergraduate student mentors and UMN faculty to analyze how wind, solar, battery storage, electrification, green hydrogen, and ammonia-based energy systems integrate with agricultural production, irrigation, grain drying, soil management, and farm operations. Students will conduct field-based measurements, examine energy flows within agricultural systems, and explore innovation in storage through the Morris Model and Morris CREST (Center for Renewable Energy Storage Technology) initiatives.

The camp includes a Climate Action Simulation using the En-ROADS model in a United Nations-style summit role-play, where students represent agricultural producers, energy developers, municipal leaders, and community stakeholders negotiating decarbonization pathways.
Recruitment will prioritize rural Minnesota communities and underrepresented Twin Cities students interested in clean energy, agriculture, and sustainability. The project strengthens Minnesota's workforce capacity at the agriculture–energy nexus and produces a replicable, standards-aligned curriculum toolkit.

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 advances the following objectives of LCCMR related to education:

- Provide engaging curriculum and natural-resource-based outdoor events in and around Morris related to rural and agricultural energy innovation for students from across Greater Minnesota and the Twin Cities.
- Create mentorship and learning experiences for young people to explore and pursue careers in the environment and natural resources led by mentors who are undergraduate students in majors related to environmental and natural resource careers.
- Enhance education by integrating experiences that foster environmental stewardship in all communities through introducing students from across Minnesota to energy innovation focused on

Activities and Milestones

Activity 1: Educational Programming Development (Months 1–6)

Activity Budget: $10,000

Activity Description:
Five integrated modules will be developed:

1. Renewable Energy Systems in Agricultural Contexts
2. Agrivoltaics and Dual-Use Land Systems
3. Energy Storage, Electrified Equipment & the CREST Initiative
4. Green Hydrogen & Ammonia in Agricultural Energy Systems
5. Climate Action Simulation with En-ROADS & Exploring Clean Economy Jobs

The Renewable Energy Systems, Agrivoltaics, and Green Hydrogen and Ammonia modules will incorporate learning connected with the Morris Model, Climate Smart Municipalities, and research at the WCROC.

The Energy Storage module will incorporate learning connected to the Morris CREST initiative, which advances innovation in battery and storage technologies essential for agricultural electrification and rural grid stability.

The Climate Action Simulation will use the En-ROADS climate model in a structured United Nations-style summit. Participating high school students will role-play agricultural producers, energy companies, governmental and Tribal leaders, and community advocates negotiating policies that influence both agricultural productivity and decarbonization goals.

Activity Milestones:

Description	Approximate Completion Date
Completed module instruction plans ready to implement	December 31, 2027

Activity 2: Participant Recruitment

Activity Budget: $20,000

Activity Description:
Recruitment will prioritize:
- Rural Minnesota high schools in agricultural regions
- Underrepresented students in Minneapolis and St. Paul
- Students with interest in agriculture, clean energy, engineering, environmental science, sustainability, and climate action

Transportation scholarships and targeted outreach through counselors and youth-serving organizations will reduce participation barriers.

Recruitment for the program will employ a two-part strategy. Recruitment from high schools within the Twin Cities metropolitan area will be led by Beth Mercer-Taylor who will leverage the IonE's networks with regional K-12 educators to provide outreach materials and information to high school teachers teaching classes related to environment, sustainability, or other relevant topical areas.

Recruitment from rural high schools will be led by Dustin Retzlaff and Jennifer Zych Herrmann as an extension of their work to develop partnerships between UMN Morris and high schools within Minnesota's rural communities to create opportunities for rural students to visit UMN Morris for educational programs related to the AgCountry Challenge.

Aspirational outcomes:
- 60% of participants will come from rural Minnesota communities.
- 40% will come from underrepresented Twin Cities communities.

Activity Milestones:

Description	Approximate Completion Date
Approximately 40 participants per year recruited (total of approximately 120 students)	June 30, 2030

Activity 3: Camp Implementation (Summer Year 1, 2, & 3)

Activity Budget: $315,000

Activity Description:
Each weeklong residential session will include classroom instruction, practical lab experiences, and site visits to allow students to interact with projects related to the Morris Model and Morris CREST initiative. Through the previously listed activities, students will develop skills and knowledge related to:
- Analysis of wind and solar generation integrated with farm operations
- Data collection on electrified agricultural equipment performance
- Storage applications for irrigation, grain drying, and peak-load management
- Hydrogen and ammonia applications in agricultural contexts
- Systems mapping of energy and nutrient flows
- Team-based agricultural and rural energy innovation

The camp will connect with the Climate Smart Municipalities exchange program that hosts German interns in Morris each summer. Dialogue sessions occurring during each iteration of the camp will explore how rural municipalities integrate agriculture and energy innovation within climate strategies, offering comparative international perspectives. Participating high school students will learn about how they might participate in international educational and research opportunities related to rural energy transition through University of Minnesota exchange and international study programs.

