



Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-311

Proposal Title: Empowering Youth to Become 21st Century Energy Leaders

Project Manager Information

Name: Elizabeth Mercer-Taylor

Organization: U of MN - Institute on the Environment

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Project Basic Information

Project Summary: Youth teams learn about our energy system, plan energy workshops and take the lead on hands-on projects for their communities. Youth are mentored by undergraduates from nearby Minnesota campuses.

Funds Requested: \$200,000

Proposed Project Completion: 2023-06-30

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?

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.

Minnesota needs trained and capable 21st century leaders to create energy projects that achieve our state goal of reducing emissions by 80% between 2005 and 2050. Citizens, politicians, business leaders and educators working together can create comprehensive and economically beneficial solutions. Raising the awareness of youth has proven key to successful community-based projects; this project therefore aims to empower 200+ youth with the knowledge, skills and experiences they need to become energy leaders. We envision a ripple effect, reaching thousands of Minnesotans.

Authentic learning and true engagement requires that young people have responsibility. In this project, youth create their own future energy scenarios using a proven curriculum, plan hands-on community projects and gain leadership skills to meet 21st century challenges. Research shows that girls and diverse students become more interested in STEM fields through such project-based learning.

The project is a triple win. Youth acquire skills and confidence by taking action, communities become more engaged and witness the positive impact of youth, and Minnesota gains by building communities able to lead our clean energy transition. Minnesota communities need to innovate in renewable energy and adapt to a changing climate. Our youth are uniquely well-positioned to jumpstart solutions that Minnesota needs.

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

Empowering Youth to Become 21st Century Energy Leaders builds understanding of energy solutions and motivates youth-led action in up to 12 Minnesota communities. This project leverages 2 strong networks of: 1) clean energy faculty, staff and students at UMN and MState campuses and 2) high school youth on Youth Eco Solutions (YES!) teams, in school clubs or in classes. The project matches youth with undergraduate college mentors. Mentors and youth will use a proven energy education curriculum to spark innovative hands-on projects. Climate Generation will ensure that Minnesota's education standards are met through the project.

Mentors will be trained in facilitating workshops involving an energy simulation frequently used in UMN engineering courses and by colleges, schools and businesses world-wide. Youth will learn energy concepts and prepare to take leadership roles in the workshops offered in each community. With their mentors, youth will invite community leaders to attend. The workshops allow participants to choose various energy technologies and policies, and the simulation shows the economic and environmental impacts of that choice. With input from invited leaders, youth will then select hands-on projects to benefit their communities. Evaluation of the project will be conducted by the UMN STEM Center.

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?

1. More than 200 youth gain knowledge related to energy resources, tradeoffs and opportunities as they affect Minnesota's environment and economy. In turn, youth bring awareness to their communities and practice leadership through offering energy workshops.
2. Up to 12 communities better understand needs and assets related to clean energy through the workshops and development of hands-on projects. This activity unites students, teachers, and community members to prioritize local challenges and work to address them.
3. Completion of 12+ new youth-led energy projects promotes healthy and sustainable communities while connecting learning to K-12 Standards in Science and Social Studies.

Activities and Milestones

Activity 1: Recruit and Educate Youth Teams on Energy and Climate, Through Activities with College Mentors and Energy Workshops

Activity Budget: \$120,000

Activity Description:

The project team will convene to plan for engaging diverse students in rural and urban schools and to align materials to meet Minnesota school standards. Youth will be recruited from up to 12 schools, with undergraduate mentors recruited from 6 campuses. Project team members train the mentors in energy education. Schools are matched with mentors and with YES! coaches to prepare student-facilitated workshops on energy scenarios. Community leaders are invited to workshops as participants alongside youth; together they envision ways of scaling up good ideas that emerge. The workshops allow participants to play roles, such as a government or an industry, which are shaped by realistic briefings on the political, economic and environmental concerns.

Workshops aim to include students and leaders across diverse political views, age, gender and background, and to reflect local priorities. Two helpful models for this effort - the Morris Model and Climate Smart Municipalities - demonstrate that bringing diverse students and community leaders together results in relevant, effective projects. Workshops are time-adjustable to fit a class period or longer, and accommodate 10 to 100 or more. All materials are freely available at the Climate Interactive website, including the online, interactive model for energy, En-Roads.

