

**Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 179-E

Community-Scale Energy Storage Guide for Renewable Energy

Category: E. Air Quality, Climate Change, and Renewable Energy

Sub-Category:

Total Project Budget: \$ 637,305

Proposed Project Time Period for the Funding Requested: June 30, 2022 (3 yrs)

Summary:

This project proposes to expand community-based, locally-produced renewable energy by increasing access to effective energy storage.

Name: Ellen Anderson

Sponsoring Organization: U of MN

Title:

Department: Institute on the Environment

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

2 images. The first image relates the projects potential impacts to CO2 emissions, the renewable energy industry, and new income sources for rural landowners and subsequent tax revenues. The second image shows 10 current MN Energy Storage Projects, located all over the state, with whom we may partner.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity	_____ Readiness	_____ Leverage	_____ TOTAL _____%
_____ If under \$200,000, waive presentation?			



Environment and Natural Resources Trust Fund (ENRTF)
2019 Main Proposal

PROJECT TITLE: Community-Scale Energy Storage Guide for Renewable Energy

I. PROJECT STATEMENT

Minnesota energy consumers are increasingly requesting wind and solar technology to produce cleaner, more efficient energy. To reach high levels of consistent renewable energy, however, Minnesotans will need to include energy storage in their renewable energy systems. This project proposes to expand community-based, locally-produced renewable energy. Activities include:

- 1) create a research-based, user-friendly print and web-based guide to energy storage;
- 2) select 3 geographically distributed representative small-scale microgrids or local energy customers (1 in northern MN, 1 in rural MN, and 1 in the metro area) and provide them with a battery energy storage system;
- 3) assess results, and share the results broadly through public engagement, site tours, and dissemination of web and print knowledge tools.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Community Scale Energy Storage Guide Preparation, Testing, & Publication

Develop the Minnesota Energy Storage Guidebook, a plain English, user-friendly print and web based information resource, including a decision-making flow chart tool for selecting the most appropriate, cost-effective technologies for energy users' proposed goals. The Beta version will be evaluated by an expert advisory group and tested by users. The final version will be broadly disseminated and hosted on ETL's website.

ENRTF BUDGET: \$199,326

Outcome	Completion Date
1. Research completed on technology, economics, value streams of storage	Dec. 31, 2019
2. Beta version of guidebook with print and basic web version of user-friendly information resources and decision flow process graphics completed	March 31, 2020
3. <i>Expert advisory group convened; expert review comments incorporated into guidebook</i>	<i>May 31, 2020</i>
4. <i>Representative energy customers focus groups convened; guidebook information and decision tools evaluated</i>	<i>Oct. 31, 2020</i>
5. <i>Print and Web-based guide and decision flow tools revised and published online</i>	<i>Jan. 15, 2021</i>

Activity 2: Community Scale Energy Storage & Renewable Energy Demonstration

Develop protocol for characteristics of 3 Exemplar Demonstration Projects, which will be examples of representative community scale energy customers with on-site renewable energy resources, control over their "nano-grid" energy system, and widely replicable. The Guidebook's tool will help pick the appropriate technology type and applications, and technical assistance will be provided for proper installation and operation.

ENRTF BUDGET: \$437,979

Outcome	Completion Date
1. Potential sites for 3 Exemplar Demonstration Projects have been evaluated via research, site visits	Dec. 31, 2019
2. Exemplar Demonstration Projects hosts selected	April 30, 2020
3. Project team has met with Exemplar Demonstration Projects hosts, presented guidebook and decision tools information	July 31, 2020



Environment and Natural Resources Trust Fund (ENRTF)
2019 Main Proposal

4. Post-Doctoral fellow and Advisory Group provide technical support for installation of storage system and controls.	May 31, 2021
5. Field Day site tours of 3 projects, presentations by customer and experts, completed	Feb. 28, 2022
6. <i>Demonstration projects assessment report completed</i>	Feb. 28, 2022

