

**Environment and Natural Resources Trust Fund
2014 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 137-E

Solar PV at Minnesotas Residential Environmental Learning Centers

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

Total Project Budget: \$ 150,000

Proposed Project Time Period for the Funding Requested: 1 Year, July 1, 2014 - December 31, 20

Summary:

5 kw institutional solar arrays will be installed at each of six residential environmental learning centers. Online monitoring, site demonstration and recently developed solar curriculum will reach thousands annually.

Name: Dale Yerger

Sponsoring Organization: Eagle Bluff, Wolf Ridge, Deep Portage, Long Lake, Audubon Center of the North

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Web Address www.deep-portage.org

Location

Region: Statewide

County Name: Statewide

City / Township:

<input type="checkbox"/> Funding Priorities	<input type="checkbox"/> Multiple Benefits	<input type="checkbox"/> Outcomes	<input type="checkbox"/> Knowledge Base
<input type="checkbox"/> Extent of Impact	<input type="checkbox"/> Innovation	<input type="checkbox"/> Scientific/Tech Basis	<input type="checkbox"/> Urgency
<input type="checkbox"/> Capacity Readiness	<input type="checkbox"/> Leverage	<input type="checkbox"/> Employment	<input type="checkbox"/> TOTAL <input type="checkbox"/> %



Environment and Natural Resources Trust Fund (ENRTF)

2014 Main Proposal

Project Title: *Solar PV at Minnesota's Residential Environmental Learning Centers*

PROJECT TITLE: Solar PV at Minnesota's residential environmental learning centers

I. PROJECT STATEMENT

In 2010 the collective of the 6 RELCs in the state implemented a diverse impact of projects with ENRTF funding. Each center implemented demonstration projects of conservation, efficiency and renewable energy educational demonstrations, yet no project included photovoltaic power generation at an institutional scale (one project included a small PV residential system). Small wind, solar hot water, envelope improvements, lighting improvements and development of energy sustainability curriculum were a few of the accomplishments of this funding. Thousands of Minnesotans have participated in a sustainable energy tour or class.

Photovoltaic (PV) power technology has progressed dramatically in the past three years resulting in ubiquitous presence in our society, e.g. PV products are now common in home improvement stores. If we are to prepare our children to understand and embrace a future with a more sustainable lifestyle, noting PV as a central source of power, the young people we educate need to have context and connection to the technology. With over 500 schools currently using the MN RELCs for field-based learning experiences, the use of PV as a teaching tool integrates the students' understanding into not only their curriculum but also their lifestyle. At other facilities students may notice a renewable energy installation; at a RELC the renewable energy is a genuine tool of teaching. The RELCs are living laboratories of learning. The PV system each center will install will be made in Minnesota, and we will do our best to encourage local contractors to bid on this project.

Many school curriculums are including STEM education. (STEM is Science, Technology, Engineering and Mathematics.) All centers will implement on-line monitoring systems with their PV install. This system will achieve the monitoring needed to assure performance as well as document CO2 impact, but it will also function as a STEM tool of education. The on-line tools available from a reporting system like Emphase Enlighten can be shared with school staff (science teachers, math, engineering) and will deepen STEM understanding.

By implementing installations of PV technology at each center—5 KW per center—we will produce 30,000 KWH each year, saving 36 tons of CO2. The tens of thousands of youth who annually attend our centers are the future of choice relative to PV solar in residences, businesses and municipal buildings. We are the environmental education experts in Minnesota. We will achieve verification of our CO2 savings by each center implementing data gathering and reporting of the function and power production of their array.

The monitoring display will be used for visiting schools to learn of the impact and value of the PV installation through incorporated use with the curriculum produced at each center with the ENRTF funding of 2010.

II. DESCRIPTION OF PROJECT ACTIVITIES

Each center will retain expert consultation to conduct a site analysis for best placement of the array. Each center will install a 20 Kilowatt array of solar photovoltaic panels incorporated with a monitoring system to document production, thus CO2 savings, as well for educational integration into existing center.

