



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-251

Proposal Title: CollectED Project

Project Manager Information

Name: Roopali Phadke

Organization: Macalester College

Office Telephone: (651) 696-6802

Email: phadke@macalester.edu

Project Basic Information

Project Summary: CollectED will launch an education platform aimed at Minnesota educators, youth and families about the science of energy storage and the need for safe battery recycling and reuse.

ENRTF Funds Requested: \$559,000

Proposed Project Completion: December 31, 2027

LCCMR Funding 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.

From cell phones to cars, batteries store the energy that powers our everyday lives. However, the correct processes for battery recycling are not understood, and improper disposal both harms our human and natural environments. Fires from punctured batteries cost county landfills millions of dollars yearly. Lead and other toxins also leach out of improperly disposed batteries and contaminate our soils and waterways. In addition, the success of the green energy transition is in part dependent on improving the public's understanding of how energy storage works and why recycling and reuse of batteries is paramount for keeping critical minerals flowing throughout the economy and out of the trash.

County and state agencies rely on their websites or mailings to educate residents about battery collection. For example, the "Be A Battery Hero" campaign informs residents about how to avoid fires. While important, this form of outreach does not address broader questions about batteries and energy storage. CollectED focuses on equipping our communities with answers to everyday questions: How long will this battery last? What is it made from? Is the supply chain ethical? Is there a second life for batteries? Understanding this information is crucial for inspiring behavioral change.

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.

CollectED will design and implement a battery education platform based on three connected activities: a permanent and traveling Exhibit, a K-12 educator REcharge Academy, and a StoryMap. Together, these three prongs will impact thousands of participants, including teachers and students, State Fair visitors and state-wide library patrons.

The Minnesota State Fair's Eco Experience building will host the CollectED exhibit beginning in August 2026. Each year 250,000 visitors visit the Eco Experience, a space coordinated by the MPCA. The MPCA also coordinates a free traveling exhibit program with the state-wide Minitex interlibrary loan service. A companion mobile exhibit, featuring elements from the Eco Experience, will travel to host libraries.

The REcharge Academy will develop a multi day summer institute aimed at K-12 teachers and informal science educators. The pilot will be hosted at Macalester in 2026. In 2027, we will identify two additional campuses to host the Academy in Greater Minnesota, in proximity to MPCA's waste collection sites.

An ArcGIS StoryMap will be created to support these activities. A StoryMap combines spatial, narrative, and multimedia content. The team will collect audio and video stories from across the battery supply chain (mining, processing, recycling and remanufacturing) to depict this emerging sector.

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?

Whereas most battery education narrowly focuses on chemistry and fire hazards, CollectED aims to increase public knowledge and inspire action by tackling the societal barriers to battery recycling and reuse. Safe recycling and recovery of battery minerals is an important feature of the emerging new energy economy in Minnesota.

This three-pronged platform will encourage behavior change toward greater recycling and reuse. We anticipate each year: 250,000 people will visit the Eco Experience, the traveling exhibit will visit 10 state-wide libraries, and we will train 40 teachers (80 in total), impacting nearly 2,000 students (~50 students per teacher).

Activities and Milestones

Activity 1: Eco Experience Exhibit and Minitex Traveling Exhibit - Design, Testing and Installation

Activity Budget: \$250,000

Activity Description:

The CollectED Public Exhibit will feature a combination of historical content, scientific information and personal stories aimed at youth and their families. It will describe processes of electrical charging and discharging, battery construction, extraction and processing of battery minerals, and methods of battery recycling. A gallery of obsolete devices, juxtaposed against their modern battery-driven equivalents, will invite play and exploration. An interactive map will allow viewers to scan a QR code so that they can pull up their local collection sites. Early schematics of the 400 square foot exhibit design are included in the attachment (see Figures 2 and 3).

A traveling library program will feature the most popular elements of the Eco Experience exhibit. The MPCA coordinates a free traveling exhibit program with the Minnesota Department of Education’s state-wide Minitex interlibrary loan service. Librarians throughout the region apply to borrow displays for a 4-week period. Local librarians then curate additional materials around the tabletop display provided. See Figure 4 in the attachment for examples. The Minitex system will store the mobile exhibit and deliver it from location to location. We will recruit the participation of libraries in counties with active mining, hazardous waste collection and e-waste recycling.