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

Name	Title	Affiliation	Role
Ellen Anderson	Energy Transition Lab	University of Minnesota	Project Lead
UMN Graduate RA	Grad RA	University of Minnesota	Web development, logistics
Post-Doc	Research Fellow	University of Minnesota	Technical support
Exemplar Demonstration Projects Hosts	TBD	TBD	Install energy storage system, share learning

B. Partners NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Advisory Group Stakeholder Experts	TBD	TBD	Advise entire project

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

Our tangible outcomes--the Energy Storage Guidebook, 3 Exemplar Demonstration Projects, public "Field Days"--will be supplemented by the Minnesota Energy Storage Alliance's work to accelerate understanding and deployment of energy storage in Minnesota for a cleaner and more efficient grid. We will highlight this project at ETL's annual Energy Storage Summit, host knowledge tools on our website, and share it with stakeholders and our many partners from across the Midwest. The experience and knowledge gained can be a replicable model for small-scale microgrids and community-based energy customers across our region, and inspire ongoing dissemination, implementation and further research. Our state's transition to clean energy depends upon broad adoption of local renewable energy resources, but small-scale energy users often lack the resources or knowledge to vet complex technology choices. Once we can demonstrate the viability of these projects, project financing becomes easier. [The Energy Transition Lab is supported by the University of Minnesota's Institute on the Environment. ETL's funding to work on energy storage has come from the UMN's Office of Vice President for Research, the McKnight Foundation, the Energy Foundation, the Carolyn Foundation, and various companies including Mortenson, Great River Energy, Target, and others.

V. TIME LINE REQUIREMENTS: The research, creation of Guidebook, and creation of Advisory Group will start in the first year, while appropriate host sites (one rural-agricultural, one northern MN, and one metro) will be selected. Then the guides will be used to educate host entities, improve the guide, and evaluate and plan optimized installations of battery storage. Finally, battery storage will be installed, and all learnings will be shared in various ways with Minnesotans broadly.