Activity 1: Site Analysis at each center

Budget: \$ 12,000

As the 5KW will need to be placed appropriately to maximize sun exposure as well as assure compliance with building codes and connection to the power grid, expert consultation is needed to discover placement options and choices.



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Outcome	Completion Date
<i>1. Site analysis for solar exposure. Analysis document to be provided by contractor</i>	<i>Dec 31, 2014</i>
<i>2. Existing building electrical and meter analysis. Analysis document to be provided.</i>	<i>January 31, 2015</i>
<i>3. Recommendation for best placement of 5KW array</i>	<i>January 31, 2015</i>

Activity 2: *Design/Build Contracts for Installation of PV Array and Monitoring System*

Budget: \$138,000

Each center will conduct their own bid process to assure maximized efficiency of using local area contractors to complete a design/build project.

Outcome	Completion Date
<i>1. Bid process conducted for contractors, with contractor chosen</i>	<i>June 1, 2015</i>
<i>2. Install of 5KW Array</i>	<i>October, 1, 2015</i>
<i>3. Install of monitoring system to assure performance and provided teaching tool</i>	<i>October 1, 2015</i>

III. PROJECT STRATEGY

A. Project Team/Partners

The Audubon Center, Deep Portage, Eagle Bluff, Laurentian, Long Lake and Wolf Ridge

B. Timeline Requirements

We estimate that it will take up to six months to complete site analysis and design, and go out to bids. All construction work will be completed within the next 12 months, with expected completion date for all project work by Dec 31, 2015.

C. Long-Term Strategy and Future Funding Needs

This project requires no future funding or on-going strategy to support its needs. The system each center installs will have a warranty of 10 years, and the panels themselves will be warranted for 25 years. No long-term funding is needed as each array will save each center \$700 per year, which more than funds the annual maintenance requirements. Each center already has renewable energies located on their site, and maintenance of the array will be integrated into the maintenance protocols of the respective centers.

2014 Detailed Project Budget

Project Title: SolarPV at Minnesota's Residential Environmental Learning Centers

IV. TOTAL ENRTF REQUEST BUDGET - One Year

<u>BUDGET ITEM</u> (See "Guidance on Allowable Expenses", p. 13)	<u>AMOUNT</u>
Contracts: Site Analysis and Array Placement Recommendation Service (\$2,000/center x 6)	\$ 12,000
Contracts: Design Build Contract for Installation of 20KW Array and Monitoring System (\$23,000/center x 6)	\$ 138,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 150,000

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
In-kind Services During Project Period: Management of the project and support for contractors will be provided as in-kind support by each center. 100 hours/center has been allotted for this support.	\$ 18,000	<i>Secured, \$3,000/center</i>
Funding History: In 2010 the collective group of RELCs received ENRTF funds to implement sustainable energy practices at each center. This included development of curriculum respective to	\$ 1,500,000	Past ENTRF funds, 2010