Activity Milestones:

Description	Completion Date
Organize team and align project materials with Minnesota high school standards to ensure teacher usefulness	2021-10-31
Recruit youth from up to 12 schools, connect to mentors and YES! coaches	2021-12-31
Educate 200+ youth on energy concepts and project opportunities while developing their leadership skills	2022-01-31
Host up to 12 energy workshops and identify hands-on energy projects to benefit communities	2022-02-28
Further align workshop project materials with Minnesota high school standards to ensure teacher usefulness	2022-10-31
Recruit youth from up to 12 schools, connect to mentors and YES! coaches	2022-12-31
Educate 200+ youth on energy concepts and project opportunities while developing their leadership skills	2023-01-31
Host up to 12 energy workshops and identify hands-on energy projects to benefit communities	2023-02-28

Activity 2: Take Action! Students and Community Leaders Plan and Implement Hands-on Energy Projects

Activity Budget: \$80,000

Activity Description:

After the workshops, youth will plan, secure resources and begin hands-on projects, with support from their mentors and newly engaged community leaders. Collaboration between youth, community partners and mentors is key. YES! coaches, teachers and school leaders will work closely with youth to budget, prioritize and break projects into steps. Projects could include, for example:

- evaluation of a school for solar
- auditing school energy use,
- designing a solar trailer or boat,
- making a “solar suitcase” for charging
- building a solar greenhouse
- developing a walk, bike or car-pool to school program or

hosting a community event

The project team will meet monthly, track progress, support youth/ mentor relationships, facilitate school connections, be a resource for workshops and support engaging community leaders. Youth, as well as the mentors, will take a pre and post assessment test on energy knowledge and motivation. Evaluation of educational effectiveness will be conducted by the UMN STEM Center, and integrated into the project.

Activity Milestones:

Description	Completion Date
Working with community partners, college mentors and YES! staff, youth-led teams complete 12+ new projects	2022-05-31
Educational effectiveness of this education-to-action project evaluated by UMN STEM Center using pre-and post assessments	2022-06-30
Working with community partners, college mentors and YES! staff, youth-led teams complete 12+ new projects	2023-05-31
Educational effectiveness of this education-to-action project evaluated by UMN STEM Center using pre-and post assessments	2023-06-30

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Kristen Poppleton	Climate Generation	Climate Generation will lead efforts to map energy activities, including workshops and hands-on projects, to Minnesota education standards, aiming for maximum usefulness for teachers, school staff and youth workers. A presentation and action guide will be developed and shared broadly with aim to scale up the work.	Yes
Kimberly Musser	Minnesota State University - Mankato, Water Resource Center	Will be a project team member, and hire, supervise and support the training of and work done by the undergraduate(s) serving as mentors for project implementation, with at least 1 youth team from a school in or near Mankato, with an aim to involve 2-3 youth teams.	Yes
Erika Bailey-Johnson	Bemidji State University	Will be a project team member, and hire, supervise and support the training of and work done by the undergraduate(s) serving as mentors for project implementation, with at least 1 youth team from a school in or near Bemidji, with an aim to involve 2-3 youth teams.	Yes
Katy Chapman	University of Minnesota - Crookston	Will be a project team member, and hire, supervise and support the training of and work done by the undergraduate(s) serving as mentors for project implementation, with at least 1 youth team from a school near Crookston with an aim to involve 2-3 youth teams.	No
Troy Goodnough	University of Minnesota-Morris	Will be a project team member, and hire, supervise and support the training of and work done by the undergraduate(s) serving as mentors for project implementation, with at least 1 youth team from a school in or near Morris with an aim to involve 2-3 youth teams.	No
Jonna Korpi	University of Minnesota-Duluth	Will be a project team member, and hire, supervise and support the training of and work done by the undergraduate(s) serving as mentors for project implementation, with at least 1 youth team from a school in or near Duluth, with an aim to involve 2-3 youth teams.	Yes
Paul Imbertson	UM TC - College of Science and Engineering	Teaching faculty member at UM TC CSE who will recruit and provide coaching to undergraduate student mentors from UM TC. These mentors will be matched to schools such as Washburne HS in Minneapolis and Harding HS in St. Paul, where Imbertson frequently works with teachers.	No
Gillian Roehrig	University of Minnesota-Twin Cities - College of Education and Human Development (CEHD) STEM Center	Roehrig will supervise Graduate Research Assistant from the UMN TC STEM Center who will be charged with evaluation of the project, using pre- and post-surveys of youth team members and mentors, and also provide input on project outcomes for the action guide for teachers produced by Climate Generation.	Yes
Shelli-Kae Foster	Prairie Woods Environmental Learning Center, for Youth Eco-Solutions (YES!)	Will lead the YES! program in recruiting interested schools to participate in the energy and climate action workshops using its statewide network of students and educators. YES! will also facilitate and support the community based youth-led hands-on projects.	Yes
Juliette RooneyVarga	University of Massachusetts Lowell	Will provide guidance to project team on best practices for engaging diverse Minnesota students in STEM fields and careers through energy workshops, activities, En-Roads simulation and youth-led hands-on projects.UMass Lowell	No

