RDF Grant: Project Innovations

Eric Pasi, CDO, IPS Solar – Xcel RDF Advisory Board – October 10th, 2017



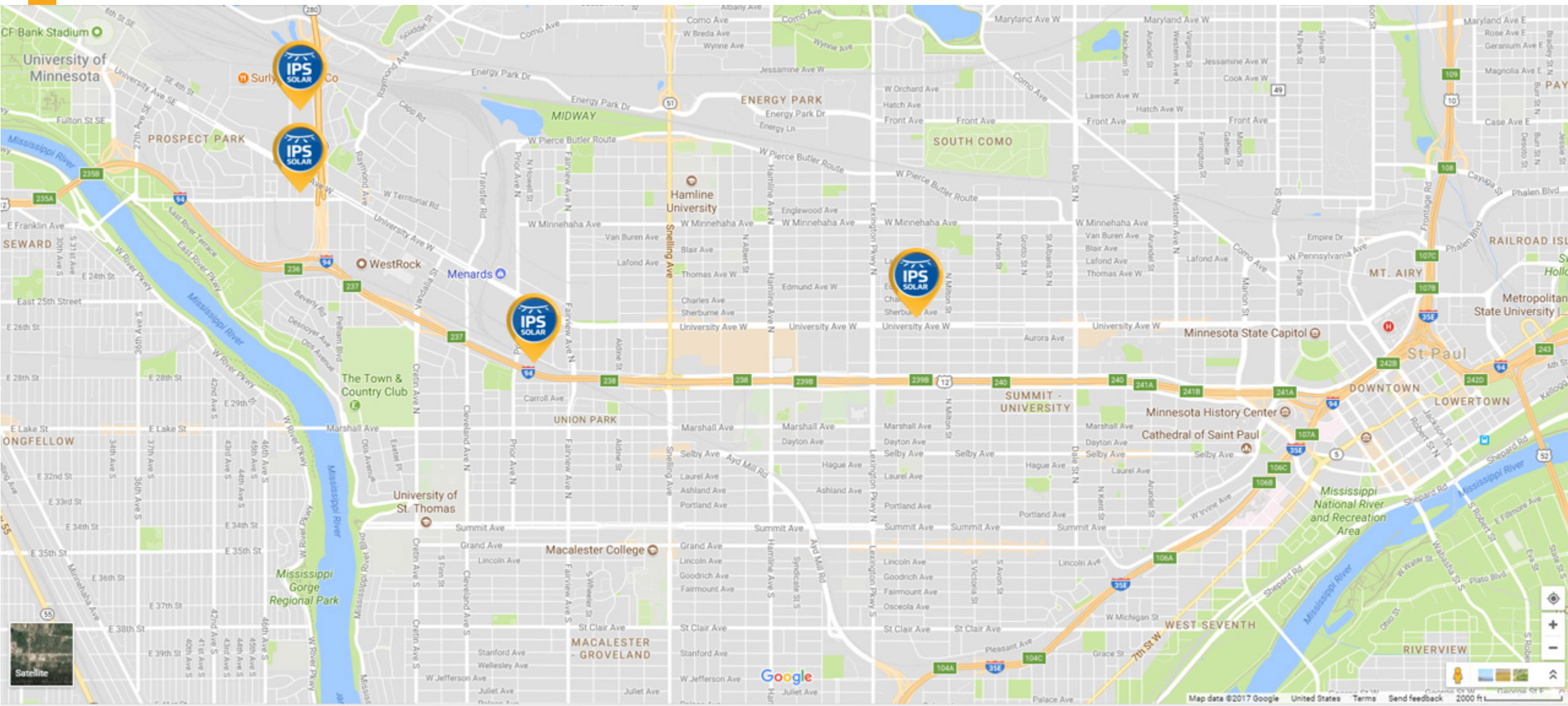

Project Site #1 – 1000 University Ave W, St Paul

Project Site #2 – 1919 University Ave W, St Paul

Project Site #3 – 1000 Westgate Dr, St Paul

Project Site #1 – 2550 University Ave W, St Paul

Project Locations



Project Objectives

- Install 967.27 kW (DC) photovoltaic capacity to demonstrate a development process utilizing private investment as a strategy for prudent commercial solar growth.
- Increase the penetration of solar energy in Minnesota.
- Establish a performance baseline for solar financing to quantify the true benefits of PV to the grid and to reduction in building demand during peak demand periods.
- Promote Minnesota-based solar energy technologies.

Project Status

	1000 University Ave.	1919 University Ave.	1000 Westgate Dr.	2550 University Ave.
RDF Grant Contract Signed	November 2015	November 2015	November 2015	November 2015
Interconnection Study Start	January 2016	January 2016	January 2016	January 2016
Interconnection Approved	April 1, 2016	September 14, 2016	September 19, 2016	September 19, 2016
Construction Start	May 15, 2016	May 26, 2015	August 21, 2016	September 3, 2016
Final Modules Installed	September 20, 2016	June 6, 2016	September 22, 2016	September 27, 2016
Mechanical Completion	October 2, 2016		March 16, 2017	May 5, 2017
Electrical Inspection	October 3, 2016		April 10, 2017	May 23, 2017
Meter Installation	October 4, 2016		April 19, 2017	May 30, 2017
System Commissioning	October 5, 2016		April 21, 2017	May 30, 2017
Formal PTO From Xcel Energy	October 26, 2016		April 24, 2017	May 30, 2017
Commercial Operation Date	October 26, 2016		April 24, 2017	May 30, 2017

