2010 Project Abstract
For the Period Ending June 30, 2012

PROJECT TITLE: Demonstrating Sustainable Energy Practices at RELCs – Eagle Bluff
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: MN Laws 2010, Chapter 362, Sect 2, Sub 7d1

APPROPRIATION AMOUNT: $350,000

Overall Project Outcome and Results
Minnesota's six accredited Residential Environmental Learning Center's undertook a collaborative project, "Today's Leaders for a Sustainable Tomorrow," with the intent of acting as a public resource for information regarding energy use and energy technologies. This was accomplished by demonstrating geographically appropriate technologies for reducing energy use and providing public access to energy information through formal education programs and a web presence. In-depth information on each center's energy reduction demonstrations are found in their individual reports. A bulleted summary of each demonstration is as follows:

- **Eagle Bluff Environmental Learning Center – Lanesboro, MN:** Installed deep energy reduction retrofit, solar thermal, and a solar hot water heater.
- **Audubon Center of the North Woods – Sandstone, MN:** Installed geothermal heat pump, solar arrays, solar panels, and a wind generator.
- **Deep Portage Learning Center – Walker, MN:** Installed wood gasification system and lighting upgrades (CFLs to LEDs and T12s to T8s).
- **Laurentian Environmental Learning Center – Britt, MN:** Installed building envelope improvements, energy conservation technologies, and a solar hot water heater.
- **Long Lake Conservation Center – Palisades, MN:** Installed building envelope improvements, a solar hot water heater, and lighting upgrades (trail lighting and T12s to T8s).
- **Wolf Ridge Environmental Learning Center – Finland, MN:** Installed biofuel heating system, solar arrays, wind generation, and lighting upgrades (trail lighting and T 12s to T8s).

Eagle Bluff implemented a deep energy reduction retrofit on its most inefficient building, the staff residence. The building was super insulated using the Cold Climate Housings Research Center's REMOTE (Residence Exterior Membrane Outside-insulate Technique). Solar thermal heat was added for domestic hot water and building heating. A 5.6 Kw solar photovoltaic system provides green power for the heating system. As a result of the retrofit, the building became the 9th house in North America to receive ACI's 1000 Home Challenge for reducing energy consumption by over 78% A pdf describing the project is available from Eagle Bluff.

All centers collaborated in developing over 20 new units of educational curriculum based on the following seven areas: biomass, conservation, efficiency, energy basics, food and energy, solar power and wind power. An activity toolbox was designed for use at the RELC's and in the formal classroom. They range from formal lessons to informal tours to an energy choice challenge and are currently in practice at the RELC's collectively reaching nearly 60,000

visitors/students annually. In order to determine the efficacy of the educational materials and program, an external assessment was done which evaluated the knowledge and behaviors of visitors to the RELC who participated in the activities. The results showed that 88.5% of children and 50.6% of adults had an increase in knowledge and 70.2% of children and 52.6% of adults increased their energy conserving behaviors while visiting an RELC.

Project Results Use and Dissemination

Homeowners, commercial businesses, educators and the general public can access the educational materials, assessment results, demonstration information, and current energy use/production on the Today's Leaders for a Sustainable Tomorrow website at: www.tlfast.org.

In addition, this project has allowed the centers the opportunity to collaborate with Winona State University to offer an Energy Resource Advisor course which is part of Continuing Education program and a core course in WSU's Sustainability major.

Using the TLFAST demonstrations and curriculum as the framework, the centers are also now positioned to collaborate on an innovative program funded by the National Science Foundation which focuses on providing informal STEM (Science-Technology-Engineering-Math) experiences for K-12 students.

In the upcoming year and upon the total completion of the project, the centers' will be participating in tours, conferences, or workshops to share the success of the project and publicize the resources available to the public as a result of the project.