		has had proven success building a similar project, which was initially funded by NSF, that involved underrepresented MA students.	
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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 be funded?

Based on expansion of energy workshops in colleges, the project team expects continued effort in both project schools and new schools. A key product is a guide to offering workshops and sparking hands-on projects. The guide will be made available online and shared in education conferences. To support continuing funding needs for hands-on projects, youth teams will receive a Team Funding Toolkit based on the past success and lessons learned over the 12-year history of YES!. YES! teams have leveraged over \$1.2 million in local support of projects in the form of in-kind contributions, matching funds, and volunteer hours.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Mississippi River Water Journey Camps	M.L. 2015, Chp. 76, Sec. 2, Subd. 05e	\$25,000

Project Manager and Organization Qualifications

Project Manager Name: Elizabeth Mercer-Taylor

Job Title: Sustainability Education Co-Director

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

Beth Mercer-Taylor, as Sustainability Education Co-Director at IonE, provides leadership for and management of Sustainability Education programming, events and communications that engage undergraduate students in transformational experiences of interdisciplinary collaboration and engaged learning to cultivate the changemakers needed for people and planet to prosper.

She designs and implements curricular and co-curricular education and leadership development activities serving 1,000 undergraduate students annually as well as hundreds of community members and nearly 100 K-12 students involved each year in summer camp, summer intern and field trip experiences. Her experience includes creating and implementing long-term strategy for programs serving the needs of diverse students, managing academic programs and providing sustainability and energy education guidance to instructors, advisors and community partners. She develops, implements and oversees program improvement and assessment of the Sustainability Studies Minor, serving over 165 students annually. Training, oversight and direction for undergraduate and graduate student workers is a core part of her work. Mercer-Taylor provides leadership to a faculty committee responsible for sustainability education and mentors a cohort of instructors working on sustainability courses with impact beyond the classroom.

Mercer-Taylor leads IonE’s projects to advance sustainability education beyond the University, including serving as PI for Water Journey Camps, a project initially launched with ENRTF-funds, but continuing now into its 6th year. It is a popular IonE/ University Youth Programs partnership immersing 6-13 year old kids in civil engineering, design and art each July. She is also a core member of the team that developed and in late 2019 launched Minnesota GreenStep Schools, a best practices and recognition framework that engaged interest from nearly 60 schools, and is expected to grow into a strong sister program to GreenStep Cities. She contributes to MPCA’s efforts at the State Fair EcoExperience with Backyard Phenology: The Climate Chaser and other projects.