VI. SEE ADDITIONAL PROPOSAL COMPONENTS:

A. Proposal Budget Spreadsheet

B. Visual Component or Map

C. Project Manager Qualifications and Organization Description

2019 Proposal Budget Spreadsheet

Project Title: Community-Scale Energy Storage for Renewable Energy

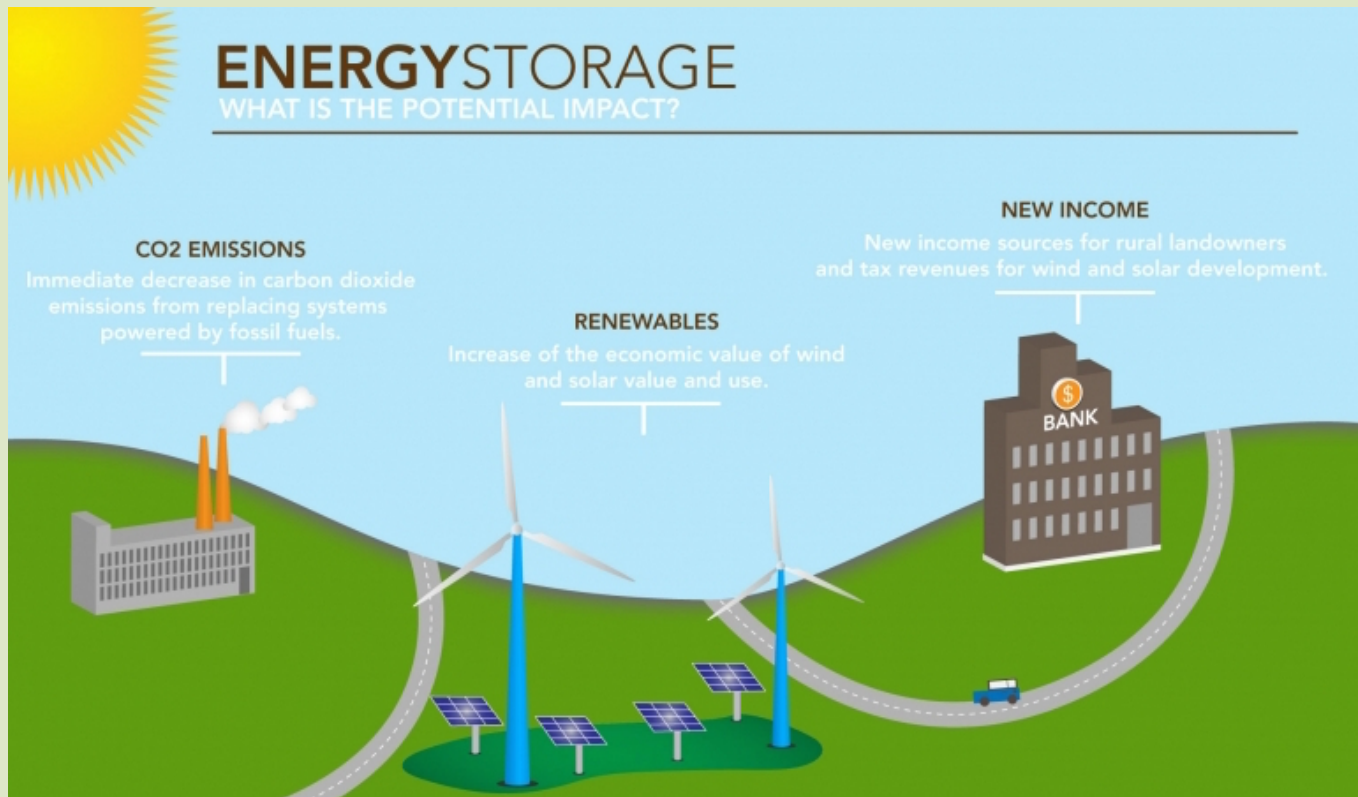
IV. TOTAL ENRTF REQUEST BUDGET 3 years

BUDGET ITEM (See "Guidance on Allowable Expenses")	AMOUNT
Personnel:	
Ellen Anderson, Project Manager (75% salary, 25% fringe) 30%FTE for year 1, 25%FTE for year 2, 20%FTE year 3.	\$ 115,078
Post Doc (82% salary, 18% fringe) 100% FTE for year 2 only.	\$ 70,970
Graduate Research Assistant (55% salary, 8% fringe, 37% tuition remission) 50% FTE during the Academic Years and 50%FTE summers 1 & 2, 25% summer 3.	\$ 124,011
Professional/ Technical/Service Contracts	
Technical assistant to create user-friendly web-based guide for community-scale energy storage based on Activity 1 and learning from Activity 2	\$ 5,000
Equipment/Tools/Supplies:	
3 Energy Storage systems including batteries and installation of system at maximum \$100,000 each (with potential additional funds to be added by host sites)	\$ 300,000
Office supplies	\$ 300
Printing of guidebooks and field day promotion materials	\$ 3,861
Acquisition (Fee Title or Permanent Easements):	\$ -
Travel:	
In-state travel and meals for project team, project advisors and focus group of representative customers in Activity 1, in-state travel and meals for project team, host site participants, advisory group, and field day participants in Activity 2. Total: Mileage, \$6,640; Meals, \$7,895; Lodging for overnight travel, \$3550.	\$ 18,085
Additional Budget Items:	\$ -
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 637,305

