

Investing in Renewable Energy

Solar Geothermal Project provides electricity, heating, and cooling for non-profit organization

Project Description:

Merrick, Inc., a non-profit agency that provides vocational training to adults with developmental disabilities, installed a 100 kW solar photovoltaic (PV) system on its roof. The solar array was connected to an existing geothermal heating and cooling system to help create one of the most unique and environmentally friendly commercial buildings in the State of Minnesota.

The project is an excellent example of combining alternative technologies in a commercial setting. The solar array provides approximately 33% of Merrick's electricity needs while the geothermal system meets 100% of the agency's heating and cooling needs. This solar geothermal combination was one of the first of its kind in Minnesota and provides a learning opportunity for other companies exploring alternative energy solutions.

The project received an RDF grant in combination with a \$52,000 investment from Merrick. In addition, Merrick invested \$250,000 on weatherization and energy efficiency improvements to further reduce energy needs.

Methodology:

- Lars Architectural Services designed the solar array
- Building permits were obtained from the City of Vadnais Heights and a project engineer reviewed the plans to ensure the building could support the solar array
- The mounts, inverters and solar panels were procured from AEE Solar
- Energy Concepts of Hudson, Wisconsin installed the 525 panel solar array for Merrick
- The solar array installation was complete after passing electrical testing by the State of Minnesota and Xcel Energy



Grantee: Merrick, Inc.

Additional Team Members: Energy Concepts, Inc. (project designer and installer)

Project Dates: 10/22/2008 – 12/22/2008

RDF Funding Cycle: 3rd

Project Funding: \$735,000 RDF Grant (Total project costs \$787,000)

Project ID: EP3-2

RDF Mission: To increase renewable energy market penetration, assist renewable energy projects and companies, and support emerging renewable energy technology through research and development.

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Executive summary:

The Solar Geothermal Project is a unique combination of renewable technologies utilizing solar and geothermal to provide electricity, heating, and cooling for a non-profit organization. In addition to the significant environmental benefits, the project provides long-term social benefits, as the organization is able to invest more money into its community programs due to its reduced energy costs. The Xcel Energy Renewable Development Fund continues to promote the growth of alternative energies in Minnesota by funding projects like Merrick's solar geothermal system.

Benefits:

- **Increased Renewable Energy:** The grid-connected project adds another 100 kW of solar power to electricity generation in Minnesota
- **Educational Opportunity:** The solar geothermal project provides an example on how organizations can successfully combine alternative energy sources to create an environmentally-friendly building
- **Social Benefit:** The solar array will generate approximately 33% of the total electricity needed to power the 52,000 square foot facility, reducing Merrick's electricity costs and allowing the non-profit to increase funding for its community programs

- **Environmental Benefit:** Over the next 25 years, the reduction in use of coal-generated electricity eliminates the emission of 6.2 million pounds of carbon dioxide, 10,800 pounds of sulfur dioxide and 18,000 pounds of nitrous oxide to the air

Lessons learned:

- Net metering and standby service requirements associated with self-generation projects should be resolved prior to project completion. Early attention to such matters will help prevent metering and billing problems after initiation of solar system operations.
- To limit snow load and wind shear, south facing panels were slanted 13 degrees, which is less than optimal.

Outcome:

The Solar Geothermal Project has demonstrated that a small non-profit organization can successfully create an environmentally friendly, economically viable building and has helped Merrick move closer to becoming 100% self-sustaining from an energy standpoint.

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