Organization: U of MN - Institute on the Environment

Organization Description:

The Institute on the Environment (IonE) seeks to lead the way toward a future in which people and the environment prosper together. IonE is accelerating the transition to this future by supporting breakthrough research across disciplines, developing the next generation of global leaders and building transformative partnerships across the state, region and globe. IonE prides itself on not being academia as usual. At IonE, we go out of our way to collaborate with external partners while bringing different academic fields of expertise together within the University — all with an eye towards being responsive, agile and entrepreneurial in the face of a changing world. For more information about IonE, see <http://www.environment.umn.edu>,

The four UMN campuses involved in the project are united through connection to the Office of Sustainability, which plays a coordinating role across the UMN system, hosting regular meetings for staff, faculty and students to contribute to energy goals and projects, among other priorities. Each UMN campus is committed to reaching goals of becoming carbon neutral by 2050, or earlier, through inclusive projects, cross-campus planning, partnerships, and working with the greater community to create positive environmental impact. The two Minnesota State campuses are key partners.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Beth Mercer-Taylor, Principal Investigator		Project Manager, Team Coordination, Communication, Outreach and Reporting			36.5%	0.06		\$6,473
Aaron Hanson, Co-Principal Investigator		Technical Lead for En-Roads Energy Model, Training, Workshop Implementation and Project Data			36.5%	0.06		\$4,543
Akisha Everett, Co-Principal Investigator		Student and Community Engagement Lead, Facilitator of Mentor & Youth Team Connections, Support for Mentors			31.8%	0.06		\$3,978
Jonna Korpi, UM Duluth Lead		UM Duluth Undergraduate Mentors Lead and Duluth Schools Youth Teams Support			31.8%	0.06		\$2,997
Graduate Research Assistant (GRA) for Project Evaluation, from UMN TC College of Education & Human Development (CEHD)		Evaluation of Project Impact, Supervised by UMN TC CEHD STEM Center Faculty, Gillian Roehrig			100%	0.33		\$14,008
Undergraduate Youth Team Mentor(s) - UM Twin Cities College of Science & Engineering		Mentor at least one school-age youth team under direction of project team and UM-TC Professor Paul Imbertson			0%	1.96		\$10,001
Undergraduate Youth Team Mentor(s) -		Mentor at least one school-age youth team under direction of project team and UMD Sustainability Office Lead Jonna Korpi			0%	1.96		\$8,500

UM Duluth Sustainability Office								
Undergraduate Youth Team Mentor(s) - UM Morris Sustainability office		Mentor at least one school-age youth team under direction of project team and UMM Sustainability Director Troy Goodnough			0%	1.96		\$12,000
Undergraduate Youth Team Mentor(s) - UM Crookston Sustainability office		Mentor at least one school-age youth team under direction of project team and UMM Sustainability Director Katy Chapman			0%	1.96		\$12,000
							Sub Total	\$74,500
Contracts and Services								
Prairie Woods Environmental Learning Center, for Youth Eco-Solutions (YES!)	Sub award	Will work with partners Ney Nature Center and Laurentian Environmental Center to utilize the YES! network to recruit schools statewide to participate and engage in the project (approx. 3, .2 FTEs and 1, .15 FTE). Includes travel for YES! staff to facilitate completion of hands-on community projects.				0.49		\$57,000
Youth Teams at Minnesota Schools	Sub award	Hands-on project funding to provide youth teams with needed supplies, materials or event items (such as small panels, LED bulbs, Kilowatt meter, greenhouse kit, printing, room rental etc). Team requests will be overseen by YES! staff and by each UMN or M-State undergraduate mentor and their supervisor.				3.92		\$24,000
Climate Generation	Sub award	Ensure that activities and learning outcomes of the project, including workshops and hands-on youth-led projects, fulfill Minnesota education standards and are feasible for teachers. Develop a guide for teachers to continue offering workshops and hands-on learning after the project. Lead outreach to teachers to ensure continuation.				0.39		\$20,000

Bemidji State University	Sub award	Bemidji area Implementation of the project, including project team meetings, hiring and supervising of undergraduate mentor for at least one and as many as 3 youth teams, oversight of connection of mentor to youth team(s), support of workshop and of hands-on youth-led projects.				0.39		\$12,000
Minnesota State University - Mankato	Sub award	Mankato area Implementation of the project, including project team meetings, hiring and supervising of undergraduate mentor for at least one and as many as 3 youth teams, oversight of connection of mentor to youth team(s), support of workshop and of hands-on youth-led projects.				0.39		\$12,000
							Sub Total	\$125,000
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	In state travel	To allow staff and mentors to rent cars or to pay mileage to visit schools and to attend meetings with project team.					\$500
							Sub Total	\$500
Travel Outside Minnesota								
							Sub Total	-

Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$200,000

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	-

Attachments

Required Attachments

Visual Component

File: [0896d5f8-2e0.pdf](#)

Alternate Text for Visual Component

The project title, Empowering Youth to Become 21st Century Energy Leaders, is displayed over a map showing the location of each community in Minnesota where the project will occur (Crookston, Bemidji, Morris, Duluth, Twin Cities and Mankato) and a photograph of a student group in front of a solar array and an infographic indicating that 20+ communities, 200+ youth and 12+ projects benefitting communities will be the result of the project.

