



SF Environment

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A Department of the City and County of San Francisco



Community Shared Solar

I. Summary

Community shared solar is a new and growing model for broadening local solar markets and extending the benefits of solar energy to new customers. By expanding access to solar energy, community shared solar can be a useful tool for San Francisco and other jurisdictions that seek to expand use of distributed, local solar power. To help educate stakeholders, including other Rooftop Solar Challenge partners and other cities, this paper discusses: (1) the basics of community shared solar; (2) the benefits of community shared solar; (3) variations in design of community shared solar programs; (4) examples of community shared solar program; (5) California's regulatory context; and (6) community shared solar's potential to expand San Francisco's solar market.

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II. What is Community Shared Solar and Why is it Important?

"Community shared solar" is the term most often used to describe solar photovoltaic (PV) systems that supply electricity to multiple customers within a geographic region (e.g., neighborhood, city, utility service area). In many ways, community shared solar is similar to on-site solar. Participants make upfront or ongoing payments to subscribe to a portion of a solar system or the rights to a portion of the system's output. Then, as the system produces electricity, participants receive credit on their energy bill based on their pro rata share. As with on-site solar, the electricity produced by the solar system offsets charges for the participant's monthly electricity use.² Community shared solar does not require the solar system to be located on a participant's property, though, allowing multiple participants to invest in and benefit from a single, centralized PV system.

Community shared solar is an important tool to expand access to solar energy for utility customers who otherwise would be unable to benefit from solar. This includes those who rent, lack an appropriate site for solar on their property, do not have the financial resources needed to meet the up-front costs of investing in solar energy on their property, or simply are not interested in hosting on-site solar. Moreover, allowing systems to

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.

² The term "community solar" is sometimes used to describe projects in which participants receive their financial benefit in the form of a check, much like a traditional investment. For the purposes of this paper, "community shared solar" denotes programs in which participants receive their financial benefit on their utility bill.

serve multiple participants can create economies of scale in the sizing of a facility, and allowing for systems to be located off-site can enable the use of locations with better solar potential. Both of these factors can lower the overall costs of participation.

III. Local Benefits of Community Shared Solar

By increasing the number of residents and businesses who can invest in solar and by allowing for off-site installations, community shared solar creates many local benefits. In particular, community shared solar:

- Reduces greenhouse gas emissions and emissions of other air pollutants from electricity demand;
- Supports the local solar industry and fosters local green jobs;
- Democratizes the benefits of solar and enables more residents and businesses to take part in the “clean economy” – particularly important in regions where all ratepayers help fund solar incentive programs;
- Enables participants to keep their solar energy when they move (within the eligible territory);
- Enables use of sites with high solar potential that would otherwise remain undeveloped due to regulatory barriers or lack of financial impetus (e.g., parking structures, warehouses, landfills);
- Increases financial viability due to increased and reliable consumer demand, economies of scale from larger systems and use of best sites with highest solar potential; and
- When located in the communities it serves, reduces transmission and distribution costs compared to utility-scale electricity generation.

IV. Variations in Program Design

Aside from the basic concept of multiple customers sharing the benefits of a single solar system, community shared solar can take various forms. Below are a few key variations in how programs have been designed.

- **Ownership**—One variation among community shared solar projects is who develops and owns the solar system. Some systems have been initiated by private developers (either for-profit or non-profit), others have been initiated by the local utility, and others have been initiated by the customer participants themselves. In addition, projects can be sited either on property owned by the system owner, or on the property of a third-party.
- **Participation**—Another variation lies in how customers participate. Some community shared solar programs offer customers an ownership stake in the solar array, while other programs have customers subscribe rather than own. In addition, in some programs customers purchase a share of system capacity (e.g., 1 kW), and in others they purchase a share of system output (e.g., 100 kWh).
- **Valuing the solar energy**—A major variation is how the value of the solar energy is credited to customers on their utility bill. Some programs credit the energy produced (kWhs) to customers’ utility bills just like net

metered³ systems, offsetting kWhs used on site. Others directly credit a monetary value to customers' bills based on a pre-determined rate. This distinction is important because it determines whether the value of the solar energy is administratively determined (i.e., dollars per kWh) or whether the value will be different for each participant based on the amount the participant pays the utility for electricity.⁴ (This is a particularly important distinction in states, such as California, that have tiered electricity pricing structures). Valuing solar energy production by crediting the kWhs to customers bills is sometimes referred to an "embedded cost approach" while valuing production at an administratively determined rate is sometimes referred to as a "value based approach." Another component to valuing solar energy is whether community shared solar customers pay their utility for distributing the solar electricity from the community shared solar system to their home.