Participating high school students will reside on campus in one of UMN Morris' residence halls with their near-peer mentors and be provided with meals at UMN Morris' dining facilities.

Activity Milestones:

Description	Approximate Completion Date
120 Minnesota high school students will complete residential program including classroom and experiential components.	July 31, 2030
Program participants will learn about international educational opportunities through dialogue sessions with staff and mentors.	July 31, 2030
Participants will learn about and experience examples of rural and agricultural energy innovation.	July 31, 2030

Activity 4: Evaluation and Program Revision

Activity Budget: $49,000

Activity Description:
Pre/post evaluation with the aid of assessment consultants will measure knowledge gains in agriculture–energy systems integration and be used to revise the educational programming for years 2, 3, and beyond.

Activity Milestones:

Description	Approximate Completion Date
Pre- and post-program assessments demonstrate that participants have increased knowledge about rural energy innovation.	August 31, 2030
Participants will report increased interest in postsecondary pathways related to rural and agricultural energy innovation.	August 31, 2030
Program mentors and faculty demonstrate improved understanding of student educational needs related to program content.	August 31, 2030
Near-peer mentors will demonstrate improvement in professional skills related to mentorship, leadership, and pedagogy.	August 31, 2030
Program revised for years 2, 3, and beyond informed by assessment results.	August 31, 2030

Activity 5: Dissemination

Activity Budget: $22,000

Activity Description:
A curriculum toolkit and evaluation report will be published for replication statewide. Members of the project's leadership team will also disseminate the lessons learned through developing the camp through presentations at professional conferences, such as:
- The Upper Midwest Association for Campus Sustainability (UMACS) - conference and/or webinar to share best practices for ag and energy talent development work with K-12 for higher education partners https://www.umacs.org/
- The Minnesota Educator Academy, 2 day conference every year in Oct, maybe always at St. Paul Rivercentre (put on by Education Minnesota, must be member to present, note that higher education educators can be members) https://educationminnesota.org/events/annual-events/mea-conference/
- Minnesota Association of Agriculture Education (MAAE) Summer Conference and Future Ag Technology conference (January), https://www.mnaged.org/index.php/conferences

Activity Milestones:

Description	Approximate Completion Date
Project manager and instructional staff present about program at multiple educational conferences	August 31, 2030
Curricular toolkit written and made available to public through UMN websites and publications.	August 31, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Troy Goodnough	UMN Morris	Sustainability Director	No
Eric Buchanan	UMN West Central Research and Outreach Center	Director of Renewable Energy	Yes
Beth Mercer-Taylor	UMN Institute on the Environment	Education Co-Director	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.
A curriculum toolkit and evaluation report will be published for replication statewide. Members of the project's leadership team will also disseminate the lessons learned through developing the camp through presentations at professional conferences, such as:
- The Upper Midwest Association for Campus Sustainability (UMACS) - conference and/or webinar to share best practices for ag and energy talent development work with K-12 for higher education partners https://www.umacs.org/
- The Minnesota Educator Academy, 2 day conference every year in Oct, maybe always at St. Paul Rivercentre (put on by Education Minnesota, must be member to present, note that higher education educators can be members) https://educationminnesota.org/events/annual-events/mea-conference/
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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?
Our proposal is intended to pursue funds for supporting the development of the described program and for supporting the first three pilot cohorts of the program. Those initial three cohorts will serve as a proof of concept to demonstrate the need and the positive impact of the Agriculture–Energy Innovation Talent Development Camp. If the initial three cohorts are successful, the project's leadership team will leverage that success to pursue institutional funds in order to continue hosting the camp as an ongoing opportunity for high school students across Minnesota.

Project Manager and Organization Qualifications

Project Manager Name: Clement Loo

Job Title: Lecturer/Assistant Professor of Environmental Studies, Gateway Coordinator

Provide description of the project manager's qualifications to manage the proposed project.
Clement Loo has been teaching faculty within the Environmental Studies discipline at the University of Minnesota Morris since 2013. During his time at UMN Morris he has coordinated a number of programs. These programs include the UMN Morris Food Access Initiative (to reduce student food insecurity at UMN Morris), both the Environmental Studies major

and Sustainability Leadership minor, the Gateway program (summer bridge program for incoming first-year students making the transition from high school to college), as well as the Sustainability Leadership for the Future (to integrate sustainability leadership into the mission and curriculum of UMN Morris).

In addition to his work at UMN Morris, Loo also serves on the executive committee of the Southwest Regional Sustainability Development Partnerships, the Faculty Leadership Council of the University of Minnesota's Institute on the Environment, and the Advisory Council for the Association for the Advancement of Sustainability in Higher Education.