Activity Milestones:

Description	Approximate Completion Date
Eco Experience exhibit design, build and test	April 30, 2026
Exhibit production, designed to be palletized and stored in Eco Experience warehouse	May 31, 2026
Design and test survey and interview protocols for exhibit, conduct visitor data gathering at Fair	September 30, 2026
Plan for second iteration of Eco Experience, including review of data and any exhibit revisions	October 31, 2026
Re-install exhibit, collect second round of visitor survey data and interviews	September 30, 2027
Design and build traveling library, recruit sites, launch lending program and collect initial user data	September 30, 2027

Activity 2: REcharge Academy for K-12 formal and informal educators

Activity Budget: \$250,000

Activity Description:

The REcharge Academy will train 80 K-12 teachers and informal science educators (afterschool programs, museums and homeschool) in the summers of 2026 and 2027. The first institute will be hosted at Macalester College in St. Paul. In year 2, we will site two additional Academies in greater Minnesota in coordination with MPCA’s 22 state-wide waste facilities. See attachment for potential locations. We will recruit widely across the state through our STEM networks. Our Advisory Board to help us recruit rural and tribal educators.

These institutes will bridge content, curriculum, and pedagogy to enable educators to meet 2019 Minnesota state science standards, in the context of new climate legislation passed in 2023, while strengthening their project-based and experiential instructional capacities. Each institute will feature expert lectures, facility tours, STEM concepts and activities appropriate to different grade levels (See Figure 5). Teachers will learn about different battery chemistries and the costs and benefits of each, how batteries fit into a power grid with increased renewable energy, and how batteries transform transportation.

All activities developed for the Academy will be open source. Participants can access a small grant fund to implement an event in their community, in partnership with a MPCA collection site.

Activity Milestones:

Description	Approximate Completion Date
Recruit educators and plan Academy logistics	April 30, 2026
Design and test new hands-on activities, recruit guest speakers and preview field trips	June 30, 2026
Conduct first Academy in summer 2026, analyze data collected through pre/post surveys	September 30, 2026
Recruit educators and plan logistics for summer 2027 Academies	April 30, 2027
Conduct Academies in early summer 2027, analyze data collected through pre/post surveys and interviews	September 30, 2027
Support educators on their community projects, post open source activities on StoryMap	December 31, 2027

Activity 3: Design and Launch CollectED StoryMap

Activity Budget: \$59,000

Activity Description:

We will develop and widely share an ArcGIS StoryMap to support the above two activities. A StoryMap combines spatial, narrative, and multimedia content to bring stories to life. For example, the MPCA’s “We Are Water” StoryMap serves as an inspiration for this project. We will collect audio and educational walkthrough videos that demonstrate how consumers can safely handle different kinds of batteries for disposal and recycling. Content from our StoryMap will be boosted through social media channels and embedded in exhibit and educational platforms.

Activity Milestones:

Description	Approximate Completion Date
Design StoryMap architecture	December 31, 2025
Build interactive map of collection sites, recycled battery processing and other secondary applications	April 30, 2026
Record audio and video stories with community organizations, at waste facilities and at recycling plants	June 30, 2026
Test StoryMap with a range of users, release StoryMap to our partners for use	July 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Teresa Gilbertson and Jeff Stuhr	MPCA	Gilberston is an Environmental Specialist with the Household Hazardous Waste Statewide Program. Stuhr is the Eco Experience Event Manager. They will both support exhibit design and testing, and connect the project team with MPCA's network of 22 state-wide collection sites.	No
Ben Amel	Upstream Exhibits	Amel is the Co-Owner and Managing Director of MN-based Upstream Exhibits. He will lead their team in designing, testing and fabricating the Eco Experience and traveling library exhibits.	Yes
Michael Arquin	KidWind Project	Arquin is the Founder and Director of the MN-based KidWind Project, the parent organization responsible for the REcharge Academy. The Academy is an annual week-long, intensive STEM professional development training for K-12 educators. Arquin will be responsible for all design, evaluation and implementation tasks.	Yes
Maria Jensen	Repowered	Jensen is an e-waste specialist and will support the StoryMap data collection and audio/video collection as a subcontractor with Repowered.	Yes
Mary Quinn McCollum	Field Guide	McCollum is the Founder and CEO of MN-based Field Guide, a communications, design and marketing firm with extensive experience in waste issues. McCollum will support the StoryMap data and audio/video collection.	Yes
Christina Manning	Macalester	Manning is a behavioral psychologist with extensive climate change and zero-waste social messaging experience. She will advise exhibit development and data collection and analysis.	Yes
James Doyle	Macalester	Doyle is a physicist and battery technology expert. He will advise the REcharge Academy development and support the scientific aspects of the exhibit design.	Yes
Amanda Lovelee	Macalester/CAIR Lab	Lovelee is an adjunct professor at Macalester. She is a public artist who works within cross-sector government collaborations. She will advise exhibit development.	Yes
David Bailey	Macalester	Bailey is an instrument and exhibit designer. He will advise exhibit development, with a focus on the traveling library exhibit.	No
Joseph Adamji	Science Museum of Minnesota	Adamji will serve on the Advisory Board. As Director for Equity and Systems Change at the Museum, he will connect us with the Kitty Andersen Science Center's diverse community of BIPOC youth to prototype and test our social messaging, exhibit materials and curricula.	Yes
Robert Blake	Solar Bear/Native Sun	Blake will serve on the Advisory Board. As a tribal citizen of the Red Lake Nation and Founder of both Native Sun and Solar Bear, he will connect us with his network of native-led renewable energy, energy efficiency and just transition organizations working in education, demonstration and workforce training.	Yes
Nick Martin	Xcel Energy	Martin will serve on the Advisory Board. As Director of Strategic Outreach & Advocacy at Xcel, he will connect us with Xcel's staff expertise and projects related to energy storage and EV charger projects, including opportunities for us to schedule educator tours at experimental battery facilities.	Yes
Sasha Lewis-Norelle	Clean Water Action	Norelle will serve on the Advisory Board. As an environmental health and justice organizer, he will connect us to citizen-led coalitions working on air and water pollution and towards climate justice.	Yes
Ashley Van Allen	Integrated Recycling Technologies (IRT)	Van Allen will serve on the Advisory Board. As Environmental Health and Safety Manager, she will share her expertise on e-waste recycling and battery reprocessing.	Yes

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?

This grant will support creation of the CollectED platform. The Eco Experience exhibit will continue beyond the project period, and may be supported through the MPCA's general Eco Experience budget in future years. Similarly, the Minitex mobile library exhibit will stay in circulation for the next several years. Teachers will be able to use CollectED materials and access open source documents for years after they participate in an Academy. The curricular resources will be available to download for free from the StoryMap site managed by Macalester College.

Project Manager and Organization Qualifications

Project Manager Name: Roopali Phadke

Job Title: Professor of Environmental Studies

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

Education:

Harvard University, Science and Technology Studies Postdoctoral Fellow (2003-2005)

UC Santa Cruz, Environmental Studies, PhD (2003)

Cornell University, Asian Studies (1998)

Wellesley College, Political Science, BA (1990)

Dr. Roopali Phadke has served as a faculty member in the Environmental Studies Department at Macalester College for the last 20 years. She leads a community-engaged energy research lab at Macalester College.

Dr. Phadke has led several National Science Foundation funded initiatives. She is currently PI on a grant "Disposition: The Army Corps of Engineers and the Upper Mississippi River" (\$143,000, 2022-2024). She was recently co-PI on the grant titled "Shaping Future STS Research on Societal Science Issues" (\$55,000, 2022-2023). She also served as PI on a mining futures grant titled "The Green Bargain" (\$155,000, 2015-2018).

In addition to these research awards, Dr. Phadke has recently co-directed Macalester College institutional grants including the "Mississippi River Watershed" (\$1.5 million, Mellon Foundation, 2022-2024) and "Educating Sustainability Ambassadors" (\$750,000, Margaret Cargill Foundation, 2016-2018).