Optional Attachments

Support Letter or Other

Title	File
Support Letter - Water Resources Center, MSU-Mankato	e127fd48-cbb.pdf
Support Letter- Bemidji State University	235fc4be-3d1.pdf
Support Letter- University of Minnesota- Crookston	37cd5046-206.pdf
Support Letter- University of Minnesota - Duluth	b2b00224-902.pdf
Support Letter- Prairie Woods ELC for YES!	fff16896-d25.pdf
Support Letter- University of Minnesota- Morris	87143e8f-0a8.docx

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have patent, royalties, or revenue potential?

No

Does your project include research?

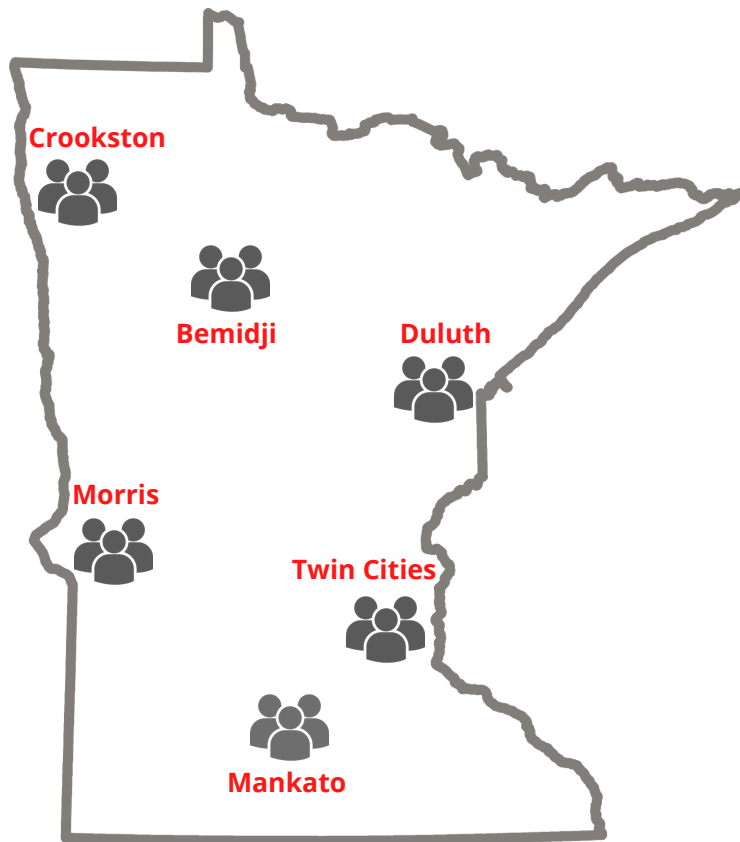
Yes

Does the organization have a fiscal agent for this project?

No

Empowering Youth

to Become 21st Century Energy Leaders



The Opportunity

Minnesota needs trained and capable 21st century leaders to create energy projects that achieve our state goal of reducing emissions 80% by 2050 from 2005 levels.

The Solution

Undergraduate mentors and youth teams will use a proven energy education curriculum to spark innovative projects* that promote healthy and sustainable communities while connecting learning to MN Science standards.

**Project-based learning is shown to increase interest in STEM among girls and students with diverse backgrounds.*

Project Partners

Youth Eco Solutions
UMN Twin Cities
UMN Crookston
MSU Mankato

Bemidji State U
UMN Morris
UMN Duluth
Climate Generation



20+

COMMUNITIES
INVOLVED

200+

MN YOUTH ACTIVATED
& ENGAGED IN COMMUNITY

12+

ENERGY AND CLIMATE
PROJECTS COMPLETED