- **Geographic proximity**—Another variation among community shared solar programs is the geographic proximity required between program participants and the solar installation. Participants can be required to be in the same utility territory, the same county, or even the same neighborhood (on the same distribution line) as the solar installation.
- **Utility compensation**—A final variation lies in how utilities are compensated for administering the program and distributing the power. This may be a fee worked into the agreement with the community shared solar developer or regulated by a state public utilities commission, by retaining the distribution charges, or even in some cases by allowing the utility to retain the RECs from the project. (For example, Xcel Energy offers community shared solar as part of its RPS obligation.)

V. Examples of Community Shared Solar Programs

Below are a few examples of community shared solar programs in the U.S.

- **Sacramento Municipal Utility District: SolarShares**—The Sacramento Municipal Utility District's (SMUD) SolarShares program allows SMUD customers to purchase a portion of the energy generated from a 1 MW solar PV installation in Sacramento County. A third-party owns the PV system, and sells the power to SMUD through a power purchase agreement (PPA). SMUD then resells the electricity to its SolarShare customers in increments of 0.5 kW, up to 4 kW. (Prices range from \$4 to \$50 each month.) In exchange, SMUD credits the electricity produced to each participant's energy bill each month. The credit per kWh is the same as what the customer would earn from a net metered rooftop system, which values solar energy at the customer's full retail rate.⁵ The program maintains about 700 participants and SMUD is now planning a 1MW expansion. Learn more about SMUD's program at: <https://www.smud.org/en/residential/environment/solar-for-your->

³ Net metering is an accounting method that enables customers to use their own generation from on-site renewable energy systems to offset their consumption over a billing period by allowing their electric meters to turn backward when they generate electricity in excess of their demand, *enabling customers to receive retail prices for the excess electricity they generate*. It allows customers to "bank" their energy and use it at a different time than it is produced, giving customers more flexibility and allowing them to maximize the value of their production. (US DOE)

⁴ Joseph Wiedman, "Community Renewables Model Program Rules," Interstate Renewable Energy Council, November 2010, pg 5.

⁵ The full retail rate of electricity includes charges for generation, transmission, distribution, and various fees and taxes.

[home/solarshares/](#)

- **Seattle City Light: Community Solar**—Seattle City Light (SCL), a public utility, initiated a community shared solar program with the help of the Department of Energy’s Solar America Cities Program. SCL has completed its first project, installing three solar-covered picnic shelters at Jefferson Park that total 23 kW. SCL divided the system into 500 “solar units,” allowing customers to purchase one or two units for a one-time cost of \$600 per unit. Each unit is expected to produce about 50 kWh annually. Each year, through June 2020, customers receive a credit on their bill equal to the value of their portion of solar electricity produced. Customers are credited at a rate of about \$0.07/kWh for the electricity, plus \$1.08/kWh for Washington State Renewable Energy Credits.⁶ Based on the success of the Jefferson Park project, SCL is now planning a second project. Learn more about SCL’s program at: <http://www.seattle.gov/light/solar/community.asp>
- **Tucson Electric Power: Bright Tucson Community Solar**—Tucson Electric Power’s (TEP) community shared solar program allows customers the opportunity to purchase solar power in blocks of 150 kWh per month, with each block offsetting 150 kWh of traditional power on the customer’s bill. The solar power costs customers \$0.02 per kWh more than traditional power does today. However, because the price is locked in for many years, it acts as a hedge against future rate increases. In 2011, TEP had 3,600 blocks available through a 1.6 MW installation at the University of Arizona. TEP has committed to meeting additional demand through new solar systems in the Tucson metropolitan area. Learn more about TEP’s program at: <https://www.tep.com/Renewable/Home/Bright/>
- **Clean Energy Collective**—Clean Energy Collective, LLC (CEC) is a private community shared solar developer that has created a member-owned model that enables individuals to directly own panels in a community shared solar system. CEC works with local utilities to negotiate a PPA or feed-in-tariff contract that determines the rate at which the utility will purchase the electricity the solar system produces. In addition, CEC arranges for payment for power production to be delivered to customers via an on-bill credit. Customers can then purchase a share of the system with an upfront payment (\$/kW) and receive credit on their bill at the rate (\$/kWh) that the utility purchased the electricity. CEC has worked with utilities in Colorado, New Mexico, and Minnesota to create community shared solar programs for their customers. Learn more about CEC at: <http://www.easycleanenergy.com>
- **Xcel Energy: Solar Rewards Community**—Xcel Energy recently launched a three-year pilot community shared solar program in Colorado called Solar Rewards Community. The program allows for-profit and non-profit organizations to develop community shared solar systems of up to 2 MW. The project developers are responsible for signing up customers to their system. Each system must have at least ten subscribers and, except for small counties, all subscribers must be located within the same county as the solar system. Subscribing customers must subscribe to at least 1 kW and to no more than 120% of their historical annual electricity usage. Each subscribing customer receives a monthly bill credit expressed in dollars. The credit is equal to the subscriber’s share of the solar system’s production times the utility’s total aggregate retail rate,