On the CollectED project, she will lead an interdisciplinary group of Macalester faculty and students with expertise in critical minerals policy, battery science, behavioral change and exhibit design. She will also be responsible for coordinating across all project teams, tracking budget and subawards, and managing the project's Advisory Board. She is on sabbatical in 2025-26 and will devote considerable time toward the project.

Recent Relevant Publications:

Phadke, R. "Green Nickel, Electric Vehicles and Mining Governance Challenges in the U.S.," *The Extractive Industries and Society*. Under peer review.

Jensen, M, R. Phadke, K. Steva and M. Riffel. "The Economic Potential of E-Waste Recycling in Minnesota" *Iron Range Partners for Sustainability*. 2023.

Phadke, R. "Green Energy Futures: Responsible Mining on Minnesota's Iron Range," *Energy Research & Social Science* Vol 35: 163-173. 2018.

Organization: Macalester College

Organization Description:

Macalester College is a highly selective liberal arts college in St. Paul committed to academic excellence, internationalism, multiculturalism, and service. U.S. students of color comprise 34% of the student body. In addition,

14% of Macalester students are international, representing 80 countries. To ensure that students from all backgrounds can attend, Macalester meets the full financial need of admitted students. In 2023-24, 61% of students received need-based financial aid, with an average award of \$62,533.

Macalester College is known as a sustainability leader among higher education institutions. In 2023, the Association for the Advancement of Sustainability in Higher Education (AASHE) ranked Macalester as the 8th most sustainable Baccalaureate Institution in the U.S. (STARS gold status) for its campus efforts, including faculty research.

Macalester also has long standing relationships with CollectED project partners, including the MPCA, Repowered and the REcharge Academy. This project will leverage the expertise of faculty and staff, while providing valuable training opportunities for students. Campus resources, including dorms and dining facilities, will be made available for the educator institutes. Macalester College will also provide convening space for monthly meetings and a workshop for exhibit design and testing.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Project Manager		Based on their hourly rate, Phadke will work two months each summer of the grant. She will also request a course release in Year 1 to allow her more time for grant support. During year 2, she is on sabbatical and can devote herself toward the project. Hourly pay rate is \$86.44 in the first year with a 3% increase each year. Benefits in the summer months are calculated at 10% of the pay for faculty on a 9-month contract.			10%	0.24		\$64,852
Co-PI		The First Co-PI, Dr. Manning, will work one summer month in the first year and .5 summer month in the second year of the grant. These rates are based on the salary of this Co-PI. This includes 10% benefits.			10%	0.12		\$14,064
Co-PI		The Second Co-PI, Dr. Doyle, will work one summer month in the first year and .5 summer month in the second year of the grant. These rates are based on the salary of this Co-PI. This includes 10% benefits.			10%	0.12		\$28,061
Co-PI		The Third Co-PI, Amanda Lovelee, will work 60 hours in the first year and 20 hours in the second year. This partner is not currently a Macalester employee, but has taught at the College in the past, and charges an hourly rate of \$100.			0%	0.06		\$8,000
							Sub Total	\$114,977
Contracts and Services								
Repowered	Professional or Technical Service Contract	Partner will support sourcing materials for exhibits, leading tours of their facility for the first Academy, and assisting with audio/video and data collection for the StoryMap.				0.4		\$20,496
REcharge	Professional or Technical Service Contract	Partner will be responsible for recruiting educators, designing and testing curriculum, organizing and implementing Academies in summers 2026 and 2027, including field tours and designing pre/post evaluation metrics. They will also follow up with educators to				0.8		\$102,400

