



SF Environment

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Solar Group Purchasing Models

I. Overview

Solar group purchasing can greatly reduce the costs of installing solar by leveraging the collective purchasing power of individuals, businesses, or municipal agencies to secure discounted pricing by buying in bulk. Experience has shown that participants favor the integration of group purchasing with emerging solar financing models – including solar leases, power purchase agreements, and property assessed clean energy (PACE) financing – that allow customers to install solar at little or no upfront cost and with monthly costs that are less than what they would otherwise pay for power from their local utility. San Francisco’s Department of the Environment (SF Environment) works directly with local communities to facilitate solar group purchases and provides support through the procurement process.

This paper was prepared by SF Environment and is based upon work funded in part by the U.S. Department of Energy’s Solar America Communities initiative and a SunShot Initiative Rooftop Solar Challenge grant managed by SolarTech.¹ The paper describes six group purchasing programs, each of which targets a different customer class. These programs include: (1) Solar@Work, a group purchasing program for small- and medium-sized commercial properties in the San Francisco Bay Area; (2) Solar@School, a similar group purchase program for private schools in San Francisco; (3) SunShares, an employee group buy program in San Jose; (4) the Silicon Valley Collaborative Renewable Energy Procurement Project (SV-REP), a municipal group purchasing program in Silicon Valley; (5) Solarize Portland, a neighborhood group buy program in Portland, Oregon; and (6) Milwaukee Power Pack, a citywide group purchase program in Milwaukee, Wisconsin. The paper also provides lessons SF Environment learned as a result of its work organizing Solar@Work and Solar@School, which may be useful to other organizations considering similar programs.

II. Solar@Work—Small Commercial Model

SF Environment initiated the Solar@Work program to provide cost-effective options for the traditionally challenging solar market for small- and medium-sized commercial properties. SF Environment began by partnering with World Resources Institute (WRI), a non-profit with experience working with businesses on green power purchasing and organizing group purchase programs, so that WRI could facilitate a non-city-driven process for vendor selection and evaluation. SF Environment then convened a working group that included WRI

¹ SolarTech is a non-profit solar PV industry association chartered to streamline industry business practices that hinder the market growth and adoption of solar PV through hidden costs and delays. SolarTech is one of 22 awardees of the DOE SunShot Rooftop Solar Challenge, leading a team comprised of City & County of San Francisco, Solar Sonoma County, East Bay Green Corridor and Clean Coalition. This team is focused on lowering the costs and burdens of permitting, inspection, interconnection, and finance for solar systems in the greater Bay Area. Visit www.solartech.org to learn more.

Program Facts

- \$4.25 per watt offer
- 70 businesses engaged
- 5 sites contracted
- 157 kW

and local businesses that were potentially interested in installing solar. These businesses were identified from previous solar outreach campaigns and direct inquiries to SF Environment from local businesses. The working group helped review vendor proposals, ultimately selecting SolarCity based on their competitive pricing and financing package, experience in San Francisco, and participation in the City's workforce development and solar incentive program. In addition, it was important that SolarCity was able to offer a pre-negotiated standard offer and standardized financing terms.

SolarCity offered group purchase pricing of \$4.25 per watt installed, which included complete balance of system, permitting, and a performance guarantee covering operations and maintenance. At the time SolarCity was selected, this was 20% below the average price for commercial systems in California. Another important component of the Solar@Work program was the ability to streamline financing to decrease costs. SolarCity proposed and offered three financing options: lease, power purchase agreement (PPA), and capital loan. Ultimately, the PPA was the only financing option used by customers, and moreover, SF Environment found that the multitude of financing options made the program more complicated for potential participants.

In addition to the terms and pricing, another important component of the program was marketing and outreach. In addition to SolarCity's own marketing efforts, SF Environment and WRI organized a comprehensive outreach campaign to identify building owners and publicize the program. The working group also outreached to other commercial property owners to increase program participation. Finally, the City provided technical and legal assistance throughout the program, including free solar site assessments and analyses.

LESSONS LEARNED

The Solar@Work Program was challenging and highly informative. SF Environment identified the follow lessons:

- Majority of small commercial businesses lease their space, and therefore are not able to install solar without an agreement with the owner.
- Concerns over long-term investments persist in an uncertain economic climate.
- Small- and medium-sized commercial organizations and property owners have competing priorities, including current operational issues and needs, planned capital investments, and short-term ROI goals.
- With no mandate or internal sustainability plan, commitment to moving forward quickly is very low.
- Even great economics for solar are still not enough for many businesses when compared to other core projects.
- Deferred maintenance and related repair and upgrade costs can permanently postpone solar projects.
- The vendor and finance communities have compelling offers, but messaging is not well-targeted.
- The fastest movers treated this as a "no-brainer" decision due to economics and alignment with organizational goals.
- The small- and medium-sized commercial market is complex; project champions are needed within the organization to move solar projects forward.

