

## SUN POWER ELECTRIC

### *A Solar Electric Utility*

#### PROJECT SNAPSHOT

##### PROJECTS

- 15-kW PV system in North Dartmouth, MA;
- 50-kW system in Conshohocken, PA
- 43-kW system in Middletown, RI

##### TECHNOLOGY

Photovoltaic (PV) panels

##### CO<sub>2</sub> EMISSION REDUCTIONS

58 tons per year

##### INVESTMENT

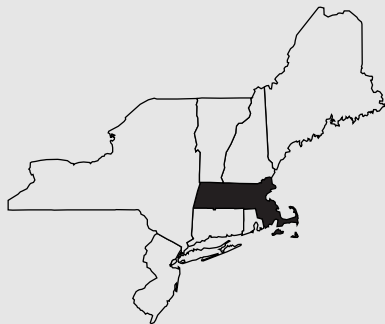
Roughly \$1 million

##### LESSONS LEARNED

The high cost of PV projects can be offset with available state and federal subsidies, and innovative partnerships that lower installation and operating cost.

##### FUNDING SOURCES

Internal funding from Conservation Services Group, and grants from the Rhode Island Renewable Energy Collaborative and the Utility PV Group (UPVG).



#### INTRODUCTION

Photovoltaic (PV) panels generate electricity that does not emit any air pollution. PV, in other words, is the cleanest of clean energy resources. Nonetheless, tapping into the sun's energy remains a relatively expensive proposition, which means that, so far, PV generation has been limited to so-called "niche" applications. But now a creative alliance between a nonprofit PV developer and a large retail chain is demonstrating that some niches are bigger than others, and easier to fill. The collaboration between the developer, Sun Power Electric, and the retailer, BJ's Wholesale Club, represents an important stride forward in making renewable energy real. By siting PV generating systems on the massive, flat roofs of BJ's stores, the Sun Power/BJ's partnership illustrates an innovative way to reduce transaction and installation costs, and capture economies of scale. The green electricity from the systems is sold by Sun Power to retail electricity suppliers who market PV in programs that offer "green energy" to consumers.

#### PROJECT DESCRIPTION

To date, Sun Power Electric has constructed PV arrays on the roofs of three BJ's retail outlets in the Northeast. The first project was a 15-kW PV system on a BJ's store in North Dartmouth, MA. This system consists of 68 PV panels manufactured by ASE Americas of Billerica, MA, and Evergreen Solar, of Waltham, MA. The North Dartmouth plant, in operation since December 1998, produces roughly 19,500 kilowatt-hours (kWhs) of electricity a year, enough to power about three homes. The company's second project, a 50-kW system in Conshohocken, Pa., has been in operation since April 1999. This system utilizes 1,400 PV panels manufactured by BP Solarex, Inc. and generates about 65,000 kWh per year, enough power for about 10 homes. The third project, a 43-kW system in Middletown, RI, consists of 176 panels manufactured by ASE Americas. The Middletown plant produces about 56,000 kWhs per year, enough for nine or so homes.

BJ's offers its rooftops to Sun Power for free, thus lowering siting costs for Sun Power. Because the rooftops of BJ's buildings are standardized, this lowers Sun Power's design and installation costs as well.

An important aspect of the Sun Power PV plants is that their output is offered to consumers willing to pay a premium for green energy – in the same way consumers may pay a little extra for top-quality organic produce or non-toxic cleansers. The nature of electricity adds complexity to the market, however; power generated by a renewable plant is indistinguishable from that of any other type of plant – all kWhs mix together on the regional electricity grid, analogous to streams that flow into a river. In order to sell "green" electricity, generators must separate the environmental attributes of their power plants from the actual energy they generate. Specifically, when a renewable power plant generates a kWh of electricity, the owner of the plant issues a certificate that is offered for sale to retail electricity suppliers. To market renewable energy to consumers, retail suppliers must either purchase these certificates or demonstrate that they hold a valid supply contract with a wholesale renewable generator. Public agencies in several states currently are developing "renewable credit trading systems" to support this type of green energy market.

In the stores with PV panels, BJ's has set up kiosks that educate customers about PV, as well as opportunities to purchase renewable energy in deregulated electricity markets. BJ's also periodically publishes information about its PV arrays in its newsletter, which goes out to some four million people from Maine to Florida. This consumer information is all the more important in light of the novelty and complexity of green energy trading.

#### THE RESULTS

Sun Power's plants in Massachusetts and Rhode Island together are estimated to avoid 57 tons of CO<sub>2</sub> annually, as well as some 160 pounds of NO<sub>x</sub> and 470 pounds of SO<sub>2</sub>. For the CO<sub>2</sub> reductions, this is

equivalent to lowering oil consumption by 104 barrels a year or taking eight typical passenger cars off the road. The BJ's store housing the PV array consumes the electricity that the array produces. But Sun Power retains the right sell green energy credits from all of the BJ's PV power plants to electricity retailers. In Rhode Island and Massachusetts, credits are sold to customers buying Sun Power's "ReGen" electricity-upgrade product. In Pennsylvania, the purchaser is Green Mountain Energy, a retail energy supplier specializing in clean energy. Sun Power's arrangements with retail electricity suppliers are serving as effective real-world models for state regulators who are developing green energy trading systems.

#### LESSONS LEARNED

The most important feature of the BJ's/Sun Power collaboration is that the companies have worked out a wide range of what might be called "sticking points" – matters involving liability, contractual structure, and grid interconnection, among others – and this makes it far easier and less expensive to replicate the PV installation in other BJ's stores. This also enables Sun Power to capture significant economies of scale by reproducing system design, and refining installation techniques and skills. Sun Power estimates that its third project cost half as much to install as its first, due to the company's increased familiarity with roofscape challenges, and standardization of the process.

#### FUTURE COMMITMENTS

Sun Power will soon unveil a new 38-kW PV plant on the roof of an IKEA store in Pittsburgh, Pa. As part of the project, Sun Power notes that Green Mountain Energy will purchase certificates for green electricity from that store for sale to customers in Pennsylvania. In the future, Sun Power also may seek limited liability partners from within the private sector to take advantage of tax benefits available for PV projects.

#### THE PARTNERSHIP

Sun Power is a wholly owned subsidiary of Conservation Services Group (CSG), a company that has been providing energy efficiency services to companies nationwide for 17 years. Based in Westborough, MA, CSG has about 300 employees nationwide.

BJ's Wholesale Club is a chain of retail stores located in the eastern U.S. The collaboration with Sun Power provides benefits to BJ's stores primarily in the form of positive environmental publicity and the opportunity to attract customers interested in home energy equipment. Since the completion of the first Sun Power electric generating station in December 1998, there have been numerous newspaper articles describing project benefits for the local community and the environment.

The collaboration with Sun Power has helped transform BJ's into an enthusiastic project host and an effective source of information about renewable energy. Sara Dill, BJ's Energy Manager, notes that "the partnership with Sun Power provides a great opportunity for BJ's to utilize an abundant resource, our rooftop space, to improve the environment for future generations."

#### CONTACTS

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