		support their outreach events. FTE is divided across project team.						
Field Guide	Professional or Technical Service Contract	Partner will support Storymap design, audio and video editing at a rate of \$200/hr for a total of 75 hours.				0.04		\$15,000
Upstream Exhibits	Professional or Technical Service Contract	Partner responsible for design, development, fabrication, installation of Eco Experience Public Exhibit and advising the design of the Traveling Library. Costs include labor/materials/services based on per square foot cost for exhibit design. FTE is divided across project team.				1.52		\$200,000
							Sub Total	\$337,896
Equipment, Tools, and Supplies								
	Tools and Supplies	Consumable learning materials for use during educator training. \$100 per person, 80 educators.	Science Kits/Workshop Consumables (incl electronic components)					\$8,000
	Tools and Supplies	Print and digital materials for exhibit related surveys and participant interviews (clipboards, pens, simple tools for spot fixes).	Materials for Eco Experience surveys, interviews and on site support					\$1,000
	Tools and Supplies	Necessary to identify support on site at the exhibit and events. \$20 per shirt, 12 shirts, two summers.	Branded T-shirts for CollectED staff working Eco Experience					\$480
	Tools and Supplies	Wooden multi-tier and rotating displays (\$500 x 4 units), Manipulatives and books for display (\$1000), Electronics, lights, and audio (\$611), Custom printing (\$500), Banner (\$500).	Traveling Library					\$4,611
							Sub Total	\$14,091
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								

	Miles/ Meals/ Lodging	Includes mileage for MN travelers, as well as dorm room rates and meal plans at Macalester College for the first Academy. We've budgeted similar rates for summer 2027 although those locations are TBD. Also in Year 2 we will have two Academies in two separate locations, but are estimating 20 teachers for each. Each year we estimate 4 days of travel for 40 people (assuming the rest will be local to the Academy site). Lodging is \$80 per person per night for 3 nights for 40 educators, gas is \$50 per person for 80 educators, and per diem is \$30 per day for 4 days for 80 educators.	Travel to educator training workshops					\$23,200
	Miles/ Meals/ Lodging	Three nights/four days for two people. Lodging is estimated at \$450 per person x 2 people (\$150 per night/\$900 total), gas is \$328, and per diem is \$50 per day x 4 days x 2 people (\$400).	Road travel for StoryMap audio/video within MN					\$1,956
							Sub Total	\$25,156
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	Printing of Academy guides, activity materials and pre/post surveys for two years. Based on color copy costs for Document Services at Macalester College.	Print Supplies for REcharge Academies					\$2,000
							Sub Total	\$2,000
Other Expenses								
		Advisory Board Member Stipend	The Advisory Board is comprised of 5 members. Each member will be paid \$1,000 in honorarium in the first year to attend meetings to consult on the project design, outreach and dissemination processes					\$5,000
		Visiting Instructor/Course Release	The Visiting Instructor is included as a placeholder for a course release for our Phadke (Project Manager) in the first year of the grant. Macalester					\$11,000

			estimates \$10,000 per course release, plus 10% in benefits					
		Small grant for 20 educators. Estimated at \$1,000 per event, 20 events each year for two years. Costs are estimated per event as \$200 for space rental, \$200 for food, \$100 for materials, and \$500 stipend per teacher for organizing the event.	Small grant for 20 educators to do community based activities					\$40,000
		State Fair Tickets - 20 participants, \$6 per ticket for 12 days, x 2 years and 2 State Fairs	State Fair tickets for staffing exhibit					\$2,880
		Eco Experience Survey - We plan to interview 50 participants for 12 days each State Fair. We will provide a \$5 coupon as an incentive.	Eco Experience Survey Participation Incentives - \$5 fair coupons					\$6,000
							Sub Total	\$64,880
							Grand Total	\$559,000

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	-

Total Project Cost: \$559,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [adb9ffa8-dc0.pdf](#)

Alternate Text for Visual Component

Visual aide lists major partners and uses photographs to depict the three major activities of the project: Eco Experience Exhibit, REcharge Academy for educators, and the accompanying StoryMap....

Financial Capacity

Title	File
Audit FY end 5.31.22	a4962eb8-227.pdf
Certificate of Good Standing	37bd52f4-fb9.pdf
Macalester College 990	697b8fb0-c46.pdf

Supplemental Attachments

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

Title	File
Advisory Board Letters of Support	c37ce338-db0.pdf
Macalester Team Letters of Support	5f363530-e28.pdf
Partners Letters of Support	215b08eb-a2c.pdf
Macalester College Presidential Letter of Support	65703dc7-501.pdf
Project Figures	29421694-f5c.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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:

Erika Schwichtenberg and Katie Aulwes Latham (Foundations, Government and Corporate Relations Office at Macalester College)