IDEAL SMALL COMMERCIAL PROFILE

The following criteria were identified as the profile of an ideal organization to participate in such a program:

- **Organization:** The commercial property owner should be a for-profit enterprise that has been in business for at least five years. It should be both the property owner and primary tenant in the facility.
- **Site Characteristics:** The site should have a relatively large area available for solar panels (approximately 5,000 to 20,000 sq. ft.) either on the rooftop or in the car parking lot with no shading (current or planned) from surrounding structures or vegetation. The facility should not require any upgrades or replacement to the roof within the next 15 years. Also, the facility's electrical infrastructure should be capable of accommodating the addition of at least a 25kW solar power system.
- **Electricity Consumption:** The current electricity usage at the facility should be at a level that can be offset by at least 60% from the solar system. This goal may be achieved by a combination of energy efficiency measures and proper sizing and design of the solar system.
- **Operational Characteristics:** The organization should have an internal project champion and/or an overall sustainability goal. The organization must be able to manage and integrate solar system and construction into its facilities plan. Access to direct financing can help, but are not required if using PPA or lease financing.
- **Underwriting Criteria:** The buyer must have the ability to execute a long-term purchase contract (lease, loan, or PPA) or directly buy the system out of available capital funds. For ideal program participants, the following financial characteristics are expected:
 - A minimum of three years of financial statements showing positive cash flow with next year projections also positive;
 - Fixed charge coverage ratio of at least 1.30 for the last fiscal year; and
 - Able to provide a bank letter of reference or a current customer.

III. Solar@School—Non-Profit School Model

Program Facts

- 12 schools received site assessments
- 5 vendors responded to RFQ
- Prepay PPA most attractive
- No schools installed due to poor timing and other concerns

SF Environment, with support from solar consulting firm Optony and using a U.S. DOE Solar America Cities grant, developed a group purchasing model specifically directed at private schools in San Francisco. San Francisco public schools receive hydroelectric power from the municipal utility at very low rates, and thus do not have the same financial, nor environmental, motivation to install solar that most schools do. Private schools, though, are excellent candidates for a group purchase model that can drive down solar costs because the schools usually have high utility costs, but also have limited capital to spend on large renovation-type projects. Additionally, private schools are unable to directly access federal tax benefits because of their non-profit tax status. Thus, Solar@School was designed around a third-party model in which the solar integrator accesses the tax benefits, which it can pass along to the school by integrating the savings into the terms of the PPA.

San Francisco Friends School led the Solar@School RFQ development and selection process, along with five participating schools. The RFQ requested group pricing, but outlined individual bids for each school, with a combined capacity of over 350 kW. SF Environment supported the implementation with technical support, including free preliminary site assessments and financial analyses, and by acting as a facilitator by setting up meetings with the stakeholders and supporting the RFQ process.

LESSONS LEARNED

The following key lessons were learned by SF Environment through its work implementing the Solar@School program:

- Work within schools' (long) planning horizon: Many of the schools involved chose not to go solar because it did not align with their timelines to do reroofing or other many renovations and capital investments. Before starting the process, make sure that all parties are aware of any existing renovation plans, as well as roof warranty expiration dates. Also, in terms of a construction schedule, summer installations make much more sense for schools, another factor to consider when planning. Lastly, the administrative structure at most schools requires that decisions go through many different boards and personnel, increasing the timeline. Key stakeholders—board members, CFOs, principals and facility managers—need to be engaged very early on in the process.
- Long commitments, high escalators aren't attractive: Many schools cited the 20-year PPA commitment as too long, and would have preferred a 10-year lease or PPA. Also, schools indicated that the 3.9% PPA escalator was not enough of a hedge against utility rate increases (assumed in financial analyses to be 5% annually). The numbers—upfront costs, cumulative savings, risks, etc—need to be presented in a straightforward manner, while maintaining transparency about any assumptions made in financial models.
- RECs, prepaid PPAs attractive options: Most schools expressed a desire to retain the RECs associated with their solar system. Also, the prepaid PPA, in which the schools pay for 20 years of power at a fixed price up front, is a viable financial option because it both retains the third-party ownership model (which allows the schools to benefit from the tax credits) and allows for a lower PPA price overall (because schools can generally secure financing at a lower rate than solar integrators).