⁶ The base rate for Washington’s incentives for community solar is \$0.30/kWh, but multipliers for using modules and inverters manufactured in Washington increased the incentive for this project to \$1.08/kWh.

less a delivery fee. Xcel Energy’s initiation of the program was required by Colorado’s Community Solar Gardens Act (HB 10-1342). Learn more about Xcel’s program at:

http://www.xcelenergy.com/Save_Money_&_Energy/For_Your_Home/Renewable_Energy_Programs/Solar*Rewards_Community_2_-_CO

- **Delaware Net Metering Rules**⁷—In 2011, the Delaware Public Service Commission revised the state’s net metering rules to allow retail customers to obtain net metering benefits from off-site renewable energy facilities, including solar systems. The new rules credit customers that are on the same distribution feeder as the renewable facility in kWh for both generation charges and delivery services (i.e., full retail rate). Customers that are not on the same distribution feeder are credited in kWh for only the generation charges. Delmarva Power & Light, the investor-owned utility in Delaware, is allowed to credit customers through a credit on their utility bill or through a separate check. (Delmarva has chosen to cut separate checks.) Learn more about Delaware’s net metering rules at:
<http://www.depsec.delaware.gov/electric/reg49%203001%20PSC%20Proposed.pdf>

VI. California Regulatory Context

CURRENT LAW

Any utility in California can establish a community shared solar program, as SMUD has done with its SolarShares program and San Diego Gas & Electric is considering with its Share the Sun proposal.⁸ However, there is no requirement that utilities offer community shared solar programs or enable private community shared solar projects. Even in utility territories where community shared solar is pursued there are legal and tax issues that must be addressed. One important issue is ensuring that the owners of privately-held community shared solar systems are not classified as public utilities. Securities law is another concern. Each project, depending on its design, must determine what federal and state securities laws may apply. If project participants take an ownership stake in the community shared solar project, then securities issues are typically more complicated.

In areas where the local utility is not interested in pursuing community shared solar, there are limited options for sharing the value of a solar system. One bright spot is recent changes to the state’s net metering rules. Historically, the California Public Utilities Commission (CPUC) required that solar systems be directly tied to a customer’s own meter in order to receive net metering credit on their utility bill. Applying credit from a solar system not attached to a customer’s meter—referred to as “virtual net metering” (VNM)—was limited to tenants of multi-family affordable housing developments with on-site solar. However, in July 2011, the CPUC ordered that utilities expand VNM to all customers, but limited its use to solar systems located at the same service delivery point (SDP) as the customer’s meter.⁹ The SDP is the point at which the customer-owned electrical system meets the utility distribution system. Thus, by allowing for VNM behind a given SDP, customers

⁷ Delaware. Public Service Commission. In the Matter of the Adoption of rules and Regulations to Implement the Provisions of 26 *DEL.C. CH. 10 Relating to the Creation of a Competitive Market for Retail Electric Supply Service*. N.p., 19 Apr. 2011. Web. 7 Aug. 2012.

<http://www.depsec.delaware.gov/electric/reg49%203001%20PSC%20Proposed.pdf>.

⁸ CPUC, Application of San Diego Gas & Electric Company for Authority to Implement Optional Pilot Program to Increase Customer Access to Solar Generated Electricity (January 17, 2012) <http://docs.cpuc.ca.gov/efile/A/157735.pdf>

⁹ CPUC, D. 11-07-031, California Solar Initiative Phase I Modifications, R 10-05-004, at 13-18 (July 14, 2011).
http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/139683.pdf

at multi-unit residential or commercial buildings are now able to jointly benefit from on-site solar installations. While this is a marked improvement over previous limitations on net metering, customers are still unable to receive credit on their utility bill for investments in solar systems located off-site, and many multi-tenant buildings do not have appropriate or sufficient space for solar installations.

