INFORMATION SHEET
RENEWABLE DEVELOPMENT FUND

Investing in Renewable Energy

SLAYTON SOLAR FACILITY

Executive Summary

Historically solar electricity in Minnesota has been generated primarily for self use through small photovoltaic (PV) arrays. This energy production project was to demonstrate the cost effectiveness of large-scale solar electric generation for sale in Minnesota. Co-locating the facility in the vicinity of wind energy generation is intended to improve the overall use and cost effectiveness of both the interconnection and transmission assets. The project also demonstrates the capacity of Minnesota's solar resources and ability to provide clean energy during peak demand hours.

Project Description

Renovo installed a 2.0 megawatt direct current (MWDC) PV array adjacent to the town of Slayton, Minn.. The array will produce approximately 2,620 megawatt hours per year, which is enough energy to power approximately 226 homes annually. The system was commissioned on Jan. 4, 2013, becoming the largest solar generation facility in the state.

Methodology

The 2.0 MWDC facility is a ground mounted array made up of 7,040 solar modules covering an area equal to approximately 7 ½ football fields. By locating the facility near Slayton, operational and production data can be obtained and analyzed along with nearby wind resources to determine the complementary nature of wind and solar power. This would include how Minnesota's seasons affects intermittent generation, compatibility of generation patterns with peak load conditions, and impacts on system reliability. The modules are mounted on embedded piers and fixed at 37 degrees to minimize loss in energy (versus an optimal 35 degree tilt) while optimizing the angle at which snow slides off.

Grantee: Renovo Renewable Energy ("Renovo")
Project Dates: 9/14/2011 – 4/1/2013
RDF Funding Cycle: 3
Project Funding: $2,000,000 RDF Grant (Total project cost $6,972,605)
Project ID: EP3-10
RDF Mission: To increase renewable energy market penetration, assist renewable energy projects and companies, and support emerging renewable energy technology through research and development.

Contact:
Renewable Development Fund
Xcel Energy - GO 7
414 Nicollet Mall
Minneapolis, MN 55401
rdfstaff@xcelenergy.com
www.xcelenergy.com/rdf
1-800-354-6060

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Benefits

- Expected carbon dioxide emission reductions of 2,133 tons/year.
- Generation of Renewable Energy Credits that are estimated to be $1,746 per year.
- All electric energy generated will qualify toward NSP's renewable portfolio mandate.
- Siting a large-scale solar facility in the same area as wind facilities will help evaluate and quantify how to better integrate these renewable resources.

Outcomes

- Features in the Star Tribune, Twin Cities Finance and Commerce, and local newspapers focused attention on solar resources in the state of Minnesota.
- Results demonstrate that large-scale PV facilities require subsidies to be economically viable in today's electric energy market.
- Public can view the facility's performance and production at www.slaytonsolar.com.

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Lessons Learned

There are many variables to take into account to determine at what size a solar facility becomes economically viable to interconnect directly to a transmission level circuit. Interconnecting renewable generation to a transmission line is costly and time consuming, therefore many systems are connected at the distribution level.

- A 2 MWDC solar project, on its own, is not economically viable to interconnect to a 69 kV transmission line.
- The point of interconnection should be as close to load as possible.
- A 12 kV distribution circuit is capable of handling a distributed generation solar facility between 1 to 5 MWDC.
- The amount of distributed generation that any single distribution circuit can handle is dependent upon not only capacity but also load

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