IV. SunShares—Employee Model

Program Facts

- 29 installations
- 140 kW total
- \$4.42 per watt
- Financing at 3.99%

The City of San Jose developed the SunShares pilot program, a residential solar group purchasing model for city employees and retirees. The purpose was to serve as a replicable model to assist employees of local and state government agencies in going solar. The program helped individual homeowners navigate the often complex logistics of procuring, financing, and installing residential solar electric and water heating systems. The key to the success of the SunShares program was securing both a low-interest financing option, and a low, standardized installation price – both possible thanks to the buying power of the group. The City negotiated

with the San Jose Credit Union to develop a solar loan at a 3.99% interest rate. Then, in coordination with the credit union, they issued an RFP for a solar vendor that resulted in group pricing of \$4.42 per watt² – significantly below average residential installation rates at that time.³ Finally, the City offered informational sessions, which over 130 employees attended, and designated point employees to facilitate the program. The combination of

² Meehan, Chris, "San Jose solar pilot program sees success." CleanEnergyAuthority.com, March 30, 2011 (<http://www.cleanenergyauthority.com/solar-energy-news/sunshares-solar-discount-program-033011/>).

³ The average installed cost of residential systems in Santa Clara County in the first half of 2010 was about \$7.50 per watt.

willing financial partners, solar contractors, city facilitation, and the negotiating power of large groups resulted in 29 employees installing 140 kW of solar through the program.⁴

For more information, visit: <http://energy.sanjoseca.gov/solar/PDFs/SunSharesGuide.pdf>

V. Silicon Valley Collaborative Renewable Energy Procurement (SV-REP)—Municipal Agency Model

Program Facts

- 9 local governments participated
- 70 installations at 40 sites
- 14.4 MW total
- Site aggregation reduced costs by 12%

Joint Venture Silicon Valley is a public-private network based in San Jose, CA, which tasks itself with “bring[ing] together established and emerging leaders—from business, government, academia, labor and the broader community—to spotlight issues and work toward innovative solutions.”⁵ One part of Joint Venture’s work is a Public Sector Climate Task Force, which brings together representatives of Silicon Valley local governments to identify and implement solutions to reduce greenhouse gas emissions from public agency operations. In 2008, the Public Sector Climate Task Force decided to launch the Silicon Valley Collaborative Renewable Energy Procurement (SV-REP) project with the goal of bringing municipalities together to identify potential solar sites on municipal properties, negotiate a better group rate with contractors, and create a standardized financing and procurement process. Nine local governments participated in the SV-REP project, identifying 70 installations at 40 locations that totaled 14.4 MW of PV.⁶ The sites – municipal facilities such as ports, agency offices, yards, and community centers – were bundled into large-, medium-, small-combined-, and small-rooftop, and RFQs were issued for each bundle. Sunpower Corporation won the large bundle, Borrego Solar won the medium, and Ecoplexus won the two small bundles.

The SV-REP project resulted in significant savings for the program participants. Joint Venture reports that:⁷

- Site aggregation reduced installation costs by 12%;
- Electricity cost savings per participant over the 20-year PPA term are expected to average 8% less than the local utility’s pricing;
- Program participants saved 75 to 90% in administrative costs and time compared to an individual (non-collaborative) procurement; and
- Program participants were able to achieve more favorable contract terms than they would have otherwise.

Joint Venture published an excellent best practices document, which gives a step-by-step process on how to best engage participants, negotiate contracts, etc. To access the document, visit:

www.jointventure.org/purchasingpower

⁴ Foster, Michael (City of San Jose). Interview by SF Environment.

⁵ “About Us” Joint Venture Silicon Valley. Accessed September 17, 2012. (<http://www.jointventure.org/#>).

⁶ Jenna Goodward et al, “Purchasing Power: Best Practices Guide to Collaborative Solar Procurement.” World Resources Institute and Joint Venture Silicon Valley. 2011. (www.jointventure.org/purchasingpower)

⁷ Goodward et al, Pg 39.

VI. Solarize Portland—Neighborhood Model

Program Facts

- 130 installations
- 350 kW total
- Completed in six months

Solarize Portland is a neighborhood residential group purchase program in Portland, Oregon. Solarize Portland pioneered the group buy model on a neighborhood level and it has since spread across Oregon and beyond.⁸ A community based effort, it was started by representatives from two non-profit organizations, Southeast Uplift and the Mt. Tabor Neighborhood Association, that organized residents of Southeast Portland and helped them understand the process of going solar.⁹ The first Solarize campaign resulted in 130 new installations

totaling 350 kW in just six months. After the success of the first Solarize campaign in southeast Portland, the City of Portland’s Bureau of Planning and Sustainability became involved, helping to spread the program to other neighborhoods. (The Bureau of Planning and Sustainability also supports the city’s free solar map, which allows interested residents to enter their address and see the solar potential and probable payback.)