PROPOSED LAW

In the 2011/12 session, the California Legislature considered a bill, SB 843, that would have created a 2 gigawatt statewide community shared solar program. While the bill received considerable public attention, it ultimately failed to pass out of the state Assembly. Solar advocates have vowed to continue pursuing the legislation in 2013.¹⁰

Specifically, the bill would have created the Community-Based Renewable Energy Self-Generation Program, allowing private developers of solar and other renewable energy projects to sell electricity to investor-owned utility customers, and require that community shared solar participants be credited on their electricity bills. The final version of the bill envisioned two ways for calculating the credit that participants receive on their bill. The basic method would have credited customers using the “weighted average time-of-delivery adjusted cost of electricity [established by the CPUC] for renewable energy resources of comparable size to, and utilizing the same generating technology as, the community renewable energy facility.”¹¹ The secondary method would have credited participants based on an evaluation of the “locational value” of the electricity. Locational value was defined to include costs and benefits associated with “avoided transmission line loss, avoided transmission and distribution infrastructure costs, reduction in operating and maintenance costs, and the offset of peak demand or shifting load.”¹² The second method was to be used if it resulted in a greater credit to customers than the primary method. Other key provisions of the bill would have allowed individual solar systems as large as 20 MW, clarified that participants would not be considered public utilities, and that state securities law would not apply to program participants.

VII. Community Shared Solar Could Remove Market Barriers in San Francisco

San Francisco currently has 20.3 MW of solar PV from 3,187 systems installed across the city, producing roughly 28,000 MWh of electricity annually. This marks a five-fold increase in the amount of solar installed in San Francisco over just five years. Notwithstanding these successes, San Francisco has the technical potential for far more solar to be installed (as much as 400 MW, based on citywide solar resource and rooftop shade analysis¹³) Meeting the city’s solar potential will require further developing the local solar market, harnessing new demand for renewable energy, and eliminating existing market barriers. Fortunately, community shared solar could play an important role in overcoming obstacles blocking the maturation of a solar market in San Francisco.

¹⁰ Lillian, Jessica. "Major Community Solar Bill Falls Short In California: What Went Wrong?" *Solar Industry*. N.p., 4 Sept. 2012. Web. 4 Sept. 2012. http://solarindustrymag.com/e107_plugins/content/content.php?content11080.

¹⁶ SB 843, 18. California State Legislature. 2012. <http://leginfo.ca.gov/pub/11-12/bill/sen/sb_0801-0850/sb_843_bill_20120824_amended_asm_v93.pdf>

¹² SB 843, 12.

¹³ Estimate by SF Department of the Environment’s solar mapping analysis using CH2MHill’s S.A.F.E. software.

One way that community shared solar could improve San Francisco's solar market is by creating a financial impetus for the City and County of San Francisco (the City) to more fully utilize solar resources on city-owned property. Currently, the City lacks a financial incentive to utilize these solar resources because City departments receive their electricity from the San Francisco Public Utilities Commission's (SFPUC's) hydroelectric power system. This century-old system produces power at a very low cost. At the same time, the SFPUC estimates that there is 45 MW of solar potential on city-owned property, including property outside city limits. Most of the property outside city limits, which is part of the SFPUC's Hetch Hetchy water supply system that brings water from the Sierra Nevada Mountains, has better solar resources than what is found in San Francisco's city limits. A local community shared solar program could give the SFPUC and other city departments a financial incentive to install solar on city-owned property and sell the power to local customers.

Community shared solar could also improve San Francisco's solar market by enabling more San Francisco residents and businesses to invest in solar energy. The majority of San Francisco residents live in multi-family buildings, rent, or both: two-thirds of residential units are in multi-family buildings and 60% of San Francisco households rent. Community shared solar would allow renters and others who cannot install solar onsite to purchase solar energy for their home or business.

VIII. Additional Resources

- *A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development*, National Renewable Energy Laboratory, 2012 (www.nrel.gov/docs/fy12osti/54570.pdf).
- *Community Renewables: Model Program Rules*, Interstate Renewable Energy Council, 2010 (http://irecusa.org/wp-content/uploads/2010/11/IREC-Community-Renewables-Report-11-16-10_FINAL.pdf).
- *Shared Solar* [website], The Vote Solar Initiative, 2012 (<http://votesolar.org/sharedsolar/>).
- *SB 843 Bill Documents* [website], Official California Legislative Information, 2012 (http://leginfo.ca.gov/cgi-bin/postquery?bill_number=sb_843&sess=CUR&house=B&author=wolk).

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