

Environment and Natural Resources Trust Fund (ENRTF) 2010 Work Program

Date of Report: 12/30/2009
Date of Next Progress Report: 1/15/2011
Date of Work Program Approval:
Project Completion Date: 6/30/2012

I. PROJECT TITLE: Demonstrating Sustainable Energy Practices at Residential Environmental Learning Centers (RELCs)—Deep Portage Learning Center (7d-3)

Project Manager: Dale Yerger, Director of Deep Portage Learning Center
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Location: *Aitkin, Cass, Fillmore, Lake, Pine, and St. Louis Counties*

| | | |
|------------------------------------|----------------------------|------------------|
| Total ENRTF Project Budget: | ENRTF Appropriation | \$212,000 |
| | Minus Amount Spent: | \$ 0 |
| | Equal Balance: | \$212,000 |

Legal Citation: M.L. 2010, Chp. 362, Sec. 2, Subd. 7d3

Appropriation Language:

\$1,500,000 is from the trust fund to the commissioner of natural resources for agreements as follows: \$206,000 with Audubon Center of the North Woods; \$212,000 with Deep Portage Learning Center; \$350,000 with Eagle Bluff Environmental Learning Center; \$258,000 with Laurentian Environmental Learning Center; \$240,000 with Long Lake Conservation Center; and \$234,000 with Wolf Ridge Environmental Learning Center to implement renewable energy, energy efficiency, and energy conservation practices at the facilities. Efforts will include dissemination of related energy education.

II. PROJECT SUMMARY AND RESULTS: Six Residential Environmental Learning Centers (RELCs – Audubon Center, Deep Portage, Eagle Bluff, Laurentian, Long Lake and Wolf Ridge) will reduce their carbon footprints while disseminating energy education that focuses on renewable energy, energy efficiency, and conservation options. The centers, supported by Bush and Butler Foundations, chose to invest in a professional energy audit utilizing the engineering and consulting firm McKinstry. The LCCMR trust fund dollars will fund several improvements that are in the McKinstry recommendations. We will demonstrate and measure these improvements and will post this data on our website and blogs. We have 10,000 program participants per year and another 10,000 drop-in visitors that will have access to this information and

demonstration. We will conduct workshops and lead tours. We will emphasize cost savings and carbon reduction. Due to the variations of each center's location, the suggested solutions represent a variety of options and make the combined effort important for statewide dissemination. McKinstry's study is the basis for our collective energy investment and education development request.

The Environment and Natural Resources Trust Fund (ENTRF) will allow Deep Portage Learning Center (DPLC) to: 1) Increase conservation measures and energy efficiency; 2) invest in renewable energies using appropriate technologies for our center; and 3) conduct multi-faceted educational outreach. A web consultant will design and construct a website showing each center's energy-related information for educational use while providing statewide verification of the engineering and installation results.

III. PROGRESS SUMMARY AS OF 11/30/2009

IV. OUTLINE OF PROJECT RESULTS:

RESULT 1/ACTIVITY 1 Implementation of carbon and energy reduction systems for education and demonstration purposes at Deep Portage Learning Center (DPLC). Budget \$212,000. Completion Date June 30, 2012.

Description: DPLC is located in Cass County, Minnesota. We serve 10-20,000 participants annually—from Minnesota and Iowa, and a small percentage of international groups. Our campus encompasses approximately 60,000 square feet. Our focus is environmental literacy for all ages.

The McKinstry report recommended a number of items that would improve the efficiency of our campus. In April 2008 when our summary was presented we were using 30,000 gallons of propane per year. (that's 378,000 lbs of carbon per year) The McKinstry report recommended the following priorities:

- Improve building envelope performance
- Add lighting controls to existing fixtures
- Convert domestic hot water with additional solar heating and instantaneous electric back up
- Upgrade existing temperature controls.

Since the McKinstry report, DPLC has already implemented some carbon reducing modifications using other funds. Instead of upgrading the temperature controls we took an alternative approach and added a wood gasification energy system to our facility in October 2009.