V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

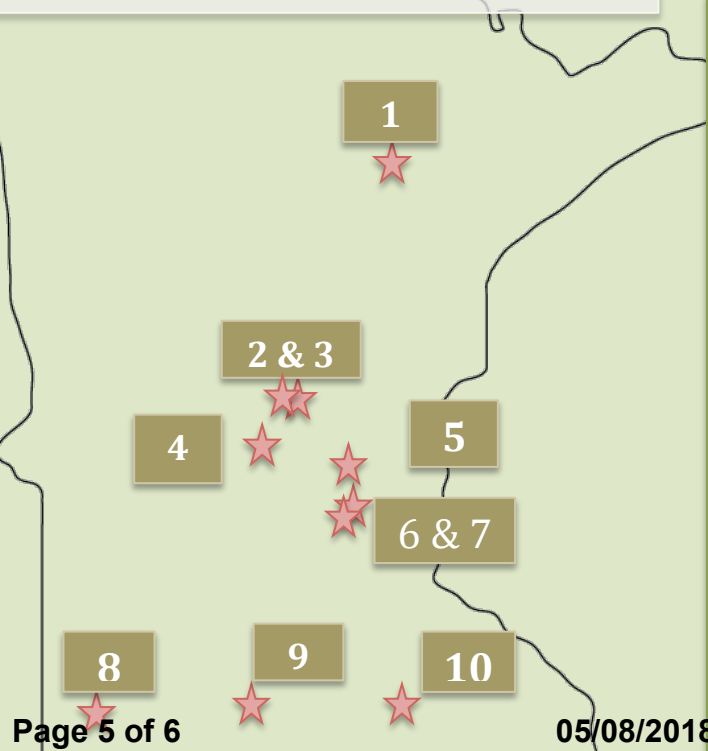
SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ To Be Applied To Project During Project Period: N/A	N/A	
Other State \$ To Be Applied To Project During Project Period: N/A	N/A	
In-kind Services To Be Applied To Project During Project Period: N/A	N/A	
Past and Current ENRTF Appropriation: N/A	N/A	
Other Funding History: N/A	N/A	

Community-Scale Energy Storage Guide for Clean Energy



Source: energy.gov

MN Energy Storage Projects



1. Mesabi Range Pumped Hydro (PHES)
2. Wright-Henn. Solar + Storage
3. National Rural Electric Co-Op - Rockford
4. National Rural Electric Co-Op - Litchfield
5. National Rural Electric Co-Op - Shakopee
6. National Rural Electric Co-Op - Jordan
7. National Rural Electric Co-Op
8. XCEL Wind to Battery
9. National Rural Electric Co-Op - Jackson
10. Austin Utilities ES Pilot

LCCMR Project Manager Qualifications

Ellen Anderson is Executive Director of the University of Minnesota's Energy Transition Lab. The Lab leverages University expertise in law, policy, and many other disciplines, in partnership with the public, private, community, and nonprofit sectors, to help solve our biggest energy challenges for the future. At the ETL, Anderson created and leads Minnesota Energy Storage Alliance, a stakeholder organization of public, private, nonprofit, community, and University energy storage experts. She organized the first Minnesota Energy Storage Summit in July 2015 and the Midwest Energy Storage Summit in September 2017.

She is also Adjunct Associate Professor with the U of MN Law School and the Sustainability Studies program, and co-teaches a Grand Challenge Curriculum course, Pathways to Renewable Energy.

From 2012 to 2014, Anderson was Senior Advisor on Energy and Environment to Governor Mark Dayton and assisted the state Environmental Quality Board (EQB). From 2011-2012 she was Chair of the Minnesota Public Utilities Commission.

Anderson served in the Minnesota Senate from 1993–2011, representing several neighborhoods of St. Paul and the city of Falcon Heights. She chaired the Energy Committee, the Environment and Energy Finance Committee, and other key committees; served on the LCCMR for 10 years, and was a founding member of the Lessard-Sams Outdoor Heritage Council. Her signature legislation includes the Renewable Energy Standard and many other energy laws, and she has an unparalleled knowledge of Minnesota renewable and clean energy law and policy.

Anderson holds a B.A. from Carleton College and J.D. *cum laude* from the University of Minnesota Law School. She has received dozens of awards for her leadership.