Renewable Development Fund
Project EP3-12

Milestone 5 Report – 04/05/10
Public

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Project Title: A Solar Electric Solution for Residential Markets

Contract Number: EP3-12  Milestone: 5  Report Date: 04/05/2010

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Congressional District for Corporate office: 5
Congressional Districts for Project location: Overall, across the Twin Cities, but for this installation corresponding to Milestone 5 - Districts 5.

Executive Summary

The goal of this project, as stated in the proposal submitted on July 17, 2007, is “to demonstrate the commercial viability of providing solar-generated electricity to homes and small businesses based on a leasing and service package”. In addition, the "project will provide distribute residential solar energy through rooftop-mounted photovoltaic solar panels" and the importance of the project is to overcome pricing and capitalization barriers in this market, which have been documented to be the biggest obstacles to solar expansion.

The key objective of the project is to install 280 KW of solar capacity in approximately 30 to 40 sites distributed across the Twin Cities. The exact number of installation sites will depend on the actual number of panels in each site.

The delivery of 280 KW will be grouped into 15 milestones, with the fifth milestone requiring the installation of 5.6 KW in one solar residential site.

The rest of this report will be dedicated to describe the technical details, what went well, what did not, lessons learned, etc.
As a reference to the reader, the installed capacity was 4.625KW in Minneapolis.

**Technical Progress**

From a technical perspective, the installation was successful with no major issues. As stated in previous reports, the process begins with permit requests and equipment ordering, in particular, building permits from each City, electrical permits from the State and submittal of Xcel Interconnection Agreement. On installation day, the process entails racking and ballasting, installation of micro-inverters and panels and electrical conduits/circuits to the home’s electrical service. After installation, inspections were conducted and an Xcel Area Engineer was scheduled for testing and commissioning. All inspections were conducted successfully and the resulting signed documents from Xcel are enclosed to this report in Appendix A (confidential information, given that it includes customer data).

The system is fully monitored with the Enphase Enlighten systems. For a real time view, please click on the following link. Please note the panel-by-panel electricity generation display and the buttons for ‘Time-lapse: Today’s Power/Power Last 7 days”, which are particularly insightful: [http://enlighten.enphaseenergy.com/installer_systems/590/freEner-g](http://enlighten.enphaseenergy.com/installer_systems/590/freEner-g)

**Project Benefits**

Project benefits are:

1. Demonstration of the viability of ‘solar-as-a-service’
2. Delivery of 280KW of generating capacity, which will count towards the Xcel Energy goal for Renewable Energy Standard
3. Green job generation
4. Generation of clean electricity for a minimum of 15 years

Given that 22.95 KW out of a total 280 KW have been delivered so far, the project benefits have been only partly achieved. In reference to benefit 3, green job generation, we report six Full-Time-Equivalent green jobs generated: Project Manager, Project Administrator, Project IT development and support, Crew Supervisor, and two Site Assessors/Installers. In addition, part-time electricians have been sub-contracted for each installation.

Project Findings – what went well and what to improve on

As we started the solar PV installation phase, the following went well:

- When working on a flat gravel roof, installing extra EPDM roofing material was a good preventive measure to protect the roof membrane, however, it entailed additional cost and time.
- For the first time, our installation combined Enphase micro-inverters with RapidRac racking. The result was clean and installation was fast.

Project findings to improve upon:
- Attaching the modules in advance at the warehouse would have improved the installation time on the roof. We will implement this approach on our next job.
Appendix A – Xcel Energy signed Interconnection Agreements-DELETED DUE TO CONFIDENTIAL INFORMATION