With these ENTRF funds we will continue to implement carbon cutting measures at DPLC by focusing on the following four McKinstry recommendations:

1. Installing a 900 gallon per day solar hot water system
2. Envelope improvements to the main lodge and the interpretive center
3. Small wind project to offset Kw hour usage
4. Electrical Improvements

We have chosen these 4 recommendations based on their ability to reduce carbon and demonstrate alternative energy.

Solar Hot Water. We use 900 gallons of hot water per day, a solar hot water system would reduce our reliance on propane and electricity. We plan to install an engineered system that will supply us with our hot water needs, which is especially efficient during the summer months when our wood system is not in use.

Envelope improvements The windows and doors in our 54,000 square foot facility are between 10 and 24 years old, they leak a lot of heat and have significant gaps. We plan to replace the oldest windows and doors first.

Small Wind We plan to install a 10 K wind turbine on a 130 foot high lattice tower help to offset the 232,000 Kw hours that we currently use each year.

Electrical Improvements, Mckinstry recommended lighting upgrades to reduce Kw hours usage. We plan to change out lighting fixtures, switches, and refrigeration and freezer compressors.

The Goal of the McKinstry study was to increase building health and efficiency thereby reducing the carbon footprint of our facility. Our plan will achieve to following goals:

1. reduce carbon
2. decrease operating expense
3. demonstrate alternative energy and conservation
4. generally show that an older building can be upgraded to have near LEED certification efficiency, most of us will improve our existing structure if there are technologies available to lower costs and save energy.

In summary, we are reducing propane and Kw hours, these two sources of carbon usage represent the low hanging fruit of carbon reduction . These improvements will be at the heart of our alternative energy demonstration and education program. Through the implementation of envelope improvements, mechanical improvements, and photovoltaic demonstration at DPLC, this project is expected to reduce carbon output by 76,883 lbs per year.

Estimated Carbon Reduction: The ENTRF project will reduce 76,883lbs. of CO2.

Summary Budget Information for Result 1: ENRTF Budget: \$212,000
Amount Spent: \$ 0
Balance: \$212,000

| Deliverable/Outcome | Completion Date | Budget | Estimated Carbon Reduction (#s) |
|---|-----------------|----------|---------------------------------|
| 1-1 Solar Hot Water | 12/31/10 | \$74,000 | 8,883 lbs. |
| 1-2 Envelope & Electrical Improvements | 12/31/10 | \$61,000 | 32,000 lbs |
| 1-3 Small Wind | 12/31/10 | \$56,000 | 36,000 lbs |
| 1-4 Professional/Technical Contracts | 12/31/10 | \$21,000 | 0 lbs. |

Result Completion Date: June 30, 2012

Result Status as of 1/15/2011:

Result Status as of 7/15/2011:

Result Status as of 1/15/2012:

Result Status as of 7/15/2012:

Final Report Summary: 7/15/2012

V. TOTAL ENRTF PROJECT BUDGET:

Contracts: \$21,000. These funds will pay for the design and engineering work, including writing the bid specs and creating the RFP for the competitive bid process.

Supplies: \$0

Capital Improvements: \$191,000

Solar Hot Water – \$74,000 - 50% equipment, 50% installation

Envelope & Electrical Improvements - \$61,000 - 50% equipment, 50% installation

Small wind \$56,000 80% equipment 20% installation

TOTAL ENRTF PROJECT BUDGET: \$212,000

Explanation of Capital Expenditures Greater Than \$3,500: The capital improvements indicated above that are made with these funds are fixed capital assets and will remain in place and will continue to be used for the same program throughout its useful life.

VI. PROJECT STRATEGY:

A. Project Partners: Audubon Center, Sandstone; Deep Portage, Walker; Eagle Bluff, Lanesboro; Laurentian, Britt; Long Lake, McGregor; and Wolf Ridge, Finland.