In Portland, each successive Solarize campaign looked slightly different, but there were common elements that led to success.¹⁰ First, the program used a competitive process to select contractors, sometimes selecting two contractors for a single neighborhood. Ultimately, however, it was the decision of citizen volunteers to select solar installers on behalf of their neighbors. Another key element to Solarize Portland’s success was community-led outreach supported by local neighborhood associations. For example, neighbors distributed fliers and spoke at workshops, delivering a direct appeal from one friend to another to join the campaign. As a result, the community became invested in the success of the project and the contractors were able to save on marketing costs because the company did not need to spend as much time generating leads. Finally, like most group buy models, Solarize campaigns were always a limited-time offer, which pushed potential customers to participate while they could.

For more information, visit: <http://www.portlandoregon.gov/bps/51902>

VII. Milwaukee Power Pack—Citywide Model

Program Facts

- 10 installations
- 28 kW total
- Use locally manufactured panels and inverters

Milwaukee Power Pack is a citywide group purchase program being piloted in 2012 by the City of Milwaukee, Wisconsin and the Midwest Renewable Energy Association (MREA). The program is supported a U.S. DOE SunShot Initiative Rooftop Solar Challenge grant.

During its first three-month pilot, Milwaukee Power Pack partnered with eight local NABCEP-certified installers, a local solar panel manufacturer, Helios Solar Works, and a local inverter manufacturer, Ingeteam. MREA conducted extensive outreach and marketing in Milwaukee to identify potential customers across the city and further educate them about opportunities to install solar. Ultimately, the program reached over 100 interested parties, helping 15 to receive

⁸ See example in Beaverton, Oregon (www.icleiusa.org/action-center/learn-from-others/case-study-city-led-solarization-in-beaverton-or); See also Solarize Washington, Solarize Massachusetts, and other examples in Linda Irvine et al, “The Solarize Guidebook: A community guide to collective purchasing of residential PV systems.” 2011. (<http://www.nrel.gov/docs/fy12osti/54738.pdf>)

⁹ “Solarize Portland” The City of Portland, Oregon. Accessed September 17, 2012 (<http://www.solarizeportland.org/index.html>).

¹⁰ Linda Irvine et al, “The Solarize Guidebook: A community guide to collective purchasing of residential PV systems.” Pg 6 (2011).

bids from the program's qualified installers.¹¹ Milwaukee Power Pack differs from most group purchase programs in that there is no negotiated price for group participants. This has meant that installers compete among one another for bids. However, all projects that come to installers through Milwaukee Power Pack are required to use Helios panels and Ingeteam inverters. (Exceptions can be made depending on an application, such as battery storage.) In exchange, Helios and Ingeteam offered a limited time discount to installers in the program. The final component to the program is the availability of Milwaukee Shines Solar Financing. The financing is a partnership between the City of Milwaukee and Summit Credit Union. The City has provided Summit \$100,000 in loan loss reserve; in return Summit has offered \$2 million in financing at an interest rate ranging from 3.5% to 5.5% (prime plus 2.25%). Notably, city residents can use the financing for all expenses associated with the solar project, including reroofing. During the first pilot, from May through July 2012, 10 customers participated, installing 28 kW at an average cost of under \$5 per watt. A second pilot will be running from October through December 2012, with a full report to be issued in early 2013.

For more information on Milwaukee Power Pack, visit: www.MilwaukeeShines.com

VIII. Additional Resources

Below is a list of resources for group purchasing models for further research and strategic planning.

BAY AREA SOLAR GROUP PURCHASING ORGANIZATIONS

- 1BOG (www.1bog.org)
- Group Energy (www.mygroupenergy.org)

SOLAR GROUP PURCHASING GUIDES

- *Purchasing Power: Best Practices Guide to Collaborative Solar Procurement*, World Resources Institute, 2011. (www.wri.org/publication/purchasing-power)
- *San Jose SunShares: Go Solar with Group Buying Power*, City of San Jose, 2010. (energy.sanjoseca.gov/solar/PDFs/SunSharesGuide.pdf)
- *The Solarize Guidebook: A community guide to collective purchasing of residential PV systems*, U.S. Department of Energy, 2011. (<http://www.nrel.gov/docs/fy12osti/54738.pdf>)
- *Solar Powering Your Community: A Guide for Local Governments*, Chapter 2.7, U.S. Department of Energy, 2011. (www4.eere.energy.gov/solar/sunshot/resource_center/sites/default/files/solar-powering-your-community-guide-for-local-governments.pdf)

For more information, contact the San Francisco Department of the Environment at (415) 355-7000 or environment@sfgov.org.

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¹¹ Heart, Amy (City of Milwaukee). Interview by SF Environment.