Construction & Installation

REFLECT panels being installed at 1000 Westgate Drive

Construction & Installation

Ten K Solar Inverter BUS at 2550 University Avenue

Construction & Installation

Switchgear under construction at 1000 Westgate Drive

Construction & Installation

AC accumulation panel at 1000 University Avenue

Project Budget - $2,698,200 / Actual $3,041,162

- Out-sourcing the installation of the modules and AC electrical resulted in a significant shift in the project budget.
  - IPS had originally planned to undertake most of the installation in-house, but the booming Community Solar Garden market resulted in shortages of qualified installers and the need to bring in larger companies with more robust pools of labor. This shift resulted in an under-realization of Salaries/Wages & Fringe Benefits of $271,000.
- The decrease in Salaries/Wages & Fringe Benefits was offset by an increase of $980,000 in Consulting and Sub-contracting.
  - The reasons for this increase are twofold; requirements of the system owner, WGL Energy, and the difficulty of obtaining labor in the sudden booming Minnesota solar industry. WGL Energy was/is the owner of the four systems and associated PPA's with Xcel. As such, they imparted a series of engineering and installation requirements that were not included in the original budgetary estimates. These requirements resulted in more robust and well-vetted installations, but at an appropriately robust increase to the budget. The shortage of compliant installation labor throughout the region also contributed to higher sub-contracting costs by forcing IPS to pull in multiple companies during winter months to complete the installations within the agreed upon window required by WGL Energy.
- The volatility of solar panel pricing worked to IPS's favor in a savings of $376,000 in solar panels/inverters/racking.
  - There was a refund of $90,000 realized in 2017 from the panel manufacturer, TenK Solar, which increased this savings to $466,000 total.
- Indirect Costs of $195,000 were incurred due to interest on a loan with the Port Authority of St. Paul ($101,000) and damages assessed by WGL Energy for energizing the systems later than contractually agreed ($94,000).

Lessons Learned

- **Clarify tie-in method, receive AHJ sign-off early in process**
  - All solar projects need to be connected to the existing building electrical system (or directly into the utility grid) in a NEC and AHJ (Authority Having Jurisdiction) approved manner. The interpretation of the NEC by the AHJ can cause this connection to vary in different cities/counties/municipalities. With 1919 University, IPS assumed an interconnection that has been previously approved for tie-in to the Xcel grid but was not acceptable to the AHJ covering St. Paul. Moving forward, IPS will obtain consent of the AHJ before moving down the path of interconnection with the utility to ensure no significant delays during construction/inspections.
- **Bring on sufficient staff to cover projected busiest periods**
  - Altogether, the Green Line project is the largest solar installation completed by IPS. At times during the interconnection application and design phases, IPS was not staffed sufficiently to respond to all requests and generate deliverables in a manner that kept the project moving as efficiently as possible. The result was 1-2 week delays in updated design documents, approvals on submittal packages and requests from site owners. Since kicking off the Green Line project, IPS has increased the Project Management department from one part-time PM to four full-time PM's and two full-time site supervisors and is well established to handle multiple projects of the same scale as the Green Line simultaneously.
- **Allow for enough time for interconnection application approvals**
  - The Interconnection Application process began in early January 2016 and was not complete for all four sites until September 2016. The reasons for this included an increased workload for Xcel engineers due to the roll out of the Community Solar Garden program and delays on the side of IPS and our sub-contracted engineers in issuing updated drawings to address Xcel engineering concerns. Regardless, the assumed timeline of 40 business days proved to be overly optimistic and has since been updated for all similar projects.
- **Use standardized solar lease agreements.**
  - When securing contracts with the four building owners along the EIC, unique lease agreements were created for each roof. This caused delays as alterations to the contracts were made. If more standardized leases had been used, it would have been easier to get the leases signed in a timely manner and there would have been fewer delays during the signing process

Project Goal Achievement – Private Investment

- Private investment can work
- ‘No money up front’ created attractive option
- Assisted in securing 4 building owners
- Created a playbook for future transactions

Project Goal Achievement – Increase Solar in MN

1,043,844
Pounds of offset CO_2

2,351 Panels
Roof Mounted

1,296,700
Kilowatt hours per year

90 Homes
Powered Per Year

Project Goal Achievement – Performance

https://solarnoc.datareadings.com/

1000 University Avenue
Username: 1000universityprojectinnovation@innovativepowersystems.com
Password: welcome

1000 Westgate Drive
Username: 1000westgateprojectinnovation@innovativepowersystems.com
Password: welcome

1919 University Avenue
Username: 1919universityprojectinnovation@innovativepowersystems.com
Password: welcome

2550 University Avenue
Username: 2550projectinnovation@innovativepowersystems.com
Password: welcome

Conclusion

- Project met all project goals and objectives.
- Private financing based development process will serve as an example to be used for future Minnesota commercial solar projects.
- Production data gathered from the four systems installed will help establish the true benefits of PV to the grid and its effect on building demand.
- Promotional efforts during construction and continued efforts afterwards have showcased these local companies and products in a positive light.
- This project will function as an example of how commercial solar can prosper in the great state of Minnesota.

Take the Green Line Portfolio Tour

https://youtu.be/m83BuGHjoNA

Thank You

Project funding provided by customers of Xcel Energy through a grant from the Renewable Development Fund.