Loo has nearly two decades of experience related to sustainability, sustainability education, rural community resilience, and managing summer programs for young adults. With his experience he is well versed in the renewable energy projects within UMN Morris, the West Central Research and Outreach Center, and the City of Morris and is well-prepared to coordinate with internal and external partners to: develop programming and curriculum, train and supervise staff, house and feed students, schedule and plan site visits, and recruit participants from high schools across Minnesota.

Organization: U of MN - Morris

Organization Description:
UMN Morris is a small public liberal arts college located in Morris, MN and is one of the five campuses of the University of Minnesota. It offers 32 undergraduate majors and enrolls approximately 1000 students. UMN Morris includes sustainability among its core mission and has the distinction of being carbon neutral in respect to the electricity used on its campus. It is in a long-term partnership, known as the Morris Model, with a number of neighboring organizations -- including the West Central Research and Outreach Center, City of Morris, and Stevens County -- aimed to pursue regional carbon neutrality.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Camp Coordinator		Organizes and leads camp			36.6%	0.24		$26,637
Student Mentors		Stipends for undergraduate student mentors to help with camp			0%	30		$76,500
Faculty Mentors		Stipends for faculty to support instruction during camp			36.6%	12		$33,684
							Sub Total	**$136,821**
Contracts and Services								
West Central Research and Outreach Center	Subaward	WROC will provide programing development and support as well as use of their facilities for some of the camp's activities				0.15		$53,196
Institute on the Environment	Subaward	En-ROADS Facilitator / TC Recruiter				0.33		$32,101
TBD	Service Contract	Program evaluation and assessment				3		$30,000
							Sub Total	**$115,297**
Equipment, Tools, and Supplies								
	Tools and Supplies	Programing supplies	Support the program events by purchasing materials necessary for camp activities					$7,500
							Sub Total	**$7,500**
Capital Equipment								
							Sub Total	**-**

Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Other	Coach and Bus Rental: 5 X $3000	To move students from different sessions around Morris area.					$45,000
	Other	Van Rental: 2 X $500	Van rental to support students who need travel support to get to the camp.					$3,000
	Miles/ Meals/ Lodging	Mileage (Local travel for recruitment, team convening, and travel to MSP airport)	Fund travel to promote camp, facilitate team convenings as well as travel to the closest airport for conference attendance.					$32,625
							Sub Total	**$80,625**
Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	1 trip to conference for three people	Travel to conference to disseminate findings	X				$14,112
							Sub Total	**$14,112**
Printing and Publication								
	Printing	Printing and Duplication	Print camp materials and handouts for camp, recruitment fliers					$3,025
							Sub Total	**$3,025**
Other Expenses								
		Participant Housing	Participant Housing: 40 X $105/week for staying at UMN Morris for the week					$12,600
		Participant Meals	Participant Meals: 40 X $154	X				$18,480
		Mentor Housing	Mentor Housing: 10 X $210					$6,300
		Mentor Meals	Mentor Meals: 10 X $308	X				$9,240

		Catering	To provide food when participants are off-site and not able to access dining options at UMN Morris	X				$10,500
		IT and A/V	Cover IT and AV costs associated with camp and camp sessions					$1,500
							Sub Total	**$58,620**
							Grand Total	**$416,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	1 trip to conference for three people	Travel to conference will allow for the team to disseminate findings from the camp to a larger audience.
Other Expenses		Participant Meals	Will pay for meal costs for students to attend the camp allowing for better access to the camp.
Other Expenses		Mentor Meals	Will provide support to the students helping with the camp since they will be required to eat with the camp participants.
Other Expenses		Catering	Allow for students to access food without requiring them to pay for food.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
In-Kind	Unrestricted State Appropriations and Tuition	10% Salary and Benefits for Troy Goodnough	Secured	$38,770
In-Kind	Unrestricted State Appropriations and Tuition Fund	% Salary and Benefits for Clement Loo	Secured	$25,896
In-Kind	Unrecovered Indirect Costs	Unrecovered indirect costs at 37% of modified total direct costs used to support project	Secured	$93,101
			Non State Sub Total	**$157,767**
			Funds Total	**$157,767**

Total Project Cost: $573,767

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 23e38a19-3f2.pdf

Alternate Text for Visual Component

The agriculture & energy talent development camp visual depicts a symbol of recycling arrows with pictures of renewable energy followed by a plus sign and a farmland graphic of smart agriculture practices. Underneath are pictures of students engaged in agriculture and renewable energy field experiences in Morris, Minnesota....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
UMN Morris Submission Approval Letter	230829d0-9de.pdf
Support Letter from University of Minnesota Institute on the Environment (IonE)	186bdc7f-98b.pdf

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 UMN Policy on travel 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:

Sabine Engel, Institute on the Environment; Dustin Retzlaff, UMN Morris; Nathaniel Steinlicht, UMN Morris; Jennifer Zych Herrmann, UMN Morris

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