B. Project Impact and Long-term Strategy: We started the carbon reduction process with the aforementioned 2009 Deep Portage/DEED Project. The ENRTF project will be the second step. We have an overall campus goal of carbon reduction and energy efficiency that is expected to cost \$1,000,000 (\$6 million for the total partnership). Deep Portage will continue to work with our five other partners to implement Educational Programs and achieve our goal of modeling efficiency and carbon reduction.

C. Other Funds Proposed to be spent during the Project Period:

| Item | Overall RELC Project | Deep Portage Learning Center |
|---------------------------------|----------------------|------------------------------|
| C1: In-kind services RELC staff | \$30,000 | \$5000 |

| | | |
|---|-------------|-----------|
| C2: Continued Project Development, Butler Family Fund | \$30,000 | \$5000 |
| C3: Federal Allocation | \$1,500,000 | \$300,000 |

D. Spending History:

| Item | Overall RELC Project | Deep Portage Learning Center |
|---|----------------------|------------------------------|
| Bush Foundation – McKinstry Study | \$176,000 | \$29,300 |
| Butler Family Foundation – Project Development | \$30,000 | \$5,000 |
| Deep Portage Foundation / MN DEED project | | \$305,000 |

VII. DISSEMINATION: Information about this project will be disseminated in our center’s newsletters, website and blogs ,emails, and annual reports. It will also be discussed in all future New ERA training seminars held on-site at each center.

The Energy Resource Advisor (ERA) certificate, developed by Winona State University, is a new curriculum designed to accelerate public understanding of energy efficiency, clean energy, carbon emissions, resource conservation, green technologies, and green jobs. This curriculum is the *first of its kind in Minnesota*. It is a non-credit, continuing education course for adults 18 years of age and older, *using online instructional technology combined with applied, field experience at one of the six RELCs*.

Participants in this class will learn about: a) the basic components of an energy audit, b) small-scale renewable energy including site suitability, system sizing, and financial incentives that are available, c) alternative building and transportation options, d) ways to “green up” the home or business, and e) the field of emerging “green” jobs.

After completing this course, the successful participant may serve as an energy resource advisor and “green” consultant in the community and workplace.

VIII. REPORTING REQUIREMENTS: Periodic work program progress reports will be submitted not later than 01/15/2011, 7/15/2011 and 1/15/2012. A final work program report and associated products will be submitted between June 30 and August 1, 2012 as requested by the ENTRF.

| Attachment A: Budget Detail for 2010 Projects - Summary and a Budget page for each partner (if applicable) | | | | | |
|--|---|------------------------|-------------------|------------------|------------------|
| Project Title: Demonstrating Sustainable Energy Practices at Residential Environmental Learning Centers (RELCs) 7d-3 Deep Portage Learning Center | | | | | |
| Project Manager Name: Dale Yerger | | | | | |
| Trust Fund Appropriation: \$1,500,000 | | | | | |
| 2010 Trust Fund Budget | Result 1 Budget: | Amount Spent (date) | Balance (date) | TOTAL BUDGET | TOTAL BALANCE |
| | Implementation of carbon and energy reduction systems for education and demonstration purposes. | | | | |
| BUDGET ITEM | | | | | |
| Contracts | | | | | |
| Professional/technical: These funds will pay for the design and engineering work, including writer the bid specs and creating the RFP for the competitive bid process for Solar Hot Water, Envelope & Mechanical and Photovoltaic Demonstration | 21,000 | | 21,000 | 21,000 | 21,000 |
| Capital equipment over \$3,500 | | | | | |
| Solar Hot Water--50% equipment, 50% installation | 30,000 | 0 | 30,000 | 30,000 | 30,000 |
| Envelope & Mechanical Improvements--50% equipment, 50% installation | 155,000 | 0 | 155,000 | 155,000 | 155,000 |
| Photovoltaic--70% equipment, 30% installation | 6,000 | 0 | 6,000 | 6,000 | 6,000 |
| | | | | | |
| COLUMN TOTAL | \$212,000 | \$0 | \$212,000 | \$212,000 | \$212,000 |