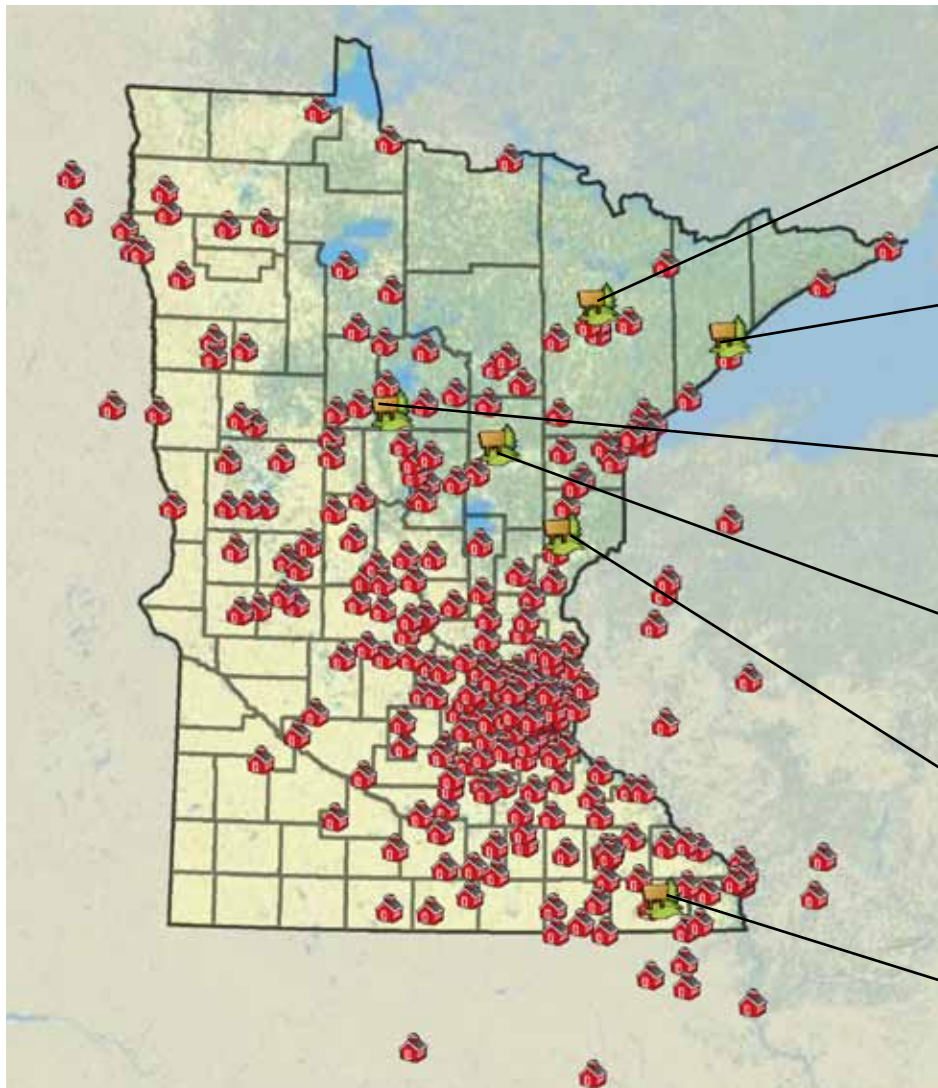
Minnesota's Residential Environmental Learning Centers & Location of Schools Attending

2011 Service Through MNRELCs

585 schools

45 colleges

84,000 people



Laurentian Environmental Center

8950 Peppard Road, Britt, MN, 55710, St. Louis County

Wolf Ridge Environmental Learning Center

6282 Cranberry Road, Finland, MN, 55603, Lake County

Deep Portage Learning Center

2197 Nature Center Dr., Hackensack, MN, 56452, Cass County

Long Lake Conservation Center

Palisade, MN, 56469, Aitkin County

Audubon Center of the Northwoods

54165 Audubon Road, Sandstone, MN, 55072, Pine County

Eagle Bluff Environmental Learning Center

28097 Goodview Dr., Lanesboro, MN, 55949, Filmore County

Project Manager

Dale Yerger B.A. Western State University- Gunnison, Colorado 1980

28 years of Environmental Education experience

16 years director of Deep Portage Learning Center, Hackensack, MN

4 years experience with solar electric PV systems, solar hot water, and wood gasification

Partners; Residential environmental learning centers

Joe Deden director Eagle Bluff-Lanesboro ,MN

Peter Smerud director Wolf Ridge- Finland, MN

Bryan Wood director Audubon center of the Northwood's –Sandstone MN

Scott Rian director Long Lake-Palisade MN

Karl Brown director Laurentian ELC –Britt MN

Minnesota's Residential Environmental Learning Centers (RELC's) have existed for 40 years and now a million or more students have been educated about or natural resources and outdoor heritage. These centers are accredited as special function schools and provide state of the art Environmental Education in 6 outstanding campuses in every corner of the state.